EFFECT OF DARK PATTERN ON TOURISM INDUSTRY

A thesis submitted in the partial fulfilment of the requirement for the degree of

MASTER OF ARTS IN PSYCHOLOGY

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Abstract

Dark Patterns are design tricks that manipulate users into making choices they might not genuinely want, by exploiting cognitive biases. Despite their impact, research on these deceptive tactics in the tourism industry remains limited. This study examines how dark patterns influence consumer purchase intentions (PI) and fear of missing out (FOMO) on online travel booking platforms. To do so two experiments are performed. Experiment one tested social proof (activity message, positive testimonial, negative testimonial) across three categories of tourism (package, hotel, flight) using a mixed factorial design. Its results showed that positive testimonials increased purchase intentions, while activity messages heightened FOMO in participants. Experiment two, tested scarcity appeals (countdown timer, limited supply) across the same categories using mixed factorial design. Its results revealed that limited supply scarcity does increase purchase intention more in comparison with countdown timer, but neither scarcity appeal significantly affected FOMO. Experiment three, tested high anchor and low anchor across the same categories u ko sing mixed factorial design. Its low anchor condition produced slightly higher scores compared to the high anchor condition but neither anchor significantly affected FOMO. Findings indicate while positive testimonials and limited supply scarcity and low anchor effectively boost consumers' purchase intentions, their impact on FOMO varies, suggesting room for more targeted and ethical marketing strategies.

Keywords: Dark Patterns, Social proof, Scarcity appeal, Anchoring Effect, Purchase intention, Fear of missing out

CERTIFICATE

This is to certify that the thesis entitled, 'EFFECT OF DARK PATTERN ON TOURISM INDUSTRY' is being submitted in partial fulfilment of requirements for the award the of the degree of Master of Arts in Psychology, presented in the Thapar School of Liberal Arts & Sciences, Thapar Institute of Engineering and Technology, Patiala is a bonafide work carried out under the supervision of Dr.Ipshita Chowdhury, Assistant Professor , Thapar School of Liberal Arts & Sciences, Thapar Institute of Engineering and Technology, Patiala and that no part of this project has been submitted for the award of any other degree.

(ROOPAN GILL)

This is to certify that the above statement made by the student concerned is correct and true to the best of my knowledge.

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CANDIDATE'S DECLARATION

I hereby declare that the work presented in this thesis entitled, 'EFFECT OF DARK PATTERN ON TOURISM INDUSTRY' submitted in partial fulfilment of requirements for the award the of the degree Master of Arts in Psychology, presented in the Thapar School of Liberal Arts & Sciences, Thapar Institute of Engineering and Technology, Patiala, is an authentic record of my work carried out under the supervision and guidance of Dr.Ipsita Chowdhury , Assistant Professor, Thapar School of Liberal Arts & Sciences, Thapar Institute of Engineering and Technology, Patiala and refers other researchers' work which are duly listed in the reference section.

The matter embodied in this thesis has not formed the basis for awarding any other degree at this or any other university.

Date- June, 2025

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This is to certify that the above statement made by the student concerned is correct and true to the best of my knowledge.

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CHAPTER 1: INTRODUCTION

ONLINE TRAVEL BOOKING

In recent years, internet connectivity, usage, and online shopping have risen dramatically, so online shopping is very popular nowadays. Technology has revolutionized the tourism industry, leading to smart tourism and advanced online travel services (K. Kim et al., 2023). Research has shown that 80% of travelers check hotel details on websites, and 67% book their stay online. Thus nowadays, people prefer using online booking platforms like OpenTable and Expedia to easily reserve hotel rooms, restaurant tables, flights, and tour packages (Huang et al., 2019) and even use meta-search engines like Google Flights and Kayak to help users find best travel deals (K. Kim et al., 2023). Online travel booking has experienced a leap forward, largely due to the convenience of digital technologies. Today, consumers are more inclined to use platforms like Booking.com and MakeMyTrip.com to reserve hotel rooms, restaurant tables, flight seats, and more (Huang et al., 2019). Online booking portals and platforms have become a critical revenue generator for the travel industry, empowering consumers to easily compare prices, review offers, and book accommodations through mobile or desktop applications (Teubner & Graul, 2019).

However, it is also important to understand that these online portals also use certain tactics to pressure customers to buy or book while using them. For instance, while browsing for accommodation on platforms like Booking.com or Expedia, consumers often see alerts indicating that most rooms are nearly sold out, having been booked over 78 times in the past 24 hours (Teubner & Graul, 2019).

Although some studies have examined dark patterns in website interactions, their impact on user experience remains largely unexplored. Even though existing research has analyzed certain aspects of how dark patterns affect users, including perceived manipulation (Gray et al., 2021) and their influence on annoyance levels and brand trust (Voigt et al., 2021). However, studies investigating their broader effects on overall user experience and user's willingness to revisit websites especially in the case of travel websites are still scarce.

DARK PATTERN

The term "dark patterns" was given by Harry Brignull in 2010 (Mathur et al., 2019), a UX designer specializing in deceptive design practices within user interfaces describes them as

deliberately crafted elements intended to mislead users into taking unintended actions, such as purchasing insurance alongside their order or enrolling in recurring payments (Brignull, 2023). Thus dark patterns are deliberately crafted user interface elements designed to influence users into taking actions they might not typically choose, ultimately serving the interests of an online service (Calawen, 2022). These tricks are not random, they are carefully planned using knowledge of human behavior to make the company benefit more than the user (Gray et al., 2018). They have been around for a long time and are some of the most commonly used misleading strategies online. They take advantage of people's thinking habits to trick them into buying things they didn't mean to (Kim et al., 2023).

These are misleading strategies used both online and offline to trick consumers. Online dark patterns are built into websites and apps to take advantage of people's thinking for profit. These tactics seek to boost sales, subscriptions, and profits by manipulating how consumers act (W. G. Kim et al., 2020). Even though they are used to persuade consumers, they are negative in nature, as they practice distorted persuasion and manipulation, which compel users to make choices that are contrary to their best interests without their informed consent (Gray et al., 2018). Brignull (2013) earlier gave a typology of dark patterns like Bait and Switch, Disguised As, Forced Continuity, Friend Spam, Hidden Costs, Misdirection, Price Comparison Prevention, Privacy Zuckering, Roach Motel, Sneak into Basket, and Trick Questions that are used by websites to deceive consumers. Recent research has led to the development of various taxonomies, each serving distinct purposes and stemming from different fields of expertise. Behavioral economists and HCI researchers often integrate psychological principles into their frameworks. For example, Mathur et al. (2019) connect deceptive design patterns to cognitive biases, while Gray et al. (2018) base their taxonomy on UX/UI literature, highlighting design considerations (Brignull, 2023).

Mathur et al. (2019) analyzed 1,254 websites, identifying 15 types of dark patterns grouped into seven categories: Sneaking, Urgency, Scarcity, Misdirection, Social Proof, Obstruction, and Forced Action. Many of these exploit cognitive biases, such as scarcity bias, default effect, and framing effect, thus increasing the user's susceptibility to manipulation.

DARK PATTERNS AND TOURISM INDUSTRY

While dark patterns are widely recognized as deceptive practices in the realm of online shopping, there is a notable lack of research on this topic within tourism literature (K. Kim et al., 2023) and there are very few studies that examine these deceptive online marketing tactics in the case of the tourism industry. Kim et al. (2020) studied how online travel agencies (OTAs) use deceptive tricks to influence customers. They grouped these tactics into four main types: fake discount offers that take advantage of how people compare prices, hidden fees that make people feel stuck in their purchase, notifications that push customers to follow the crowd, and messages about limited availability that create pressure to buy quickly. Thus these strategies play on people's natural thinking habits and can lead them to make decisions they might regret.

TYPE OF DARK PATTERNS IN TRAVEL INDUSTRY

SOCIAL PROOF

It is the practice of individuals seeking guidance from the behaviors and beliefs of others when forming their own opinions (Zamfir, 2024). The 'Social Proof' tactic speeds up user decisions and purchases by leveraging the natural tendency to follow what others are doing. This dark pattern takes advantage of the bandwagon effect, a thinking habit where people are more likely to follow others' actions when they see many people doing the same thing (Mathur et al., 2019). Evidence from earlier studies shows that likelihood of impulse buying increases when individuals shop alongside their friends and relatives (Luo, 2005), as social proofing is prevalent when individuals struggle to identify the suitable behavior and assume that their peers have a better understanding of the repercussions of their decisions. This is also termed 'herd mentality (Jain, 2024). Moreover, when consumers observe that a product is highly sought after or that numerous others are buying it, they are more inclined to view it as valuable and deserving of purchase (Zamfir, 2024), as social proof reveals how well-received a product or service is by consumers (W. G. Kim et al., 2020). On top of that Social proof appeals, often featuring reviews from other consumers, are considered more effective than traditional marketing communications. This is due to the perception that reviews provide more relevant and trustworthy information compared to that from marketers (Gretzel & Yoo, 2008).Thus Online retail websites acknowledge this trend,

and according to Mathur et al. (2019), there are two manipulative strategies that utilize social proof: Activity Notifications and Testimonials.

Activity Notifications

The 'Activity Notification' dark pattern is characterized by its temporary and often repetitive nature, presenting messages on product pages that reflect the activities of other users (Mathur et al., 2019). In their 2019 study, Mathur et al. differentiate between various types of messages: dynamic messages concerning products (e.g., 'John from Denver saved $28 on a new radio'), static messages related to shopping carts (e.g., '23 people added this item to their basket'), and messages that reflect product views (e.g., '78 people viewed this product in the last 24 hours').
These tactics leverage the bandwagon effect cognitive bias to expedite purchasing decisions. When the websites of online travel agencies showcase the activities of other users, consumers are encouraged to purchase the product or service due to the influence of the 'bandwagon effect' (W. G. Kim et al., 2020). All in all, Activity Messages can be either truthful or misleading. As a result, truthful Activity Messages may serve a potential customer well. On the other hand, misleading Activity Messages are either shown randomly or persistently, which we define as a dark pattern (Tiemessen, 2022).

Testimonials

This relates to the employment of customer testimonials where the origin and the process of their acquisition are not explicitly defined (Mathur et al., 2019). In the sphere of online reviews, the opinions of other consumers regarding a product can act as a vital benchmark for assessing its quality. If the testimonials of previous consumers are largely positive, individuals may form a favorable opinion of the service or product prior to their own experience, whereas a predominance of negative testimonials can cultivate negative attitudes toward goods or services (K. Kim et al., 2023).

URGENCY

The 'Urgency' tactic is a type of trick used in online sales to push people into making quick decisions by setting a time limit on deals. It takes advantage of people's fear of missing out, making discounts and special offers seem even more tempting than they really are. This approach suggests that if users don’t act fast, they might lose potential savings. When combined with other tactics like showing that many others are buying the same product (Social Proof) or claiming that only a few items are left (Scarcity), it becomes even more effective. In their research Mathur et al. (2019) recognized two key forms of Urgency tactics: Countdown Timers and Limited-time messages.

Countdown Timers

Countdown timers are widely utilized to create urgency for limited-time discounts (Chou, 2019). This design pattern visually represents a deadline for a promotional offer, counting down to its conclusion. Previous research has indicated that certain countdown timers may be misleading (Mathur et al., 2019), as the promotional offer remains accessible even after the timer has expired. For example, the timer might start over when it reaches zero or when the page is refreshed.

Limited-time messages

In contrast to misleading Countdown Timers, 'limited-time message' strategy generates a sense of urgency and uncertainty by suggesting that the promotion will end shortly, yet it does not provide a specific deadline (W. G. Kim et al., 2020). Thus, Limited-time Messages are static in nature (Mathur et al., 2019).

SCARCITY

The term 'scarcity' denotes a type of dark pattern that indicates a product's limited availability or high demand, thereby enhancing its perceived value and appeal (Mathur et al., 2019). It is often employed by salespeople and shop advisors in offline settings, and shown to significantly impact consumer attitudes, boost purchase intentions, and enhance perceived product value. This tactic is equally prevalent online, especially on booking websites. Anyone who has booked a flight

with Ryanair is familiar with messages like “only 4 seats left at this fare.” Similarly, pop-up banners stating, "You are the winner; you have 10 seconds to react by pressing the button below" are common examples of online scarcity techniques (Klaver, 2015).

Low-stock Message

The 'Low-stock Message' dark pattern indicates to users that the availability of a product is limited (Mathur et al., 2019). Cues derived from supply scarcity suggest that a certain product or service is on the verge of being out of stock (e.g., 'Only 3 items left in inventory!'). Such cues have been demonstrated to amplify consumers' perceptions of scarcity for goods and services in both traditional and online marketplaces (Teubner & Graul, 2019).

High-demand Message

The 'High-demand Message' dark pattern indicates to users that a product is experiencing high demand, suggesting that it may soon be out of stock (Mathur et al., 2019).For instance, websites like Expedia, Booking.com, and OpenTable employ demand-framed scarcity tactics, using phrases like "in high demand, booked 15 times in the last 24 hours" and "10 people booked this property in the last 48 hours” (Huang et al., 2019).This appeal signals to consumers that a product's popularity is outstripping its availability. Consumer competitiveness and the desire for social approval push them toward items that are scarce because of their popularity (Aguirre-Rodriguez, 2013).

ANCHORING

The phenomenon of anchoring bias arises when people overvalue the first piece of information they receive, known as the 'anchor', while making decisions, even if that information is not entirely accurate or pertinent (Zamfir, 2024). 'Price anchoring' represents a frequently utilized cognitive bias in tourism marketing that can affect the purchasing choices of travelers (Book et al., 2015). This strategy is employed by online travel agencies as a pricing tactic (Tanford et al., 2018). When consumers use the first piece of information they are presented with to inform their later decisions, this is known as anchoring. The original price is deliberately set at a high level

and shown alongside the discounted price. The subsequent discounted price becomes more significant as individuals have already anchored their perception to the initial high price .

PURCHASE INTENTION

The willingness of consumers to buy a particular product or service is referred to as purchase intentions, which effectively predicts consumer behavior (Yoong & Lian, 2019). Previous research like Roux et al. (2015), showed that scarcity fuels competition by creating desire and increasing purchase intent, as obtaining a scarce product feels like winning. However, when availability is time-limited rather than competitor-driven, this effect weakens, reducing consumer excitement (Guo et al., 2017; Kristofferson et al., 2016). Thus, increasing the purchase intention of consumers actually results in an increase in sales (Föbker 2018).

FEAR OF MISSING OUT (FOMO)

The term FOMO, or "fear of missing out," refers to the uneasiness social media users experience when they see others—friends, colleagues, or peers—participating in exciting activities or possessing desirable things while they themselves are not, leading to a feeling of being left out.. As a result, to prevent this feeling of exclusion in social media engagement, FOMO increases the motivation to remain informed and connected to the experiences of others (Harahap et al., 2024).

In tourism, recent research identifies four dark pattern tactics used by online travel agencies (OTAs): false discount claims, hidden costs, activity notifications, and scarcity alerts, all exploiting consumer biases (Kim et al., 2020). These deceptive design practices push users into irrational decisions, benefiting businesses by boosting subscriptions, profits, and performance (Buhalis, 2000; Buhalis et al., 2020; Kim et al., 2020). Other studies have demonstrated how dark patterns negatively impact consumer’s sense of fairness and attitudes toward online travel agencies (OTAs) and how negative feedback worsens it (K. Kim et al., 2023). But very few studies have examined deceptive marketing tactics like price anchoring, a common strategy, influences purchase decisions by placing discounted prices next to inflated original prices, increasing willingness to pay (Book et al., 2015; Tanford et al., 2018).

CHAPTER 2: LITERATURE REVIEW

Social Proof in Online Booking Behavior

A growing body of research underscores the significant impact of social proof on consumer decision-making in online travel and hotel booking contexts. Velten (2017) investigated the interplay between scarcity appeals, social proof, and cancellation policies, concluding that social proof, particularly in customer reviews, significantly enhanced consumer attitudes and purchase intentions. In contrast, scarcity appeals demonstrated limited or even negative effects, suggesting they may backfire if overused. Similarly, Park and McCallister (2023) found that adolescent consumers were strongly influenced by peer reviews when making e-commerce purchase decisions, while pop-up messages were largely ineffective and often perceived as inauthentic, especially when combined with review content.

Piccione (2018) further highlighted the role of social proof within the Irish hotel market, identifying it as a pivotal element influencing consumer trust and booking decisions. The study noted that, alongside hotel location and pricing psychology, online reviews and ratings were crucial in shaping perceptions of value and credibility. In support of this, Gretzel and Yoo (2008) discovered that online travel reviews were mainly used in the initial planning phases, helping travelers to refine their choices. Gender and generational differences also emerged, with women and younger users engaging more deeply with review content.

Gavilan et al. (2017) expanded on the nuances of review influence by revealing that consumers placed greater trust in negative ratings than positive ones, despite the former significantly reducing purchase likelihood. Moreover, during early-stage decision-making, review volume outweighed content, underscoring the importance of review quantity in establishing trust. In a related context, K. Kim et al. (2023) examined the moderating effect of social proof on deceptive design practices, such as fake discounts or false scarcity cues, finding that positive social proof could mitigate negative perceptions, whereas negative social cues intensified distrust. Collectively, these studies confirm that social proof remains one of the most influential drivers of consumer confidence and action in online travel platforms.

Scarcity Appeals and Consumer Urgency

The body of work regarding scarcity marketing strategies reveals a more nuanced perspective. Föbker (2018) identified gender-based differences in response to scarcity appeals, with females exhibiting higher sensitivity due to greater fear of missing out (FOMO), which in turn heightened booking intentions. Limited-time scarcity (LTS) was found to be particularly effective in luxury settings compared to limited-supply scarcity (LSS), especially among less frequent online purchasers (Banerjee & Pal, 2020).

Kim et al. (2020) demonstrated that scarcity tactics employed during influencer live-streaming events could trigger impulsive purchases and heightened cognitive dissonance afterward. Tiemessen et al. (2023) offered further critique of urgency-inducing mechanisms like countdown timers, describing them as potential dark patterns—persuasive designs that manipulate users into rushed decisions. While these cues were effective at increasing urgency and conversion, they also elicited feelings of regret and eroded trust, raising ethical concerns around consumer manipulation.

Piccione (2018) confirmed that scarcity cues, such as low availability, can effectively prompt immediate action. However, consistent with the findings above, the effectiveness of these tactics is conditional on consumer characteristics such as impulsivity, FOMO, and prior purchase behavior. These findings point to the necessity of balancing persuasive design with transparency and ethical considerations in digital marketing strategies.

Anchoring Effects and Price Perception

Consumer behavior is notably affected by anchoring bias, particularly regarding online hotel bookings and investment decisions. Tanford et al. (2018) found that managerial responses to online reviews, especially those addressing negative feedback, enhanced trust and booking intentions more than volume or valence alone. Book et al. (2015) provided evidence of price anchoring, showing that consumers' willingness to pay increased with higher reference prices, particularly when reviews were positive. Unanimously negative reviews, however, suppressed purchase intentions even in the presence of favorable pricing.

Beyond hospitality, De Wilde et al. (2018) explored anchoring in group decision-making and found that cooperative group settings were more susceptible to anchoring, whereas accountability and competitive dynamics helped mitigate its influence. This study highlighted the early-stage impact of anchors in shaping preferences, reinforcing their subconscious effect on group and individual judgments.

Anchoring bias was further linked to emotional and psychological traits in financial contexts. Nizar and Daljono (2024) and Altundal et al. (2024) explored how FOMO, availability bias, and impulsiveness shaped investment behaviors under the influence of social media. Both studies demonstrated that cognitive biases, including anchoring, contributed to irrational decisions, particularly when amplified by emotional triggers such as FOMO and social comparison.

Hence across all the reviewed literature, three major themes emerge: the centrality of social proof, the conditional effectiveness of scarcity appeals, and the subconscious influence of anchoring. Social proof, particularly through user-generated reviews and ratings, consistently enhances trust and purchase likelihood across different consumer segments and contexts. Scarcity tactics, while effective in creating urgency, require careful deployment to avoid consumer backlash and post-purchase regret. Anchoring, whether through pricing or review patterns, can subtly shape expectations and valuations, often outside conscious awareness.

Importantly, these studies illustrate that consumer behavior in digital environments is driven by both cognitive and emotional processes, moderated by demographic factors such as gender and psychological traits like impulsivity and FOMO. They also emphasize the ethical challenges posed by manipulative digital marketing techniques and highlight the need for transparent, user-centric design strategies that respect consumer autonomy. But the important part is that, none of the studies till now have worked to investigate the effect of dark patterns on different travel categories like packages, flights etc. It's true that consumers come across them while visiting a travel website often. But do different categories affect consumers' purchase intention and fomo remains unanswered.

CHAPTER 3: RESEARCH GAP AND OBJECTIVES

3.1 Research Gap

Despite extensive research on online travel booking and dark patterns, several gaps remain. Like the fact that most studies use multiple dark patterns and see their effect on single tourism categories like hotels (K. Kim et al., 2023; Föbker 2018), but none of the studies have actually saw the effect of of individual dark patterns on a number of travel categories like packages, flights etc at once, which is something quite commonly viewed by user while surfing through the online travel websites like makemytrip.com etc and this study aims to fill this gap by investigating effect of different type of dark patterns on different travel categories in case of online travel websites.

3.2 Theoretical Framework

Dark patterns take advantage of certain thinking shortcuts people use when making decisions. One of these is the Anchoring Effect, where individuals rely too much on the first piece of information they see, such as a displayed price, when deciding what to buy. Another is the Bandwagon Effect, where people value something more simply because others seem to like it, leading them to follow popular choices. Then there is Sunk cost fallacy that leads them to continue an action simply because they've already invested in it, even if it's not beneficial (Arkes & Ayton, 1999). Lastly, the Scarcity Bias makes people believe that limited availability means higher value, encouraging them to make quick purchases out of fear of missing out. Thus these biases influence online behavior and can lead users to make impulsive decisions (Mathur et al., 2019). In the context of online travel agencies, four essential biases guide consumer decisions: anchoring bias, the sunk cost fallacy, the bandwagon effect, and scarcity bias. Together, these biases drive impulsive booking decisions influenced by deceptive marketing tactics (K. Kim et al., 2023).

It's well known that dark patterns exploit cognitive biases to influence consumers' decisions. For instance social proof appeal, two subtypes: activity message and Testimonials, work by exploiting cognitive bias of bandwagon effect, which is the tendency of individuals to value something more because others seem to value it (Mathur et al., 2019). The bandwagon effect, introduced by David Luder, describes how people adopt beliefs or behaviors simply because others do. It influences trends, consumer choices, and perceptions of popularity. As more people embrace something, others follow, often ignoring their own opinions. This impact shapes trends in fashion and affects buying patterns. A positive bandwagon effect boosts popularity, while a negative one, called a reverse bandwagon, leads to social taboos (Maxwell, 2014).

While dark patterns of scarcity appeal like countdown timer and low stock message exploit scarcity bias (Mathur et al., 2019). Scarcity appeal, which is derived from commodity theory, includes messages like "only 2 rooms left" which create urgency by signaling limited availability. According to the theory, the value of a commodity depends on how unavailable it is. In other words, the more easily a product is available, the less desirable or valuable it seems to be, which suggests that scarcity increases perceived value and desirability (Velten, 2017). According to Brock (1968) commodity theory, the psychological implications of scarcity are significant. The main argument is that the value of a commodity rises with its lack of availability. This theory suggests that scarcity boosts the desirability of possessions that are useful to their owners and can be transferred to others. This theory proposes that the value of a commodity is directly linked to its scarcity meaning that the rarer it is, the more desirable it becomes. Conversely, when a product is widely available, its perceived worth tends to decrease. In this context, value specifically refers to how desirable the commodity appears to be (Brock & Brannon, 1992).

3.3 Aim:

1. Which of these dark patterns is most effective in increasing purchase intention of consumers on online travel booking websites.
2. to determine do presence different kind of social proof (positive testimonials,negative testimonials and activity notification) influence customer decision making while online travel booking

3. to determine do different kind of scarcity appeals (countdown timers and limited supply scarcity) influence customer decision making while online travel booking
4. to determine do different kind of anchors like low and high anchors influence customer decision making while online travel booking

3.4 Objectives:

Study 1- to determine do presence different kind of social proof (positive testimonials,negative testimonials and activity notification) influence customer decision making while online travel booking

Study 2- to determine do different kind of scarcity appeals (countdown timers and limited supply scarcity) influence customer decision making while online travel booking

Study 3- to determine the presence of different kinds of anchors like high and low anchors influence customer decision making while online travel booking.

3.5 Hypothesis:

1. There will be a significant difference in purchase intentions across all social proof conditions in all categories

2. There will be a significant difference in FOMO levels across all social proof conditions

3. There will be significant difference in purchase intentions between the Limited Supply Scarcity (LSS) and Countdown Timer (CDT)

4. There will be a significant difference in FOMO levels induced by Limited Supply Scarcity (LSS) and Countdown Timer (CDT) conditions.

5. There will be a significant difference in purchase intentions between the low and high anchor conditions for all travel categories.

6. There will be significant difference in FOMO levels induced by low and high anchor conditions.

CHAPTER 4: METHODOLOGY

Study 1

4.1 Sample

138 participants participated in the study. These participants identified themselves as between 18-30 years of age. (M-4.2971, S.D-1.6025) and Convenience sampling was used to collect data and only those participants that use online travel websites for booking when planning a vacation are approached to participate in the study.

4.2 Research Design

In this study a 3 (Dark Pattern: Social proof- Activity Message, positive testimonial, negative testimonial) X 3 (categories: package, hotel, flight), repeated measures mixed group design is used. Where the independent variable is social proof while the dependent variables are purchase intention and fomo.

4.3 Tools used

1) Social Proof: The study uses a total of 6 images like 2 packages, 2 hotels and 2 flights which were designed to mimic real travel websites. These images are a replica of images of packages, hotels and flights used in websites like booking.com or make my trip.com which was done to make these images as real as possible to participants. The Activity Message appeal was manipulated with a tagline: “35 people looking at this right now”. Positive testimonial appeal was manipulated with a tagline: “Superb trip with warm welcome, rooms were very good. Driver was very friendly. Overall, very nice and excellent trip”, while negative words such as terrible, small, poor, and bad were used to describe the negative attributes of the packages, hotels and flights in case of negative

testimonial. In addition, we used a one-star rating to represent negative social proof and a four-star rating to represent positive social proof.

2) Purchase Intention: Purchase intention was measured with three statements “What is the likelihood that you would reserve these packages” , “What is the likelihood that you would make a reservation at these hotels”, “What is the likelihood that you would reserve a seat on these flights” using a 7-point scale (unlikely/likely) (α = 0.843) (Huang et al., 2019).
3) Fear of Missing out (FOMO): Fear of missing out (FOMO) was measured with 4 statements using a 5-point scale (1=“StronglyDisagree”and 7=“StronglyAgree”) (α =0.79) (Föbker, 2018).

4.4 Procedure

In this study first, participants were asked to go through the ethical principles and guidelines of the research study. Once they had given their online written consent, they were invited to the study and were requested to provide their relevant demographic information. Then they were asked to read a scenario in which they were asked to imagine that they are going for a holiday trip to one of India's popular travel destinations like Udaipur and Jaipur and decide to browse through an online travel website to look for suitable packages , hotels , and flights and after that they were shown the stimuli which were designed to mimic real travel websites, it consist of six images in total 2 images of packages, 2 of hotels and 2 of flights. After that they went through purchase intention and fomo scales and provided the data. The whole experiment took around 5 minutes and in the end, they were acknowledged for their participation. After this, data was subjected to statistical analyses using IBM SPSS 29 to get additional interpretations of the results.

Study 2

4.5 Sample

104 participants participated in the study. These participants identified themselves as between 18-30 years of age. (M-4.6923, S.D-1.54011) and Convenience sampling was used to collect data and only those participants that use online travel websites for booking when planning a vacation are approached to participate in the study.

4.6 Research Design

In this study a 2 (Dark Pattern: Countdown Timer and Limited-Supply Message) X 3 (categories: package, hotel, flight), repeated measures mixed group design is used. Where the independent variable is countdown timer and limited supply message while the dependent variables are purchase intention and fomo.

4.7 Tools used

Scenario - In the study, participants first read a scenario in which they were asked to imagine that they are going for a holiday trip to one of India's popular travel destinations like Udaipur and Jaipur and decide to browse through an online travel website to look for suitable packages, hotels , and flights . The scenarios and the manipulations were adapted from previous studies (Teubner & Graul, 2019; Huang et al., 2019).

Stimuli- the study uses a total of 6 images like 2 packages, 2 hotels and 2 flights which were designed to mimic real travel websites. These images are a replica of images of packages, hotels and flights used in websites like booking.com or make my trip.com which was done to make these images as real as possible to participants.

Dark pattern manipulated- The Countdown Timer appeal was manipulated with a tagline: “17 hrs 40 min 31 sec”. Limited-scarcity appeal was manipulated with a tagline: “Last chance! Only 2 packages left on our site”.

Purchase intention- purchase intention was measured with three statements “What is the likelihood that you would reserve these packages” , “What is the likelihood that you would make

a reservation at these hotels", "What is the likelihood that you would reserve a seat on these flights" using a 7-point scale (unlikely/likely) (α = 0.843) (Huang et al., 2019).

FOMO- Fear of missing out (FOMO) was measured with 4 statements using a 5-point scale (1="StronglyDisagree"and 7="StronglyAgree") (α =0.79) (Föbker, 2018).

4.8 Procedure

In this study first, participants were asked to go through the ethical principles and guidelines of the research study. Once they had given their online written consent, they were invited to the study and were requested to provide their relevant demographic information. Then they were asked to read a scenario in which they were asked to imagine that they are going for a holiday trip to one of India's popular travel destinations like Udaipur and Jaipur and decide to browse through an online travel website to look for suitable packages , hotels , and flights and after that they were shown the stimuli which were designed to mimic real travel websites, it consist of six images in total 2 images of packages, 2 of hotels and 2 of flights. After that they went through purchase intention and fomo scales and provided the data. The whole experiment took around 5 minutes and in the end, they were acknowledged for their participation. After this, data was subjected to statistical analyses using IBM SPSS 29 to get additional interpretations of the results.

Study 3:-

4.9 Sample

A total of 100 participants participated in the study. These participants identified themselves as between 18-30 years of age and Convenience sampling was used to collect data and only those participants that use online travel websites for booking when planning a vacation are approached to participate in the study.

4.10 Research Design

In this study a 2 (Anchor: High anchor and Low anchor) X 3 (categories: package, hotel, flight), repeated measures mixed group design is used. Where the independent variable is High anchor and Low anchor while the dependent variables are purchase intention and FOMO.

4.11 Tools used

Scenario - In the study, participants first read a scenario in which they were asked to imagine that they are going for a holiday trip to one of India's popular travel destinations like Udaipur and Jaipur and decide to browse through an online travel website to look for suitable packages, hotels , and flights . The scenarios and the manipulations were adapted from previous studies (Teubner & Graul, 2019; Huang et al., 2019).

Stimuli- the study uses a total of 6 images like 2 packages, 2 hotels and 2 flights which were designed to mimic real travel websites. These images are a replica of images of packages, hotels and flights used in websites like booking.com or make my trip.com, which was done to make these images as real as possible to participants.

Dark pattern manipulated- The low anchor appeal was manipulated with a tagline: “Prices starting from”. While the high anchor appeal was manipulated with a tagline: “Prices up to” (Tanford et al., 2018).

Purchase intention- purchase intention was measured with three statements ”What is the likelihood that you would reserve these packages” , “What is the likelihood that you would make a reservation at these hotels”, “What is the likelihood that you would reserve a seat on these flights” using a 7-point scale (unlikely/likely) ($\alpha = 0.798$) (Huang et al., 2019).

FOMO- Fear of missing out (FOMO) was measured with 4 statements using a 5-point scale (1=“StronglyDisagree”and 7=“StronglyAgree”) ($\alpha = 0.79$) (Föbker, 2018).

4.12 Procedure

In this study first, participants were asked to go through the ethical principles and guidelines of the research study. Once they had given their online written consent, they were invited to the study and were requested to provide their relevant demographic information. Then they were asked to read a scenario in which they were asked to imagine that they are going for a holiday trip to one of India's popular travel destinations like Udaipur and Jaipur and decide to browse

through an online travel website to look for suitable packages, hotels and flights and after that they were shown the stimuli which were designed to mimic real travel websites, it consist of six images in total 2 images of packages, 2 of hotels and 2 of flights, it's also important to note that participants are divided into 2 groups, and each group is shown 3 categories containing only one type of anchor. After that they went through purchase intention and fomo scales and provided the data. The whole experiment took around 5 minutes and in the end, they were acknowledged for their participation. After this, data was subjected to statistical analyses using IBM SPSS 27 to get additional interpretations of the results.

CHAPTER 5: RESULTS

Statistical Package for Social Sciences (SPSS 29) is used to compute descriptive and inferential statistics. Tables for each hypothesis testing are discussed underneath.

Experiment 1:

Manipulation check:-

For manipulation check of Dark pattern, 3 statements like “I think that many people are interested in this package ”, “I think that many people are interested in this hotel ”, “I think that many people are interested in this flight” are used for manipulation check of activity notification ($\alpha = 0.720$) (Keizer, 2017). For Positive testimonial statements like “This package is well reviewed by other people”, “This hotel is well reviewed by other people”, “This flight is well reviewed by other people” ($\alpha = 0.742$) and for Negative testimonial statements like “This package is disliked by other people”, “This hotel is disliked by other people”, “This flight is disliked by other people” are used ($\alpha = 0.851$) (Velten, 2017).

Table 1: Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Activity * Package	156	100.0%	0	0.0%	156	100.0%
Activity * Hotel	156	100.0%	0	0.0%	156	100.0%
Activity * Flight	156	100.0%	0	0.0%	156	100.0%

Table 1 summarizes case processing for Activity * Package, Activity * Hotel, and Activity * Flight, showing all cases were valid (N = 156, 100.0%) with no missing data and that dataset is complete, which ensures a thorough analysis with no exclusions or data loss.

Table 2: Chi-Square Tests package

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	99.612[a]	1	.000		
Continuity Correction[b]	96.425	1	.000		
Likelihood Ratio	116.089	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	98.973	1	.000		
N of Valid Cases	156				

Table 2 shows results of the chi-square test of independence revealed a statistically significant association between the variables, $\chi^2(1, N = 156) = 99.61$, $p < .001$. The continuity correction, $\chi^2(1, N = 156) = 96.43$, $p < .001$, and the likelihood ratio, $\chi^2(1, N = 156) = 116.09$, $p < .001$, were

also significant. Fisher's Exact Test further confirmed this with an exact significance value of $p < .001$ (for both 2-sided and 1-sided tests). Additionally, a significant linear-by-linear association was observed, $\chi^2(1, N = 156) = 98.97, p < .001$.

As the results show a strong and statistically significant relationship between the two variables in your data (with 156 valid cases). This means the association is very unlikely to be due to chance, and whatever factors you're studying are likely connected in a meaningful way.

Table 3: Chi-Square Tests hotel

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	118.642[a]	1	.000		
Continuity Correction[b]	115.178	1	.000		
Likelihood Ratio	142.299	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	117.882	1	.000		
N of Valid Cases	156				

Table 3 shows a chi-square test of independence for hotel category finds that identified a statistically significant association between the variables, $\chi^2(1, N = 156) = 118.64, p < .001$. The continuity correction, $\chi^2(1, N = 156) = 115.18, p < .001$, further confirmed this significance, along with the likelihood ratio, $\chi^2(1, N = 156) = 142.30, p < .001$. Fisher's Exact Test reinforced these results, showing an exact significance value of $p < .001$ for both 2-sided and 1-sided tests. Additionally, a significant linear-by-linear association was observed, $\chi^2(1, N = 156) = 117.88, p < .001$. Overall, the findings indicate a strong and statistically significant relationship between the variables influencing hotel selection or perception.

Table 4: Chi-Square Tests flights

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	100.954[a]	1	.000		
Continuity Correction[b]	97.723	1	.000		
Likelihood Ratio	120.536	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	100.306	1	.000		
N of Valid Cases	156				

Table 4 shows that in the case of flights, the chi-square test of independence showed a statistically significant association between the variables, $\chi^2(1, N = 156) = 100.95$, $p < .001$. The continuity correction remained significant, $\chi^2(1, N = 156) = 97.72$, $p < .001$, as did the likelihood ratio, $\chi^2(1, N = 156) = 120.54$, $p < .001$. Fisher's Exact Test also indicated a significant result ($p < .001$ for both 2-sided and 1-sided tests). Additionally, a significant linear-by-linear association was observed, $\chi^2(1, N = 156) = 100.31$, $p < .001$. These results suggest a strong and statistically significant relationship between the two categorical variables associated with flights (e.g., purchase decision and a possible influencing factor like scarcity or influencer presence).

TABLE 5 : ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Package_MC	Between Groups	10.293	2	5.147	3.966	.021
	Within Groups	190.780	147	1.298		
	Total	201.073	149			
Hotel_MC	Between Groups	2.080	2	1.040	.820	.442
	Within Groups	186.460	147	1.268		
	Total	188.540	149			
Flight_Mc	Between Groups	1.853	2	.927	.704	.496
	Within Groups	193.480	147	1.316		
	Total	195.333	149			

Table 5 shows results of one-way analysis of variance (ANOVA), The results indicate a statistically significant effect for Package_MC at the $p < .05$ level, $F(2, 147) = 3.966$, $p = .021$, suggesting that the groups differ significantly in their effect on the dependent variable. Conversely, Hotel_MC did not show a statistically significant effect, $F(2, 147) = .820$, $p = .442$, indicating that the means of different groups within this category were not significantly different. Similarly, Flight_MC also did not exhibit a significant effect, $F(2, 147) = .704$, $p = .496$, suggesting that the differences among its groups were not meaningful.

This means that manipulation of social proof is most effective in the package category but not in the other two categories.

Purchase intention

TABLE 6 : Descriptive Statistics

	Social_Proof	Mean	Std. Deviation	N
Package	Activity	4.59	1.343	46
	Positive	5.07	1.482	46
	Negative	3.15	1.850	46
	Total	4.27	1.761	138
Hotel	Activity	4.3478	1.59468	46
	Positive	4.9565	1.39772	46
	Negative	3.0435	1.73790	46
	Total	4.1159	1.76367	138
Flight	Activity	4.7609	1.64904	46
	Positive	5.1304	1.51450	46
	Negative	3.6304	1.85423	46
	Total	4.5072	1.78496	138

Table 6 illustrates that PN conditions yielded the highest purchase intentions, with flights ranking the highest (M = 5.13, SD = 1.51), AN conditions resulted in moderate purchase intentions, with flights again leading (M = 4.76, SD = 1.65) and NN conditions produced the lowest purchase intentions, especially for hotels (M = 3.04, SD = 1.74). Thus flights consistently had the highest purchase intention under PN condition,and this trend is consistent across Hotel and package categories too. Hence Purchase intentions were highest under Positive testimonial, moderate under Activity notification, and lowest under Negative testimonials for all travel types.

TABLE 7: Within-Subjects Effects

Source		Type III Sum of Squares	df	Mean Square	F	Sig	Partial Eta Squared
Travel_Category	Sphericity Assumed	10.739	2	5.370	4.470	.012	.032
	Greenhouse-Geisser	10.739	1.845	5.821	4.470	.015	.032
	Huynh-Feldt	10.739	1.897	5.661	4.470	.014	.032
	Lower-bound	10.739	1.000	10.739	4.470	.036	.032
Travel_Category * Social_Proof	Sphericity Assumed	2.899	4	.725	.603	.661	.009
	Greenhouse-Geisser	2.899	3.690	.786	.603	.647	.009
	Huynh-Feldt	2.899	3.794	.764	.603	.652	.009
	Lower-bound	2.899	2.000	1.449	.603	.549	.009
Error(Travel_Category)	Sphericity Assumed	324.362	270	1.201			
	Greenhouse-Geisser	324.362	249.078	1.302			
	Huynh-Feldt	324.362	256.114	1.266			
	Lower-bound	324.362	135.000	2.403			

Table 7 results shows that Travel_Category had a significant effect, $F(2, 270) = 4.47$, $p = .012$, $\eta^2 = .032$ while the interaction of Travel_Category × Social_Proof was not significant, $F(4, 270) = 0.60$, $p = .661$, $\eta^2 = .009$, which supports the idea that social proof effects are consistent across travel types.

TABLE 8: Between-Subjects Effects

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	2548.181	1	2548.181	1417.417	<.001	.913
Social_Proof	77.454	2	38.727	21.542	<.001	.242
Error	242.698	135	1.798			

Table 8 results indicate a significant main effect of Social_Proof, $F(2, 135) = 21.542$, $p < .001$, $\eta^2 = .242$.

TABLE 9-Post hoc Bonferroni tests

(I) Social_Proof	(J) Social_Proof	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Activity	Positive	-.4855	.27958	.254	-1.1633	.1922
	Negative	1.2899*	.27958	<.001	.6121	1.9676
Positive	Activity	.4855	.27958	.254	-.1922	1.1633
	Negative	1.7754*	.27958	<.001	1.0976	2.4531
Negative	Activity	-1.2899*	.27958	<.001	-1.9676	-.6121
	Positive	-1.7754*	.27958	<.001	-2.4531	-1.0976

Table 9 illustrates Post hoc Bonferroni tests results that show that negative reviews sharply reduce purchase intentions, while activity and positive reviews are more effective and equally persuasive. As a pairwise comparison of Negative vs. Activity is $p < .001$ which means Negative testimonials significantly lower purchase intention and same is true in case of Negative vs. Positive where $p < .001$, but in case of Activity vs. Positive it is not significant ($p = .254$).

A 3 (Social_Proof: Activity, Positive, Negative) × 3 (Travel_Category: Package, Hotel, Flight) mixed-design ANOVA revealed a significant main effect of Travel_Category on purchase intention, $F(2, 270) = 4.47$, $p = .012$, $\eta^2 = .032$, and a significant main effect of Social_Proof, $F(2, 135) = 21.54$, $p < .001$, $\eta^2 = .242$. Post hoc comparisons indicated that negative social proof produced significantly lower purchase intentions than both positive and activity-based cues. No significant interaction was observed, $F(4, 270) = 0.60$, $p = .661$.

Hense hypothesis 1 is accepted. From table 8 interpretation it is confirmed that there is a significant effect of Social Proof on purchase intention ($F(2, 135) = 21.54$, $p < .001$), with negative social proof notably reducing purchase intention compared to the other conditions. However, from table 7 it's clear that no significant interaction was found between Travel Category and Social Proof ($F(4, 270) = 0.60$, $p = .661$), indicating that the impact of Social Proof remains consistent across travel packages, hotels, and flights. If the hypothesis assumes variation across all travel categories, the absence of this interaction limits full confirmation.

FOMO:-

TABLE 10: Descriptive Statistics (FOMO)

					95% Confidence for mean interval				
	N	Mean	Std.Deviation	Std.Error	Lower Bound	Upper Bound	Min	Max	Between Component Variance
Activity	46	11.6304	2.82338	.41629	10.7920	12.4689	6.00	20.00	
Positive	46	10.9565	3.68756	.54370	9.8615	12.0516	4.00	20.00	
Negtive	46	9.2826	3.90819	.57623	8.1220	10.4432	4.00	19.00	

Total		138	10.6232	3.61708	.30791	10.0143	11.2321	4.00	20.00	
Model	Fixed Effect			3.50445	.29832	10.0332	11.2132			
	Random Effect				.69795	7.6201	13.6262			1.19442

Table 10 illustrates that Activity Condition had the highest mean score (M = 11.63, SD = 2.82), suggesting a greater engagement level and 95% CI [10.79, 12.47] indicates that the true population mean is likely within this range. While Positive Condition had a lower mean (M = 10.96, SD = 3.69), with a 95% CI [9.86, 12.05] and Negative Condition had the lowest mean (M = 9.28, SD = 3.91), suggesting lower engagement and 95% CI [8.12, 10.44] further confirms this trend. Total mean across all conditions was 10.6232 (SD = 3.61), with a 95% CI [10.01, 11.23] with a between-component variance of 1.19442, which suggests that there is a meaningful variability between group means due to the social proof condition.

These findings indicate that the activity condition yields the highest fomo scores, whereas the negative condition results in the lowest fomo and the confidence intervals confirm these differences, suggesting that the effects are not due to random variation.

TABLE 11: ANOVA (FOMO)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	134.449	2	67.225	5.474	.005
Within Groups	1657.957	135	12.281		
Total	1792.406	137			

Table 11 illustrates that there was a statistically significant difference between the groups, $F(2, 135) = 5.474$, $p = .005$

Table 12 : Post Hoc Comparisons - Group

		Mean Difference	SE	df	t	p_{tukey}
Acti	Posi	0.67	0.73	135	0.92	0.62
	Neg	2.34	0.73	135	3.21	0.05
Posi	Neg	1.67	0.73	135	2.29	0.06

Table 12 post hoc comparisons indicate a statistically significant difference between activity and negative groups (p = 0.05)

As the results of ANOVA table $F(2, 135) = 5.474$, $p = .005$, indicates that there was a statistically significant difference in fomo scores between all the 3 conditions, thus hypothesis 2 is accepted, with activity notification yielding highest fomo scores and negative testimonials the lowest.

Experiment 2:

Manipulation checks:-

Manipulation check- For manipulation check of Dark pattern, 3 statements like "I perceive that many packages are not available", "I perceive that many hotel rooms are not available", "I perceive that many seats are not available" are used for manipulation check of limited supply scarcity (Park et al., 2017). For countdown timer statements like "I think the availability of this offer is limited " are used (Föbker, 2018).

TABLE 13 : Paired Sample Test

	95% interval	confidence of difference

Pair 1	LSS-CDT	Mean	Std.Deviation	Std.Error Mean	lower	upper	t	df	Sig (2 tailed)
		4.07843	3.74082	.52382	3.02631	5.13055	7.786	50	<.001

Table 13 shows that the mean difference between limited supply scarcity (LSS) and countdown timer (CDT) was statistically significant, M = 4.08, SD = 3.74, t (50) = 7.79, p < .001, which suggests a significant difference between the two conditions.

Hence manipulation check is proven to be effective.

Purchase Intention

TABLE 14 : Descriptive Statistics

	Scarcity_Appeal	Mean	Std. Deviation	N
Package	Countdown Timer	4.6923	1.76611	52
	Limited Scarcity	4.7885	1.64896	52
	Total	4.7404	1.70091	104
Hotel	Countdown Timer	4.6923	1.57851	52
	Limited Scarcity	4.7308	1.37364	52
	Total	4.7115	1.47255	104
Flight	Countdown Timer	4.6538	1.51961	52
	Limited Scarcity	4.6346	1.46901	52
	Total	4.6442	1.48728	104

The table 14 presents descriptive statistics for scarcity appeal conditions, Countdown Timer (CDT) and Limited Scarcity (LSS) across three travel categories: Package, Hotel, and Flight. For the package CDT condition had a mean purchase intention of M = 4.6923, SD = 1.76611, N = 52, while the LSS condition showed a slightly higher mean of M = 4.7885, SD = 1.64896, N = 52. But in the hotel category, CDT had a mean purchase intention of M = 4.6923, SD = 1.57851, N = 52, while LSS had a slightly higher mean of M = 4.7308, SD = 1.37364, N = 52 and for flights, CDT produced a mean purchase intention of M = 4.6538, SD = 1.51961, N = 52, while

LSS resulted in M = 4.6346, SD = 1.46901, N = 52. So across all categories, LSS produced slightly higher purchase intention scores compared to CDT, implying that limited availability cues may have a slight edge in influencing consumer decisions. However, the gap is minimal, suggesting that both scarcity tactics function at nearly the same level of effectiveness.

TABLE 15 : Within-Subjects Effects

Source		Type III Sum of Squares	df	Mean Square	F	Sig	Partial Eta Squared
Travel_Category	Sphericity Assumed	.506	2	.253	.203	.816	.002
	Greenhouse-Geisser	.506	1.950	.260	.203	.811	.002
	Huynh-Feldt	.506	2.000	.253	.203	.816	.002
	Lower-bound	.506	1.000	.506	.203	.653	.002
Travel_Category* Scarcity_Appeal	Sphericity Assumed	.173	2	.087	.070	.933	.001
	Greenhouse-Geisser	.173	1.950	.089	.070	.929	.001
	Huynh-Feldt	.173	2.000	.087	.070	.933	.001
	Lower-bound	.173	1.000	.173	.070	.793	.001
Error(Travel_Category)	Sphericity Assumed	253.987	204	1.245			
	Greenhouse-Geisser	253.987	198.886	1.277			
	Huynh-Feldt	253.987	204.000	1.245			
	Lower-bound	253.987	102.000	2.490			

Table 15 shows results of within-subjects effects analysis which evaluates the impact of the Travel_Category and Travel_Category × Scarcity_Appeal interaction on purchase intention.The analysis shows no significant main effect of Travel_Category on purchase intention (F(2, 204) =

0.203, p = .816, η^2 = .002) indicating that differences in travel categories (package, hotel, flight) do not significantly affect consumer decisions. Moreover The interaction effect between Travel_Category and Scarcity_Appeal is also non-significant (F(2, 204) = 0.070, p = .933, η^2 = .001), suggesting that limited supply scarcity and countdown times do not interact significantly with travel categories to influence purchase intention.

These findings show that neither the travel category alone nor its interaction with Scarcity Appeal conditions significantly impact purchase behavior. This suggests that scarcity bias operates independently of the type of travel category, which means travelers may respond similarly to persuasive appeals regardless of whether they are booking flights, hotels, or packages.

TABLE 16 : Between-Subjects Effects

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	2296.107	1	2296.107	1419.706	<.001	.933
Scarcity_Appeal	.038	1	.038	.024	.878	.000
Error	164.966	102	1.617			

Table 16 results presents the results of the ANOVA analysis, examining the effect of scarcity appeal on purchase intention.The intercept effect was significant, F(1, 102) = 1419.706, p < .001, with a large effect size (η^2 = .933), suggesting a strong baseline influence on the purchase intention, indicating that factors outside scarcity appeal play a important role in purchase intention, While main effect of scarcity appeal was non-significant, F(1, 102) = .024, p = .878, suggesting that scarcity appeal does not have a measurable impact on purchase intention. Hence findings show that scarcity appeal does not significantly affect purchase intention, suggesting that other psychological factors or marketing strategies may play a more dominant role in consumer decisions.

TABLE 17 : Pairwise Comparisons

Travel_category	(I) Scarcity_Appeal	(J) Scarcity_Appeal	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference[a]	
						Lower Bound	Upper Bound
1	Limited Scarcity	Countdown Timer	-.096	.335	.775	-.761	.568
	Countdown Timer	Limited Scarcity	.096	.335	.775	-.568	.761
2	Limited Scarcity	Countdown Timer	-.038	.290	.895	-.614	.537
	Countdown Timer	Limited Scarcity	.038	.290	.895	-.537	.614
3	Limited Scarcity	Countdown Timer	.019	.293	.948	-.562	.601
	Limited Scarcity	Countdown Timer	-.019	.293	.948	-.601	.562

Table 17, illustrates results of pairwise comparison conducted to examine differences in purchase intention between the Countdown Timer (CDT) and Limited Scarcity (LSS) conditions across various travel categories. In the first comparison the mean difference between Countdown Timer and Limited Scarcity was -0.096 (SE = 0.335, p = .775), suggesting no significant effect. In the next comparison the mean difference was -0.038 (SE = 0.290, p = .895), again showing no statistical significance. And at last the mean difference was 0.019 (SE = 0.293, p = .948), reinforcing the lack of substantial variation. Hence the results demonstrate that CDT and LSS do not significantly differ in their effect on purchase intention across the tested conditions.

All in all, the statistical results show no significant difference in purchase intentions between the Limited Supply Scarcity and Countdown Timer conditions, thus contradicting the claim that there is not a significant difference in purchase intentions between the Limited Supply Scarcity (LSS) and Countdown Timer (CDT) conditions for online travel bookings, thus hypothesis 3 is proved to be rejected.

FOMO

TABLE 18: Descriptive Statistics (FOMO)

		N	Mean	Std.Deviation	Std.Error	95% Confidence for mean interval Lower Bound	Upper Bound	Min	Max	Between Component Variance
Countdown timer		52	12.5385	3.25071	.45079	11.6335	13.4435	4.00	18.00	
Limited Scarcity		52	11.7885	3.69598	.51254	10.7595	12.8174	4.00	19.00	
Total		104	12.1635	3.48397	.34163	11.4859	12.8410	4.00	19.00	
Model	Fixed Effect			3.48047	.34129	11.4865	12.8404			
	Random Effect				.37500	7.3986	16.9283			.04829

Table 18 presents the descriptive statistics for FOMO under two experimental conditions: Countdown Timer and Limited Scarcity. In the CDT condition (N = 52), the mean FOMO score was 12.54 (SD = 3.25), with a standard error of 0.45 and a 95% confidence interval ranging from 11.63 to 13.44. Scores ranged from a minimum of 4.00 to a maximum of 18.00. For the LSS condition (N = 52), the mean FOMO score was slightly lower at 11.79 (SD = 3.70), with a standard error of 0.51 and a confidence interval between 10.76 and 12.82. Scores in this condition also varied from 4.00 to 19.00. Across both conditions (N = 104), the total mean FOMO score was 12.16 (SD = 3.48), with a standard error of 0.34 and a confidence interval between 11.49 and 12.84. The model accounted for both fixed and random effects, with the fixed effect showing a standard deviation of 3.48 and a standard error of 0.34, while the random effect had a standard deviation of 0.38, with a confidence interval spanning 7.40 to 16.93 and a

between-component variance of 0.048. These findings indicate that the CDT condition resulted in slightly higher FOMO scores compared to LSS, although the difference remains modest.

TABLE 19: ANOVA (FOMO)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	14.625	1	14.625	1.207	.274
Within Groups	1235.596	102	12.114		
Total	1250.221	103			

Table 19 results demonstrated that there was no significant difference in FOMO scores between the two conditions, $F(1, 102) = 1.207$, $p = .274$. Which suggests that the type of scarcity appeal (Countdown Timer vs. Limited Scarcity) did not significantly influence participant's FOMO levels.

From the results of the ANOVA table, $F(1, 102) = 1.207$, $p = .274$, it's clear that there is no significant difference in FOMO scores between the two conditions, thus hypothesis 4 is rejected. This means that Scarcity appeals (LSS and CDT) do not significantly differ in their influence on FOMO levels.

Experiment 3:

Anchor

TABLE 20: Descriptive Statistics

	Appeal	Mean	Std. Deviation	N
Packages	Low anchor	5.1600	1.29929	50
	High anchor	4.5600	1.15539	50
	Total	4.8600	1.45658	100
Hotel	Low anchor	4.5400	1.23239	50
	High anchor	4.6000	1.27775	50
	Total	4.5700	1.24928	100
Flight	Low anchor	4.8000	1.19523	50
	High anchor	4.3200	1.64677	50
	Total	4.5600	1.45171	100

Table 20, findings reveal variations in average values between the Low Anchor and High Anchor groups across all categories. For example, individuals in the Low Anchor group consistently exhibit higher averages for Package (5.16 compared to 4.56) and Flight (4.80 to 4.32), whereas the averages for Hotel are nearly the same (4.54 compared to 4.60). The standard deviations indicate variability, showing greater variability in the High Anchor group for Flight (SD = 1.65) in contrast to the Low Anchor group (SD = 1.19).

TABLE 21 : Within-Subjects Effects

Source		Type III Sum of Squares	df	Mean Square	F	Sig	Partial Eta Squared
Travel_Category	Sphericity Assumed	5.807	2	2.903	2.018	.136	.020
	Greenhouse-Geisser	5.807	1.995	2.911	2.018	.136	.020
	Huynh-Feldt	5.807	2.000	2.903	2.018	.136	.020
	Lower-bound	5.807	1.000	5.807	2.018	.159	.020
Travel_Category * Anchor	Sphericity Assumed	6.180	2	3.090	2.148	.120	.021
	Greenhouse-Geisser	6.180	1.995	3.098	2.148	.120	.021
	Huynh-Feldt	6.180	2.000	3.090	2.148	.120	.021

	Lower-bound	6.180	1.000	6.180	2.148	.146	.021
Error(Travel_Category)	Sphericity Assumed	282.013	196	1.439			
	Greenhouse-Geisser	282.013	195.471	1.443			
	Huynh-Feldt	282.013	196.000	1.439			
	Lower-bound	282.013	98.000	2.878			

Table 21 shows Travel_Category does not shows significant effect $F(2, 196) = 2.018$, $p = .136$, $\eta^2 = .020$ and the interaction between Travel_Category and anchor was also not significant, $F(2, 196) = 2.148$, $p = .120$, $\eta^2 = .021$.

TABLE 22 : Between-Subjects Effects

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	2174.668	1	2174.668	2313.755	.000	.959
Anchor	2.890	1	2.890	3.075	.083	.030
Error	92.109	98	.940			

Table 22 shows anchor condition had no statistically significant effect $F(1, 98) = 3.075$, $p = .083$

TABLE 23: ANCHOR PAIRWISE COMPARISONS

					95% Confidence Interval for Difference	
(I) Anchor	(J) Anchor	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Low Anchor	High Anchor	.340	.194	.083	-.045	.725

High Anchor	Low Anchor	-.340	.194	.083	-.725	.045

Table 23 shows the result of pairwise comparison, performed to assess the impact of anchor type (low vs. high) on the dependent variable. The mean difference between the Low Anchor and High Anchor conditions was close to statistical significance, M = 0.34, SE = 0.194, p = .083. While it does not meet the conventional α = .05 threshold, this marginal result hints at a possible trend where the Low Anchor condition produced slightly higher scores compared to the High Anchor condition.

TABLE 24: TRAVEL_CATEGORY PAIRWISE COMPARISONS

					95% Confidence Interval for Difference	
(I) Travel_category	(J) Travel_category	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
1	2	.290	.168	.261	-.119	.699
	3	.300	.174	.263	-.124	.724
2	1	-.290	.168	.261	-.699	.119
	3	.010	.167	1.000	-.397	.417
3	1	-.300	.174	.263	-.724	.124
	2	-.010	.167	1.000	-.417	.397

Table 24, shows that here pairwise comparison was conducted to evaluate differences across the three travel categories and the analysis indicates that none of the pairwise differences reached statistical significance. Specifically, the comparison between Travel Category 1 and Travel Category 2 revealed a mean difference of 0.29 (SE = 0.168), which was not significant, p = .261, with a 95% confidence interval of -0.119 to 0.699. Likewise, the difference between Travel Category 1 and Travel Category 3 was not statistically significant, M = 0.30, SE = 0.174, p =

.263, 95% CI [-0.124, 0.724]. The comparison between Travel Category 2 and Travel Category 3 showed a negligible mean difference of 0.01 (SE = 0.167), p = 1.000, 95% CI [-0.397, 0.417]. These results suggest that there were no substantial or statistically significant differences among the three travel categories with respect to the assessed outcome variable

TABLE 25: ANCHOR * TRAVEL_CATEGORY PAIRWISE COMPARISONS

						95% Confidence Interval for Difference	
Travel_category	(I) Anchor	(J) Anchor	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
1	Low Anchor	High Anchor	.600	.286	.039	.032	1.168
	High Anchor	Low Anchor	-.600	.286	.039	-1.168	- .032
2	Low Anchor	High Anchor	-.060	.251	.812	-.558	.438
	High Anchor	Low Anchor	.060	.251	.812	-.438	.558
3	Low Anchor	High Anchor	.480	.288	.099	-.091	1.051
	High Anchor	Low Anchor	-.480	.288	.099	-1.051	.091

Table 25 explains that here pairwise comparison was conducted to assess the influence of anchor type (Low vs. High) within each travel category. In Travel Category 1, a significant difference was observed between the Low Anchor and High Anchor conditions, with participants in the Low Anchor group reporting notably higher scores than those in the High Anchor group, M = 0.60, SE = 0.286, p = .039, 95% CI [0.032, 1.168]. This finding confirms a statistically significant anchoring effect in this category which is the package category. Conversely, in Travel Category 2 that is hotel , the difference between anchor conditions was not statistically significant, M = -0.06, SE = 0.251, p = .812, 95% CI [-0.558, 0.438], indicating no apparent anchoring effect. Similarly, in Travel Category 3 (flight), the difference approached but did not achieve statistical significance, M = 0.48, SE = 0.288, p = .099, 95% CI [-0.091, 1.051], suggesting a possible trend toward an anchoring effect, though it did not reach conventional significance.

So the results show that the anchoring effect was significant only in Travel Category 1, indicating that how people respond to anchoring may vary based on the travel category.

TABLE 26: ANCHOR * TRAVEL_CATEGORY PAIRWISE COMPARISONS

						95% Confidence Interval for Difference	
Anchor	(I) Travel_category	(J) Travel_category	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Low Anchor	1	2	.620*	.237	.031	.042	1.198
		3	.360	.246	.440	-.239	.959
	2	1	-.620*	.237	.031	-1.198	-.042
		3	-.260	.236	.822	-.836	.316
	3	1	-.360	.246	.440	-.959	.239
		2	.260	.236	.822	-.316	.836
High Anchor	1	2	-.040	.237	1.000	-.618	.538
		3	.240	.246	.995	-.359	.839
	2	1	.040	.237	1.000	-.538	.618
		3	.280	.236	.717	-.296	.856
	3	1	-.240	.246	.995	-.839	.359
		2	-.280	.236	.717	-.856	.296

Table 26 a pairwise comparison was conducted to analyze differences among the three travel categories within each anchor condition (Low Anchor and High Anchor). Under the Low Anchor condition, Travel Category 1 showed a significantly higher score than Travel Category 2, M = 0.62, SE = 0.237, p = .031, 95% CI [0.042, 1.198]. However, no other comparisons within this condition reached statistical significance, including the contrast between Category 1 and Category 3, M = 0.36, SE = 0.246, p = .440, 95% CI [0.239, 0.959], and the comparisons involving Category 2 and Category 3 ($p > .05$). In contrast, under the High Anchor condition, no significant differences were observed among any travel categories. For instance, the comparison between Travel Category 1 and Travel Category 2 did not yield a meaningful difference, M = 0.40, SE = 0.237, p = 1.000, 95% CI [-0.618, 0.538], nor did the contrast between Travel Category 1 and 3, M = 0.240, SE = 0.246, p = .995, 95% CI [0.839, -0.359].

Overall, the only statistically significant difference among the travel categories emerged under the Low Anchor condition, specifically between Categories 1 and 2. This finding suggests that the Low Anchor condition may have heightened sensitivity to distinctions between travel categories, whereas the High Anchor condition appeared to diminish such differences.

Thus from the overall findings we can say that our hypothesis 5 is rejected, as from table 22 it's clear that, overall comparison was not statistically significant (p = .083), also findings from table 25, shows that anchoring effect was significant only in Travel Category 1 which is of package (p = .039), but not significant in Travel Categories 2 (hotel) or 3(flights) (p = .812 and .099, respectively), which indicates the effect of anchoring is context-specific, not consistent across all travel types

TABLE 27: FOMO

						95% Confidence for interval mean				
		N	Mean	Std.Deviation	Std.Error	Lower Bound	Upper Bound	Min	Max	Between Component Variance
Low anchor		50	13.2800	3.36876	.47642	12.3226	14.2374	6.00	20.00	
High anchor		50	12.4400	2.61986	.37050	11.6954	13.1846	8.00	16.00	
Total		150	12.8600	3.03188	.30319	12.2584	13.4616	6.00	20.00	
Model	Fixed Effect			3.01764	.30176	12.2612	13.4588			
	Random Effect				.42000	7.5234	18.1966			.17068

TABLE 27: results show participants in the Low Anchor condition (n = 50) reported a higher mean FOMO score (M = 13.28, SD = 3.368) compared to those in the High Anchor condition (n = 50; M = 12.44, SD = 2.619).

TABLE 28: ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	17.640	1	17.640	1.937	.167
Within Groups	892.400	98	9.106		
Total	910.040	99			

Table 28, results indicated that the effect of anchor condition on FOMO scores was not statistically significant, F(1, 98) = 1.94, p = .167.

Since p-value (.167) is greater than .05, which means that the difference in FOMO scores across the levels of activity appeal is not statistically significant. This means that hypothesis 6 is rejected, as there is no significant difference in FOMO across the levels of activity appeal, as indicated by $F(1, 98) = 1.94$, $p = .167$.

Chapter 6: DISCUSSION

Study 1

The study aims to explore how dark patterns like social proof, activity notifications, positive testimonials, and negative testimonials influence consumer purchase intentions (PI) and fear of missing out (FOMO) on online travel booking platforms. The finding suggests that positive testimonials and activity notifications significantly enhance purchase intention across all travel categories, which actually align with the assumptions of first hypothesis that state that there is a significant difference in purchase intentions across all social proof categories like Positive testimonials, Activity Notification, and Negative testimonials conditions for travel packages, hotels, and flights, thus the hypothesis is accepted. Studies from the past have shown that social proof appeals, including reviews and ratings, have a marked positive influence on attitudes towards advertisements, products, and the intention to purchase. This means that consumers view reviews and ratings as trustworthy and credible, which increases their likelihood of making decisions influenced by this feedback (Velten, 2017), which in turn increases their willingness to

buy that product or service. It was also discovered that teens are much more likely to buy a product if they read positive reviews (S. Park & McCallister, 2023). Furthermore, the findings of Piccione's (2018) study showed that participants gave online reviews the highest ranking among social proof elements, indicating that social proof is an effective inducer for hotel reservations. This proves that reviews influence people's trust in a hotel and also influence their willingness to pay for a particular hotel room. All this emphasizes the credibility and reliability of positive testimonials in building consumer trust in products and services and how credible and authentic social proof, like positive testimonials, is highly effective in boosting purchase intentions (S. Park & McCallister, 2023).

Similarly, activity notifications, positive testimonials, and negative testimonials were found to differ statistically significantly in FOMO, which again proves that the second hypothesis also gets accepted. Moreover from the results it's clear that different kinds of social proof have different effects on FOMO levels of the participants in the study, where negative testimonials result in the lowest FOMO levels while activity notifications produce the greatest FOMO scores. These results are consistent with earlier research that found FOMO is most effective when combined with genuine, reliable persuasion cues such as social proof (Velten, 2017). Also, Park and McCallister's study demonstrates that good product reviews, which is a reliable form of social proof, were the most effective means of raising consumer’s FOMO, which supports the notion that social evidence and other genuine persuasive elements are most effective when used in conjunction with FOMO (S. Park & McCallister, 2023). Moreover the fact that negative testimonials result in lower FOMO levels which actually contrast the positive effect on FOMO levels by positive testimonials and activity notification can be due to the fact that negative online reviews actually amplify the negative perception of fairness attitudes which mostly occurs when consumers are aware of dark patterns used to sell a product or service to customer (K. Kim et al., 2023).

Study 2

This study explored how different kinds of scarcity appeals like countdown timers and limited supply scarcity influence customer decision-making during online travel booking. Findings from experiment 2 show an insignificant difference in purchase intentions between the Limited Supply

Scarcity and countdown timer conditions hence hypothesis 3 is rejected, according to the results of this study. Additionally, no significant difference was found in FOMO between the two conditions of scarcity appeal, which means that LSS and CDT do not significantly differ in their influence on FOMO levels. Hence hypothesis 4 is also rejected. Also it is important to note that these results do not align with previous studies which have shown that supply-based scarcity increased participants' willingness to pay for a hotel room, especially when combined with price discounts (E. J. Kim et al., 2020).

A deeper analysis reveals that across all categories, LSS produced slightly higher mean values for purchase intention scores compared to CDT, implying that limited availability cues may have a slight edge in influencing consumer decisions. However, the gap is minimal, suggesting that both scarcity tactics function at nearly the same level of effectiveness. Previous research actually proves the reason for the results, Study by Velten, (2017) explains that scarcity tactics can sometimes provoke skepticism or even irritation, leading to reduced purchase intentions rather than increased urgency. Additionally, the effectiveness of scarcity appears to diminish when bookings are made well in advance, as psychological distance reduces the sense of urgency. Some participants in earlier studies recognized scarcity appeals as mere marketing tactics and opted to contact hotels directly for better deals, bypassing perceived pressure (Piccione, 2018). Moreover high-pressure techniques like countdown timers and limited supply scarcity may, in certain cases, lead to adverse effects such as consumer irritation or avoidance when perceived as inauthentic (Tiemessen et al., 2023). This underscores the conditional effectiveness of scarcity appeals, which may be successful in urgent booking situations but counterproductive when viewed as artificial or excessively aggressive (Piccione, 2018). Moreover, this study finds that altering scarcity tactics, CDT versus LSS, does not significantly impact purchase decisions which aligns with Föbker's (2018) research, where it was found that consistency in purchase intentions regardless of whether limited time scarcity (LTS) or LSS was employed in hotel bookings. Specifically, Limited time scarcity appears to negatively affect perceived novelty and fails to meaningfully boost purchase intention, supporting the idea that CDT versus LSS comparisons yield similar consumer responses.

Also, the study shows no significant difference in FOMO levels between countdown timers and limited supply scarcity appeals, while this finding deviates from dominant research trends, some

studies provide explanations. For instance, FOMO-driven scarcity appeals sometimes backfire when perceived as overly manipulative or aggressive (Velten, 2017), which may have influenced participant responses in this study. Furthermore, research by Föbker (2018) highlights gender differences in FOMO susceptibility, showing that females tend to be more affected by FOMO, whereas males are driven by competitiveness. The study also found that scarcity appeals alone such as LTS and LSS were insufficient to trigger heightened FOMO-driven decisions when gender differences were controlled. This suggests that FOMO-driven tactics may lose effectiveness if consumers view them as insincere, which may explain the findings observed in this study.

Study 3

The aim of this study is to determine the presence of different kinds of anchors like high and low anchors influence customer decision making while online travel booking. The findings suggest that according to the interpretation of the results, hypothesis 5 which states that there is not a significant difference in purchase intentions between the high anchor and low anchor conditions for online travel bookings, is rejected, as the mean difference between the Low Anchor and High Anchor conditions was not statistical significance, which hints to the fact that there might be a possibility that low anchor condition produced slightly higher scores compared to the High Anchor condition. The results of this study aligns with results of some previous studies as well, like that of Tanford et al. (2018) which has shown the existence of anchoring effects, but from both the studies it's clear that anchoring effects strength and consistency basically depend on the context of the study (e.g., travel category, budget framing). Moreover, Book et al. (2015) study explained the fact that anchoring was effective only in certain scenarios like in positive review contexts, where consumers are more susceptible to pricing cues, which was not the case in this study and because of that effect of anchor is comparatively less visible in this study.

Moreover, findings also show that in the case of travel category anchoring the effect was significant only in the package category, but not significant in hotel or 3 flights, which indicates the effect of anchoring is context-specific, not consistent across all travel types. This was also the case with Book et al. (2015) study where effect of anchors was not similar across all conditions of the study, which is also the case in this study as anchoring was only significant in the package

category, and not in hotels or flights. So according to the results people's responses to different type anchoring may vary based on the travel category. This reinforces the idea that anchoring strength varies by travel category, price framing, and the valence of other information (like reviews) (Book et al., 2015, Tanford et al., 2018). Research conducted by De Wilde et al. (2018) also illustrates that anchoring is a genuine phenomenon, but is significantly influenced by contextual factors such as task framing, category type, social environment, and cognitive motivation. Thus in all these findings reinforces the notion that anchoring is not universally robust, but rather dependent on the specific circumstances of its application.

Additionally, no significant difference was found in FOMO between low and high anchors, which means the sixth hypothesis proved to be rejected as per this study's results. Which is something explained by previous research as well, for instance a study by Nizar and Daljono (2024) supports the idea that FOMO is influenced by internal cognitive biases availability or representativeness biases, but since this study consist of an anchor which are external cues and are alone insufficient to shift FOMO levels, which actually proves the findings are logical as study results shows that anchoring is not be a strong enough trigger for FOMO compared to more ingrained biases like availability or representativeness. Moreover, previous study had shown that FOMO is primarily shaped by internal psychological and behavioral factors and not by external framing like high and low anchors. Hence, anchoring may influence decision framing, but not emotional states like FOMO (Altundal et al., 2024). Also the above findings are also supported by Kim et al. (2023) study findings, which shows that while dark pattern tactics like anchoring (fake discounts) and scarcity (low stock) influence perceptions of fairness and attitude, they do not cause a significant difference in FOMO.

Overall, this study highlights the conditional nature of anchoring effects, demonstrating that while anchors may influence purchase intentions, their strength varies across travel categories and framing contexts. Additionally, anchoring does not appear to be a strong enough trigger for FOMO, as internal cognitive biases play a more substantial role in shaping consumer emotions. These findings provide valuable insights into the nuanced and context-driven effectiveness of anchoring in online travel bookings.

CHAPTER 7: CONCLUSIONS AND FUTURE DIRECTIONS

CONCLUSIONS

This research critically examined how different types of dark patterns, specifically social proof, scarcity appeals, and anchoring bias, influence purchase intentions and FOMO (Fear of Missing Out) among consumers using online travel booking platforms. Across three experimental studies, the findings reveal nuanced impacts of these manipulative design strategies on consumer psychology and behavior.

The findings of Study 1 show that purchase intention is considerably raised by favorable reviews and activity alerts for all travel-related categories (flights, hotels, and packages). Notably, while negative testimonials significantly decreased purchase intention, positive testimonials had the greatest impact in increasing purchase intention. Activity notifications elicited the highest degrees of FOMO, confirming the potent emotional pull of perceived in-the-moment social acceptance. These results are consistent with other research that argues that, when viewed as genuine, social evidence is a powerful and convincing persuasive strategy. While for study 2 both scarcity tactics (Countdown Timer and Limited Supply Scarcity) elevated purchase intentions,but Limited Supply messages had a greater impact, particularly for travel packages. This effect was not uniform across all categories, as flights and hotels did not show the same magnitude of influence. Importantly, no significant difference was found in FOMO levels between the two scarcity conditions, suggesting that scarcity may prompt buying behavior without necessarily inducing anxiety or urgency, especially when perceived as inauthentic or manipulative. The third study which focuses on anchoring effects yielded limited and context-specific influence. Low anchor messages showed slightly higher purchase intentions than high anchor ones, but the difference was not statistically significant across all categories. However, anchoring was effective only in the travel package category, where a low anchor led to significantly higher purchase intentions. FOMO levels between high and low anchors were also not significantly different. This suggests that anchoring may work best when combined with other persuasive cues or within specific product contexts.

The research underscores that dark patterns are not uniformly effective across all contexts; their success depends heavily on type, travel category, and perceived authenticity. Social proof

elements like positive reviews and real-time activity notifications are more potent than urgency-based or price-framing tactics in influencing purchase behavior. However, FOMO is not always directly correlated with higher purchase intention, and can even diminish when users sense manipulation.

FUTURE DIRECTIONS

This study offers important insights into how different types of dark patterns affect consumer behavior in case of different tourism categories like packages,hotels and flights, but there are still many areas of further exploration in case of dark patterns. Future research could examine the long-term impact of repeated exposure to dark patterns on consumer trust and brand loyalty, particularly in the case of tourism, where repeat bookings are common. It would also be valuable to explore how demographic factors such as age and digital literacy, influence susceptibility to these tactics, as different groups may respond differently to them.

Moreover, given the mixed findings of the study on FOMO, future studies could investigate the emotional and psychological effects of these manipulative strategies, including potential user fatigue, skepticism, or avoidance of certain platforms. Additionally, research should expand to cover other dark patterns, like forced continuity or hidden costs, and assess their impact in industries beyond tourism, such as e-commerce and fintech.

Also using qualitative approaches like interviews or focus groups could provide deeper insights into consumer awareness and ethical perceptions of these tactics. Lastly, cross-cultural comparisons could help identify how different cultural backgrounds shape reactions to deceptive design strategies, offering more globally applicable conclusions.

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