

EVALUATING THE WORTH OF MICHELIN GUIDE-RECOMMENDED  
RESTAURANTS IN LONDON THROUGH SENTIMENT ANALYSIS:  
CONSUMER PERSPECTIVES AND COMPARATIVE INSIGHTS

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CHUN-CHENG KUO

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## ABSTRACT

**Background.** The rise of online review sites like Yelp and TripAdvisor has considerably impacted consumer decisions in the restaurant industry, with reviews often seen as genuine reflections of customer experiences. In contrast, the Michelin Guide, a long-standing authority in fine dining, provides expert evaluations through a rigorous and standardised process. As these platforms shape public perceptions and restaurant reputations, examining the relationship between consumer reviews and expert ratings has become a crucial area of research in the competitive restaurant sector.

**Aims.** This research aims to investigate the relationship between consumer sentiments in Yelp reviews and the expert ratings provided by the Michelin Guide, specifically focusing on Michelin-starred and Bib Gourmand restaurants in London. The study seeks to figure out the correlation between Michelin ratings, customer satisfaction, and perceived value. The text analyses whether Bib Gourmand restaurants, known for their reasonable prices, provide a more pleasant eating experience than Michelin-starred restaurants. Furthermore, the research intends to identify the crucial characteristics and specific frequent words associated with both consumer contentment and discontentment across different Michelin distinctions.

**Methods.** This study employs a quantitative approach, analysing Yelp reviews and Michelin Guide ratings for Michelin-starred and Bib Gourmand restaurants in London. Data includes review text, ratings, and restaurant characteristics. Sentiment analysis, topic modelling, correlation analysis, and statistical tests such as ANOVA, t-tests, and regression are used to examine relationships between variables and consumer perceptions.

**Results.** The analysis showed Bib Gourmand restaurants had the most Yelp reviews and higher average ratings than Michelin-starred ones. Sentiment scores positively correlated with Yelp ratings, but price level had no significant effect. Topic modelling highlighted key themes like food quality, service, and overall dining experience.

**Conclusions.** This study highlights that while Michelin-starred restaurants generally uphold their prestigious reputation, Bib Gourmand establishments receive higher Yelp ratings, emphasizing value for money. Customer expectations vary across Michelin distinctions, suggesting that both price and perceived value significantly shape customer satisfaction.

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# CHAPTER 1. INTRODUCTION

## 1.1 Background and Context

With the growing influence of social media and the internet, online consumer review platforms have significantly changed the way individuals make purchasing choices, especially when it comes to dining (Yan et al., 2013). As the number of social media users continues to grow, consumers are relying more on online reviews to guide their purchasing decisions. This is because they place greater trust in the opinions of others who have had experience with the product or service (Rita et al., 2022). Review platforms like Yelp, Google Maps, and TripAdvisor allow consumers to express their thoughts and experiences, offering valuable insights into various aspects of the restaurant experience, such as food quality, service, and ambience (Li & Hecht, 2021; Yalcinkaya & Just, 2022). These reviews, which are commonly seen as genuine reflections of actual customer experiences, have become a crucial resource for potential diners in search of reliable data (Mathayomchan & Taecharungroj, 2020). This phenomenon was particularly evident during significant global events, such as the COVID-19 pandemic, which underscored the importance of online visibility for enterprises. Yalcinkaya & Just (ibid) conducted research indicating that a substantial majority of customers, around 87%, actively sought internet reviews of local businesses during the 2020 epidemic (Paget, 2024). As a result, factors such as ratings, positive feedback, and negative evaluations became more and more important in influencing customer preferences (Rita et al., ibid). Online evaluations have become an essential variable in the competitive environment of the worldwide restaurant sector. The opinions of varied consumers now have a major effect on public perceptions and selections.

The Michelin Guide, established in the early 20th century by the French tire company Michelin, has consistently been recognised as the benchmark in the international food industry. The Guide was first developed to provide useful information to drivers, but it rapidly transformed into a highly regarded standard for exceptional culinary experiences (MICHELIN, 2023). Over several decades, star ratings have become important indicators of both a restaurant's reputation and its financial performance and client flow. The Michelin Guide employs a meticulous and thorough assessment procedure, encompassing criteria such as Michelin stars and the Bib Gourmand. The evaluation is carried out by anonymous and extensively trained inspectors (Ayling, 2021). The inspectors evaluate restaurants according to various critical criteria, including the quality of ingredients, the harmony of flavours, the expertise in culinary techniques, the chef's creativity through their cuisine, and the consistency of the menu and performance over time (The MICHELIN Guide UK Editorial Team, 2022). The Michelin Guide's distinctions are highly regarded in the restaurant sector, often shaping public perceptions of quality and elevating a restaurant's prestige in the competitive culinary world. However, there is a key distinction between the ratings offered by the Michelin Guide and those available on consumer review platforms such as Yelp. Michelin's evaluations are based on a rigorous and standardised review procedure conducted by professional inspectors who follow precise standards, guaranteeing a high degree of objectivity and uniformity. On the other hand, Yelp reviews generally represent personal viewpoints from a wide range of regular consumers, covering individual tastes and diverse dining experiences (Rita et al., ibid.). This contrast raises significant enquiries regarding the comparison and insights into customer perceptions of quality that these two evaluation methods provide. While Michelin represents the highest level of culinary excellence as evaluated by experts,

Yelp reviews reflect a more inclusive and democratic perspective, showcasing the diverse opinions and experiences of the general people concerning dining.

Given this context, this study aims to investigate the correlation or disparity between customer sentiment reflected in Yelp reviews and the expert ratings given by the Michelin Guide, with a particular focus on Michelin-starred restaurants and Bib Gourmand. In a general sense, the research can be classified into two main goals. The primary aim is to examine whether restaurants that have received Michelin ratings are indeed worth visiting, as perceived by customers. Secondly, it analyses if Bib Gourmand restaurants are more attractive to visit in comparison to Michelin-starred restaurants. Furthermore, the study seeks to determine the factors and specific terms linked to both customer satisfaction and dissatisfaction in these two types of restaurants. This will ultimately enhance our understanding of how consumer opinions and expert evaluations are associated.

## 1.2 Aims and Objectives

The primary aim of this research project is to investigate the correlation between the sentiments expressed by customers in Yelp reviews and the expert ratings provided by the Michelin Guide. This analysis involves several Michelin distinctions, including one-star, two-star, and three-star ratings, as well as Bib Gourmand selections. The study seeks to figure out the relationship between different levels of Michelin distinction and consumer satisfaction and perceived value. It will also examine if the renowned reputation of Michelin stars and Bib Gourmand is reflected in the actual eating experiences of clients. Through an in-depth analysis of consumer feedback, the research will explore the key factors that diners prioritize when visiting these restaurants, while also identifying common reasons for dissatisfaction across various Michelin classifications. Additionally, the research explores the perceived prestige and consumer sentiment of Michelin-starred restaurants and Bib Gourmand places. It specifically focuses on whether the lower price of Bib Gourmand selections makes them more appealing to diners compared to Michelin-starred venues. Ultimately, this research aims to provide a comprehensive analysis of whether these distinguished restaurants meet the standards established by their Michelin recognition, offering insights into the real-world implications of Michelin ratings from the perspective of the general public.

To achieve these aims, the research will establish the following specific objectives:

- **Objective 1: Evaluate the worthiness of Michelin-Rated restaurants:** This objective aims to assess whether Michelin-starred restaurants are perceived as worth visiting by customers, using Yelp reviews as the primary data source. The study will analyse both review ratings and sentiment scores to determine if customer satisfaction aligns with Michelin ratings. By exploring the correlation between customer perceptions and Michelin distinctions, this objective seeks to

provide insights into whether these highly rated restaurants meet the expectations set by their Michelin recognition.

- **Objective 2: Compare the attractiveness of Bib Gourmand vs. Michelin-starred restaurants:** The purpose of this objective is to conduct a comparison of customer satisfaction levels between Bib Gourmand and Michelin-starred restaurants using Yelp reviews. The study seeks to evaluate variations in customer opinions and ratings based on these distinctions, with a specific focus on finding if Bib Gourmand restaurants, valued for their affordable prices, offer a more attractive dining experience. The research aims to determine whether Bib Gourmand restaurants provide similar or higher perceived value and satisfaction compared to Michelin-starred restaurants by analysing the average Yelp reviews' rating and sentiment scores.
- **Objective 3: Identify factors and specific words linked to customer satisfaction and dissatisfaction:** This objective is to identify the key variables and specific words that are closely associated with both consumer satisfaction and dissatisfaction in Yelp reviews of Michelin-starred and Bib Gourmand restaurants. The research will emphasise common themes that impact customer perceptions through an analysis of the language used in reviews. The study will investigate how these factors differ between the two groups of restaurants and how they contribute to positive or negative experiences, thereby explaining the elements that most significantly influence consumer sentiment.

### 1.3 Dissertation Structure

This dissertation is organized into six chapters, each serving a specific purpose to ensure a logical progression of the research. Chapter 1 introduces the background, research problem, and objectives, laying the groundwork for the subsequent analysis. Chapter 2 presents a comprehensive literature review, systematically exploring key theoretical frameworks and prior studies relevant to this research. The focus is on the influence of online reviews on consumer behaviour, perceptions of Michelin-starred restaurants, and the application of sentiment analysis and topic modelling. This chapter establishes the theoretical foundation and informs the research questions and hypotheses. Chapter 3 details the research methodology, including data collection and preparation, research design, and the analytical methods employed. Ethical considerations and the limitations of the methodology are also discussed. Chapter 4 presents the results of the data analysis, beginning with exploratory data analysis (EDA) and progressing to hypothesis testing. It also includes sentiment analysis and topic modelling, addressing each research question with statistical evidence and visualizations. Chapter 5 interprets the findings in light of the literature, discussing their implications and connecting them to existing academic perspectives. This chapter also acknowledges the limitations of the research and suggests directions for future inquiry. Finally, Chapter 6 provides a conclusion, summarizing the key findings, reflecting on the contributions of the study, and offering recommendations for further research. The structure of this dissertation is designed to ensure a coherent flow from the identification of the research problem to the presentation of findings and their implications.

## Chapter 2. Literature Review

### 2.1 Literature Search Strategy

The initial step in this literature search strategy involves using academic databases such as Starplus, Google Scholar, Scopus, ProQuest, and the school's Past dissertations database to collect scholarly articles. Additionally, it includes referencing journals, news sources, reports, and Michelin's official website and publications to acquire the required material. The search will use relevant keywords such as "Michelin-starred restaurants", "Bib Gourmand", "consumer sentiment", "online reviews", "sentiment analysis", and "Yelp Reviews", and combined with Boolean Searching methods were used to ensure a comprehensive and accurate search of relevant literature (Library, 2024). The criteria for inclusion were designed to emphasise material published within the past two decades, ensuring its contemporary relevance, with a particular focus on sentiment analysis of high-end dining experiences, culinary awards, and online reviews. Conversely, scientific journals lacking peer-reviewed studies inaccessible in English, and studies irrelevant to this research endeavour will be excluded. The selection procedure involves an initial evaluation of Titles and Abstracts to determine their relevance, followed by a thorough examination of parts such as the Introduction and Conclusion to verify the extent to which the chosen works contribute to the research objectives. Finally, the identified literature will be organized and synthesized according to its thematic relevance to the research question, and the gaps and debates that will be addressed by the paper will be identified to establish a strong theoretical framework for the study.

## 2.2 The Literature Review

### 2.2.1 *Consumer Influence of Online Reviews*

Online reviews are a typical form of electronic word-of-mouth (E-WoM). When consumers share their experiences and opinions about a product or service on an online platform, these become online reviews. These reviews can be positive, recommending a product, or negative, pointing out the product's shortcomings. Whether on social media, specialized review websites, or e-commerce platforms, these reviews constitute electronic word-of-mouth (Mathayomchan & Taecharungroj, 2020; Rita et al., 2022). According to Rita et al. (ibid), the rating system launched by Amazon.com in the late 1990s further enriched the format of online reviews. This system allows consumers to quickly rate products or services, often using stars or points, enabling other consumers to quickly grasp the overall rating. These ratings provide quantitative evaluation criteria (usually on a scale of 1 to 5 stars) and are often accompanied by detailed comments that explain the reasons for the rating or provide a deeper analysis of the user experience. This information is extremely valuable to potential consumers, as it allows them to more accurately assess the quality of the product and the level of service.

With the rise of social media platforms, online reviews have become increasingly influential. These reviews have also gained importance for restaurant customers, as more people search online for relevant information before deciding where to dine (Yan et al., 2013). Consumers can easily share and access others' genuine reviews of restaurants through these platforms, including details on food quality, service level, and overall dining experience (Yalcinkaya & Just, 2022). These reviews can spread quickly and widely, exposing more potential customers to a variety of perspectives and opinions. Since these reviews usually come from real users, they carry a high degree of authenticity and credibility (Mathayomchan & Taecharungroj, ibid). This makes online

restaurant reviews crucial in influencing customers' dining choices and can even directly impact their decisions.

Online platforms such as Yelp, Google Maps, and TripAdvisor offer rich review resources, allowing consumers to share and review their real experiences with various restaurants and services. However, the credibility of reviews on these platforms is a significant concern. Some reviews may be exaggerated or biased, especially those that are overly positive or extremely negative. These reviews may be written by competitors or even the restaurant itself to mislead consumers. Additionally, some reviewers might accept free food or other benefits in exchange for positive reviews, further undermining the authenticity of the feedback. Therefore, consumers should be mindful of potential biases when reading these reviews and consider opinions from multiple sources to gain a more comprehensive understanding. At the same time, when writing their own reviews, individuals should avoid revealing their identity as reviewers and strive to remain objective and impartial to provide information that is genuinely useful to other consumers (Filloon, 2019).

### ***2.2.2 Consumer Perceptions Towards Michelin Restaurants***

Michelin-starred restaurants hold a prestigious position within the global culinary landscape, a status largely attributed to the influence of the Michelin Guide. First established in 1900 by the French tire company Michelin, the Guide initially gained prominence among motorists who sought practical information to enhance their journeys. As its reputation expanded, the Guide evolved to offer more refined recommendations, particularly focusing on restaurants and hotels. In 1933, to uphold the highest standards of quality, the role of the "Inspector" was officially introduced. These inspectors, recognized for their anonymity, independence, expertise, and

curiosity, have since become integral to the Michelin Guide's identity, ensuring that only the most exceptional establishments receive recognition (MICHELIN, 2023). Over time, the Guide has developed into the world's most renowned restaurant rating system.

The Michelin Guide awards stars to restaurants based on a meticulous evaluation process, which considers several critical criteria: the quality of ingredients, the harmony of flavours, the mastery of culinary techniques, the personality of the chef as expressed through their cuisine, and, importantly, consistency both across the entire menu and over time (The MICHELIN Guide UK Editorial Team, 2022). Depending on their level of excellence, restaurants may receive the Bib Gourmand distinction or be awarded one, two, or three Michelin stars. A one-star rating signifies "a very good restaurant in its category," a two-star rating denotes "excellent cooking, worth a detour," and a three-star rating is reserved for "exceptional cuisine, worth a special journey." Additionally, the Bib Gourmand distinction is awarded to restaurants that offer high-quality food at a reasonable price. Although these establishments may not meet the stringent criteria required for a Michelin star, they still provide diners with an outstanding culinary experience (Ayling, 2021; Gillespie, 2024). The mission of the Guide is to honour the work of talented professionals who are passionate and dedicated, often working behind the scenes to create remarkable dining experiences.

For many consumers, a Michelin star represents more than just a dining accolade; it symbolizes unparalleled quality and luxury. This perception is shaped by the Guide's long-standing reputation and the rigorous evaluation process employed by its inspectors. Diners often view Michelin-starred restaurants as destinations for special occasions, where they can expect not only outstanding food but also impeccable service and a refined atmosphere (Kiatkawsin & Han, 2019). However, these high expectations can

sometimes create a gap between what diners anticipate and what they actually experience, leading to varied levels of satisfaction. Research has shown that while some diners find their experiences at Michelin-starred establishments to meet or even exceed their expectations, others may feel that the reality falls short of the Michelin star's promise (Rita et al., 2022). This discrepancy can be attributed to factors such as personal preferences, past dining experiences, and cultural differences. Additionally, the elevated prices at these restaurants, often justified by the Michelin distinction, can further heighten expectations (Chiang & Guo, 2021). When these expectations are not fully met, it can result in disappointment and negative reviews.

In the digital age, consumer perceptions are increasingly shaped by user-generated content on platforms like Yelp, TripAdvisor, and social media (Li & Hecht, 2021). These platforms enable diners to share their personal experiences and opinions, offering a more democratized view of Michelin-starred restaurants (Yalcinkaya & Just, 2022). Unlike the professional critics of the Michelin Guide, who adhere to strict criteria, online reviewers represent a diverse demographic with varied tastes and expectations. This diversity leads to a wide range of reviews, with the same restaurant potentially receiving both high praise and harsh criticism (Yan et al., 2013). These reviews significantly influence public opinion and shape potential diners' perceptions and decisions. The combination of the Michelin Guide's formal evaluations and the broader perspectives found in online reviews underscores the complexity of consumer perceptions toward Michelin-starred restaurants. While the prestige of a Michelin star can elevate a restaurant's status and attract discerning clientele, it also sets the bar for expectations at the highest levels (Rita et al., ibid). Understanding these perceptions requires a balanced approach that considers both the authoritative evaluations of Michelin inspectors and the evolving dynamics of consumer behaviour in the digital era.

### ***2.2.3 Sentiment Analysis and Topic Modelling***

Text mining and sentiment analysis are crucial methodologies for extracting meaningful insights from consumer reviews. Text mining involves the process of deriving high-quality information from text, utilizing various computational techniques to analyze the textual data. This method includes tasks such as parsing, tokenization, and the extraction of entities and key phrases, which help in understanding the underlying themes within the reviews. Sentiment analysis, a specialized area within natural language processing (NLP), focuses on identifying and extracting views or emotional expressions from written or textual information (Jagreet Kaur Gill, 2023). NLP is an advanced field of study that aims to provide computers with the ability to comprehend and manipulate human language (Łukasz Sus, 2023). It encompasses the capability to understand and interpret substantial volumes of human-generated text, subsequently transforming it into structured data suitable for study (Rita et al., 2022). Algorithms with the ability to recognize semantic patterns, context, and textual sentiment can analyze large volumes of online comments to evaluate public opinion (Pang & Lee, 2008). Techniques used in sentiment analysis range from simple lexicon-based approaches to advanced machine-learning algorithms. Lexicon-based methods involve counting words with positive or negative connotations to determine the overall sentiment. In contrast, machine learning approaches use pre-trained models, such as VADER (valence-aware dictionary and sEntiment Reasoner) or BERT (Bidirectional Encoder Representations from Transformers), to analyze the context and sentiment of the text more accurately. These techniques are particularly effective in understanding consumer feedback, as they can capture the nuances and complexities of human emotions expressed in reviews. Text analysis commonly categorizes emotions as positive, negative, or neutral.

In the context of restaurant evaluations, sentiment analysis helps in quantifying the emotional tone of customer reviews, providing valuable insights into consumer satisfaction and preferences. Research has shown the effectiveness of these technologies in several fields, including the restaurant industry, where they have been used to collect consumer emotions and preferences as stated in online feedback (Liu, 2012). For instance, sentiment analysis has been employed to understand how consumers express their dining experiences in restaurant reviews. Studies have investigated the connections between sentiment scores and variables such as restaurant characteristics, quality of service, and even Michelin star ratings to identify the elements that influence consumer happiness and dissatisfaction (Tirunillai & Tellis, 2014). By employing text mining and sentiment analysis, this study aims to bridge the gap between consumer-generated content and expert reviews, contributing to a deeper understanding of consumer behaviour in the restaurant industry.

Topic modelling is an essential methodology in text mining that unsupervised methods in Natural Language Processing (NLP) employ to find underlying topics in massive sets of documents. It is widely used in areas like information retrieval and exploratory search interfaces, where accurately understanding model results is essential (Murel & Kavlakoglu, 2024). Conventionally, topic modelling methods such as Latent Dirichlet Allocation (LDA) depict subjects as a collection of phrases arranged in order of their likelihood, which frequently presents difficulties in terms of comprehensibility. Researchers have thus investigated many approaches to enhance the clarity and usability of these subjects, such as rearranging topic words to create more understandable topic representations. A recent study has shown that incorporating data on the significance of words within subjects, as well as their frequency across the entire collection of texts, improves the comprehensibility of the results (Blei et al., 2003). In addition, re-ranking techniques have been assessed using both human and automated

methods. The results suggest that re-ranked terms are more successful in enhancing the understanding of themes for end-users.

Further efforts to enhance the comprehensibility of topics have resulted in the creation of automated labelling techniques. In the past, the process of labelling subjects often consisted of two stages: initially, selecting potential labels from a vast collection, such as the titles of Wikipedia articles, and subsequently prioritising them based on how closely they relate to the phrases associated with the topic (Alokaili et al., 2020). Nevertheless, the extractive methods are limited by the pool of potential labels, which may not consistently produce suitable outcomes. In order to overcome this constraint, recent progress suggests utilising a sequence-to-sequence neural-based method to produce topic labels. This approach, which has been trained using extensive synthetic datasets under the guidance of distant supervision, enables the development of labels that are more adaptable and suitable to the given context (Alokaili et al., 2019). Assessments indicate that these labels generated automatically correspond closely with those assessed by humans, providing a more precise method of representing themes (Blei et al., *ibid*). When used in conjunction with sentiment analysis, these improved topic representations offer more profound comprehension of consumer behaviour and sentiment. As a result, they become valuable instruments for comprehending customer experiences and enhancing decision-making in businesses like the restaurant sector.

## 2.3 Research Questions and Hypotheses

The research questions and hypotheses presented below have been formulated based on the objectives described in Section 1.2. Each research question and corresponding hypothesis are designed to address specific aspects of the study's objectives, providing a structured approach to evaluating customer satisfaction and perceived value in Michelin-rated and Bib Gourmand restaurants. These research questions and hypotheses will be analysed once the exploratory data analysis (EDA) in Section 4.1 is finished. The findings will be illustrated in Sections 4.2 through 4.5. Subsequently, the findings will be thoroughly examined and explained in Chapter 5, Section 5.1 Discussion and Interpretation of Results. This section of the discussion will focus on whether the research questions have been resolved as anticipated and will assess the extent to which the results correspond with the initial research objectives.

- **Objective 1: Evaluate the worthiness of Michelin-rated restaurants**
  - **Research Question 1 (RQ1): What is the overall customer satisfaction with Michelin-rated restaurants?**
    - **Hypothesis 1 (H1):** The majority of customer review ratings for Michelin-rated restaurants on Yelp will exhibit high levels of satisfaction, with most ratings falling within the 4- to 5-star range.
    - **Hypothesis 2 (H2):** The distribution of sentiment scores for customer reviews of Michelin-rated restaurants will align with the distribution of review ratings.
    - **Hypothesis 3 (H3):** There will be a significant positive correlation between sentiment scores and review ratings for Michelin-starred restaurant reviews, with minimal instances of high ratings accompanied by low sentiment scores.

- **Objective 2: Compare the attractiveness of Bib Gourmand vs. Michelin-starred restaurants**
  - **Research Question 2 (RQ2): Does the high price of Michelin-rated restaurants correlate with the quality of their dining experience?**
    - **Hypothesis 4 (H4):** There is a positive correlation between the price level of Michelin-rated restaurants and customer satisfaction, as reflected by Yelp ratings.
    - **Hypothesis 5 (H5):** There is a positive correlation between the price level of Michelin-rated restaurants and sentiment scores in customer reviews.
  - **Research Question 3 (RQ3): How does customer satisfaction at Bib Gourmand-recommended restaurants compare to that at Michelin-starred restaurants?**
    - **Hypothesis 6 (H6):** As measured by Yelp ratings, the average customer satisfaction at Bib Gourmand-recommended restaurants will differ significantly from that at Michelin-starred restaurants.
    - **Hypothesis 7 (H7):** The distribution of customer satisfaction, as measured by sentiment scores, will differ between Bib Gourmand-recommended restaurants and Michelin-starred restaurants.
    - **Hypothesis 8 (H8):** There are significant differences in Yelp ratings among restaurants with different Michelin star distinctions (1-star, 2-star, 3-star).
    - **Hypothesis 9 (H9):** There will be a significant relationship between Michelin star distinctions (1-star, 2-star, 3-star) and sentiment scores in Yelp reviews.

- **Objective 3: Identify factors and specific words linked to customer satisfaction and dissatisfaction:**
  - **Research Question 4 (RQ4): What are the factors influencing customer choices between Michelin-starred and Bib Gourmand-recommended restaurants?**
  - **Hypothesis 10 (H10):** Specific words or phrases with high frequency in customer reviews of Michelin-rated restaurants will be significantly correlated with sentiment scores.
  - **Hypothesis 11 (H11):** Specific words or phrases that frequently appear in customer reviews of Bib Gourmand and Michelin-starred restaurants (1-star, 2-star, and 3-star) will exhibit significant differences in their correlation with sentiment scores across these categories.
  - **Hypothesis 12 (H12):** The key topics discussed in customer reviews of Michelin-rated restaurants (including Bib Gourmand, 1-star, 2-star, and 3-star distinctions) will reveal distinct thematic patterns that reflect diners' overall experiences and expectations.

## CHAPTER 3. METHODOLOGY

### 3.1 Research Design

This study utilises a quantitative research approach to investigate consumer satisfaction and perceived value at Michelin-rated and Bib Gourmand restaurants. The primary data source for this analysis is Yelp reviews. The research follows a deductive method, commencing with well-defined research questions and hypotheses (as detailed in Section 2.3). It then proceeds through data collecting, exploratory data analysis (EDA), and statistical hypothesis testing. The aim is to achieve a thorough comprehension of consumer perceptions by employing a range of statistical methods, such as sentiment analysis, correlation analysis, and comparisons of Yelp ratings across several Michelin categories. The analysis is based on structured data collected from Yelp, which includes customer ratings, review texts, price levels, and restaurant distinctions. The main variables of interest are customer satisfaction, measured by Yelp ratings and sentiment scores, sentiment distribution, and the frequency of specific words or phrases in customer reviews. In addition, the research methodology incorporates topic modelling to discover common themes in the reviews. To obtain reliable results, a combination of descriptive and inferential statistical techniques is used. Descriptive statistics help us understand the distribution of ratings, review counts, and sentiment scores. On the other hand, inferential statistics, such as Pearson correlation coefficients, t-tests, ANOVA, and regression analysis, allow me to explore the relationships between variables and test and validate hypotheses. This rigorous methodology ensures that the research findings are statistically stable and strongly substantiated.

## 3.2 Data Collection

### 3.2.1 Data Sources and Selection Criteria

The data for this research project was collected from two primary sources: the Michelin Guide (<https://guide.michelin.com/en>) and Yelp (<https://www.yelp.co.uk/london>). The Michelin Guide provides authoritative evaluations and star ratings for restaurants that are well-known for their prestige. Yelp is a widely used consumer review platform that offers user-generated reviews and ratings, which represent the experiences and opinions of a diverse variety of customers.

In this study, data from both the Michelin Guide and Yelp were gathered for the selected Michelin-starred restaurants. The collected information comprises restaurant names, cuisine types, the categories of Michelin distinctions, price levels, reviews and ratings on Yelp, and addresses. To ensure the selection of only restaurants that consistently meet high standards, the study requires that each restaurant have an unbroken record of receiving Michelin star ratings from 2022 to 2024. For Bib Gourmand, only the 2024 list is considered to differentiate the evaluation criteria. In addition, to prevent an imbalanced influence on the overall evaluation of a restaurant caused by inadequate data, the research necessitates that each chosen restaurant must possess both an overall Yelp rating and a minimum of 30 reviews. London, UK, was selected as the research location due to its abundant Michelin-starred restaurants and the substantial amount of English-language reviews available.

The majority of Yelp reviews were gathered from 2023 to July 2024. This specific time frame ensures that the data is up-to-date and relevant to current customer sentiment while also excluding the period affected by the COVID-19 pandemic. The pandemic may have distorted consumer perceptions and affected restaurant operations

significantly. For example, certain famous Michelin-starred restaurants were forced to shut down, such as the two-star restaurants The Ledbury and The Greenhouse (Dwyer, 2020). Moreover, numerous Michelin-starred restaurants heavily depend on international tourists for revenue. However, the implementation of global travel restrictions during the pandemic resulted in a substantial decline in this particular customer segment (Dwyer, *ibid*). The process of reopening presented unique difficulties, such as the setting up of social distancing rules and the reduction of seating capacity (Private Dining Rooms, 2020). Therefore, this particular time frame was selected to guarantee the stability and dependability of the data gathered for this study.

The selection criteria for the restaurants in the research project are as follows: (1) Restaurants must maintain a continuous record of receiving Michelin star ratings from 2022 to 2024. Only the 2024 list is taken into account for the Bib Gourmand. (2) Restaurants are required to have an overall Yelp rating and a minimum of 30 reviews. (3) The inclusion is limited to restaurants situated in London, UK. (4) Reviews have been collected from January 2023 to July 2024, except for restaurants that have received fewer than 15 reviews during this time period, in which case reviews from 2022 are also included.

### ***3.2.2 Data Collection Process***

The data collection process for this study consisted of a series of sequential steps to ensure thorough and relevant data acquisition. Initially, data regarding the Michelin star ratings of restaurants from 2022 to 2024 was collected, while the Bib Gourmand recommendations were only taken from the most recent list from 2024. Substantial data about these restaurants, including the types of cuisine offered, price classifications, and

precise locations, later emerged from the Michelin Guide. Afterwards, Yelp was utilised to gather data on the total amount of reviews and overall ratings for each restaurant. Using specific selection criteria, the restaurants were filtered based on the given details. This process resulted in a refined list that includes 5 three-star Michelin restaurants, 8 two-star Michelin restaurants, 30 one-star Michelin restaurants, and 15 Bib Gourmand restaurants. Later, Yelp was revisited to acquire customer reviews for the chosen restaurants, specifically targeting reviews posted from January 2023 to July 2024. If there were less than 15 reviews available for this period, an exception was made to include reviews from 2022 as well in order to ensure a sufficient sample size.

The ultimate dataset comprised a total of 884 reviews.

The variable definitions in the dataset are as follows:

- **Name:** The name of the restaurant.
- **Cuisine:** The types of cuisine offered by the restaurant.
- **M\_Distinction\_24:** The Michelin star rating in 2024 (0, 1, 2, or 3 stars).
- **M\_Distinction\_23:** The Michelin star rating in 2023 (0, 1, 2, or 3 stars).
- **M\_Distinction\_22:** The Michelin star rating in 2022 (0, 1, 2, or 3 stars).
- **Price:** The price category of the restaurant indicates the cost level.
- **Y\_Rating\_Value:** The overall rating of the restaurant on Yelp.
- **Y\_Review\_Count:** The total number of reviews available on Yelp.
- **Y\_Selected\_Review:** The text content of selected reviews utilized for analysis.
- **Address:** The physical address of the restaurant.
- **Star\_Avg:** The average star rating is calculated from M\_Distinction\_24, M\_Distinction\_23, and M\_Distinction\_22.
- **Review\_Date:** The date when each review was posted.

- **Review\_Rating:** The individual rating given in each review.
- **Review\_Text:** The full-text content of the review, providing qualitative data for analysis.

## 3.3 Data Preparation

### 3.3.1 Data Cleaning

In the initial phase of data preparation, data cleaning was conducted to ensure the integrity and accuracy of the dataset. Despite the manual data collection process used in this project, which typically reduces the likelihood of errors, a basic verification was conducted to ensure data integrity. This process involved several key steps aimed at addressing potential issues such as missing values, duplicate entries, inconsistencies in data formatting, and the accuracy of numerical data.

First, missing data was identified and handled appropriately across all columns. The examination revealed no missing values in either dataset. To ensure data integrity, I checked for duplicate review texts within the "Yelp\_Reviews.csv" file, identifying and removing three duplicate entries, thereby reducing the total number of reviews to 881. Additionally, I standardized the 'Review\_Date' field to a consistent format of 'YYYY-MM-DD' and checked for invalid date entries, resulting in zero NaT (Not a Time) values. Further scrutiny was applied to detect outliers in the datasets. For the 'Y\_Rating\_Value' in "Selected\_Restaurants.csv" and 'Review\_Rating' in "Yelp\_Reviews.csv", no outliers were found, confirming that all ratings fell within the expected range of 1 to 5.

### 3.3.2 Text Preprocessing and Representation

The text preprocessing phase was meticulously executed to standardize and purify the textual data for subsequent sentiment analysis. Initially, all text entries were converted to lowercase to ensure uniformity and eliminate case-sensitivity discrepancies. Subsequently, punctuation marks were entirely removed, preserving

only the essential textual content. Numerical digits were excluded as needed to maintain the focus on the textual information. Any non-English characters were removed using a regular expression, ensuring that only English alphabet characters and spaces were retained. Common stopwords such as "the," "is," and "at," which do not contribute significant meaning, were systematically removed. Furthermore, lemmatization was employed to reduce words to their base forms, thereby consolidating various inflections of a word into a single representation; for instance, "eating" was simplified to "eat." Finally, the text was tokenized into individual words, enabling detailed analysis at the word level.

### ***3.3.3 Feature Engineering***

In this section, the procedures undertaken for feature engineering and the subsequent splitting of the dataset into training and testing subsets are described. The initial step in feature engineering involved converting the preprocessed review text into numerical representations using two widely adopted techniques: The bag-of-Words (BoW) model and the Term Frequency-Inverse Document Frequency (TF-IDF). The CountVectorizer from the sklearn library was utilized to transform the processed review text into a BoW representation, restricting the number of features to 500 while ignoring words that appeared less than 2 times in the review to ensure computational efficiency and avoid overfitting. The resulting BoW matrix was converted to a data frame for ease of manipulation and inspection. Non-zero values within the BoW matrix were identified to verify the presence of significant terms, and any NaN values within the BoW DataFrame were handled using the dropna() method. Similarly, the TfidfVectorizer from the sklearn library was employed to convert the processed review text into a TF-IDF representation and limit the number of features to 500 as well. It also filtered out

words that appeared less than 2 times in reviews, as well as overly common words that appeared in more than 80% of reviews. The resultant TF-IDF matrix was converted to a DataFrame, inspected for non-zero values, and NaN values were addressed using the dropna() method.

## 3.4 Data Analysis Methods

### 3.4.1 Exploratory Data Analysis (EDA)

EDA is an essential first step in understanding the data distribution, patterns, and relationships within the dataset. In Chapter 4, EDA was used to examine the distribution of Yelp reviews across different Michelin distinctions, track the review counts over time, and explore the variety of cuisine types represented. This analysis provided a foundational understanding of the dataset and guided the subsequent hypothesis testing.

### 3.4.2 Correlation and Linear Regression Analysis

Correlation analysis was employed to measure the strength and direction of relationships between key variables, such as the association between sentiment scores and Yelp review ratings. Linear regression analysis was used to further model these relationships, particularly in assessing how Michelin star distinctions influence customer sentiment. These techniques allowed for the identification of significant relationships and patterns within the data, which were crucial for testing hypotheses related to customer satisfaction and pricing.

### 3.4.3 Statistical Methods (ANOVA, t-Test)

Statistical tests, including One-Way ANOVA and independent t-tests, were applied to compare the mean differences between groups. ANOVA was utilized to assess whether Yelp ratings significantly differ among restaurants with varying Michelin star distinctions. Independent t-tests were used to compare the average Yelp ratings between Bib Gourmand and Michelin-starred restaurants. These methods

provided a rigorous statistical basis for evaluating the variability in customer satisfaction across different restaurant categories.

#### ***3.4.4 Sentiment Analysis and Topic Modeling***

Sentiment analysis was conducted to quantify the emotional tone expressed in Yelp reviews, while topic modelling was applied to identify the central themes discussed in these reviews. In Chapter 4, sentiment analysis helped in correlating customer sentiment with review ratings, and topic modelling revealed the key aspects of the dining experience that customers emphasized. These text-mining techniques enabled a deeper qualitative understanding of customer feedback and the factors driving their restaurant choices.

### 3.5 Ethical Considerations

The University of Sheffield Ethics Administrator approved the ethical application for this research project on 3 July 2024, which was assessed as low risk (reference number 061847). This project involves collecting restaurant information from the Michelin Guide and consumer reviews from Yelp. Data collection will be conducted manually, with each item of data and reviews being duplicated and stored individually for analysis. Although these comments can be viewed by the public, personal identifiers such as commenter names, user profiles, and locations will not be gathered in order to protect privacy. Only textual reviews, ratings, and dates will be considered, with the exclusion of any visual or multimedia data to concentrate on the written material.

While the likelihood of inflicting bodily or psychological harm to commentators is minimal, there remains a potential for unintentionally revealing identities. By integrating data from several sources, such as comment time, location, and consumption patterns, it becomes feasible to identify anonymous users (C. Christine Porter, 2008). To mitigate these risks, the complete dataset will not be disclosed to the public. Any comments cited in the research report will be paraphrased or limited to anonymous excerpts to protect the participants' privacy and reduce the risk of harm.

### 3.6 Limitations of the Methodology

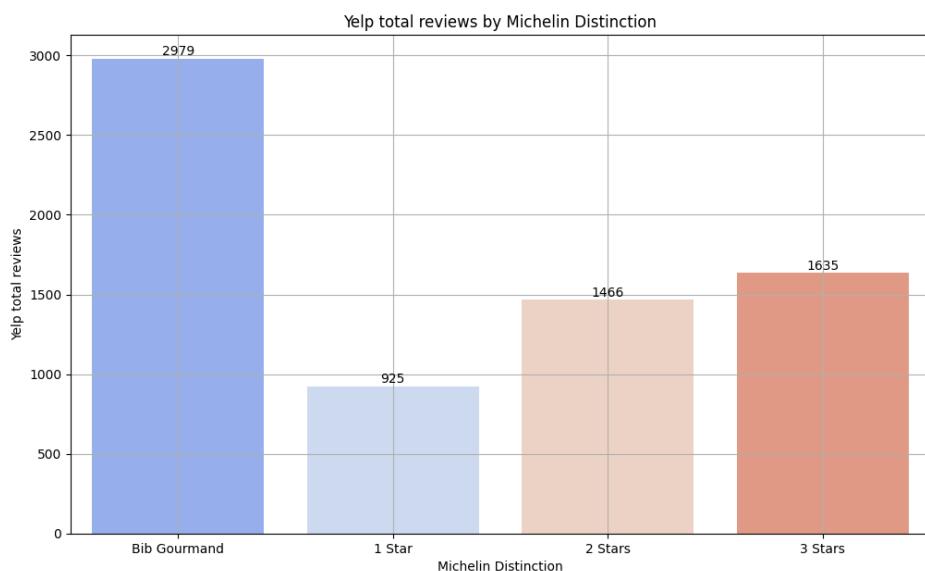
While the methodology employed in this study provides a comprehensive framework for analysing the alignment between consumer and professional evaluations of restaurants, several limitations must be acknowledged. Firstly, due to ethical limitations, prominent online companies such as Google Maps and TripAdvisor forbid the use of web scraping and automated data extraction techniques. As a result, manual data collection procedures were used, and they were authorised after an ethical review process. This method reduced the dataset to 884 reviews, resulting in a significantly smaller sample size than could be acquired using automated scraping. As a result, the limited data amount may have an impact on the analysis's robustness and generalisability, as it may fail to capture the complete range of consumer perspectives. Furthermore, the data sources themselves—Yelp and Michelin Guide—have inherent biases. Yelp evaluations are self-reported and may reflect the experiences of a certain group, which may not be indicative of the general community. This could bias sentiment analysis results because the reviews may over-represent extreme opinions, whether strongly favourable or negative. Furthermore, sentiment analysis and topic modelling techniques, while effective, have limitations. Sentiment analysis algorithms may struggle with context, irony, or cultural nuances, thereby misclassifying sentiment. Similarly, while topic modelling is effective for identifying themes, it may have interpretability concerns depending on the model parameters and the quality of the textual data employed.

## CHAPTER 4. DATA ANALYSIS AND RESULTS

### 4.1 Exploratory Data Analysis

#### 4.1.1 Yelp Total Reviews by Michelin Distinction

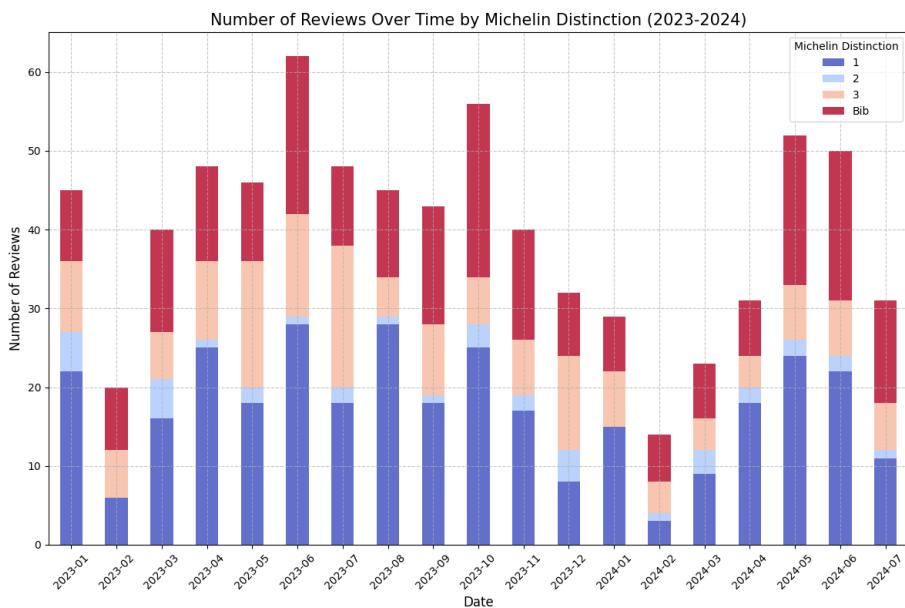
The exploratory data analysis begins with an examination of the distribution of Yelp total reviews. The distribution of Yelp total reviews varies across different Michelin distinctions. Bib Gourmand restaurants have the highest number of reviews, with 2,979 total reviews. This is followed by 3-star Michelin restaurants, which received 1,635 reviews. 2-star Michelin restaurants have a total of 1,466 reviews, while 1-star Michelin restaurants have the fewest reviews, totalling 925. The data indicates that Bib Gourmand restaurants garnered the most reviews on Yelp, while 1-star Michelin restaurants received the least. This distribution highlights a concentration of reviews around Bib Gourmand and higher-starred Michelin restaurants, indicating varying levels of user engagement across different distinctions (Figure 4.1.1).



*Figure 1-4.1.1. Yelp Total Reviews by Michelin Distinction*

### 4.1.2 Number of Reviews Over Time by Michelin Distinction

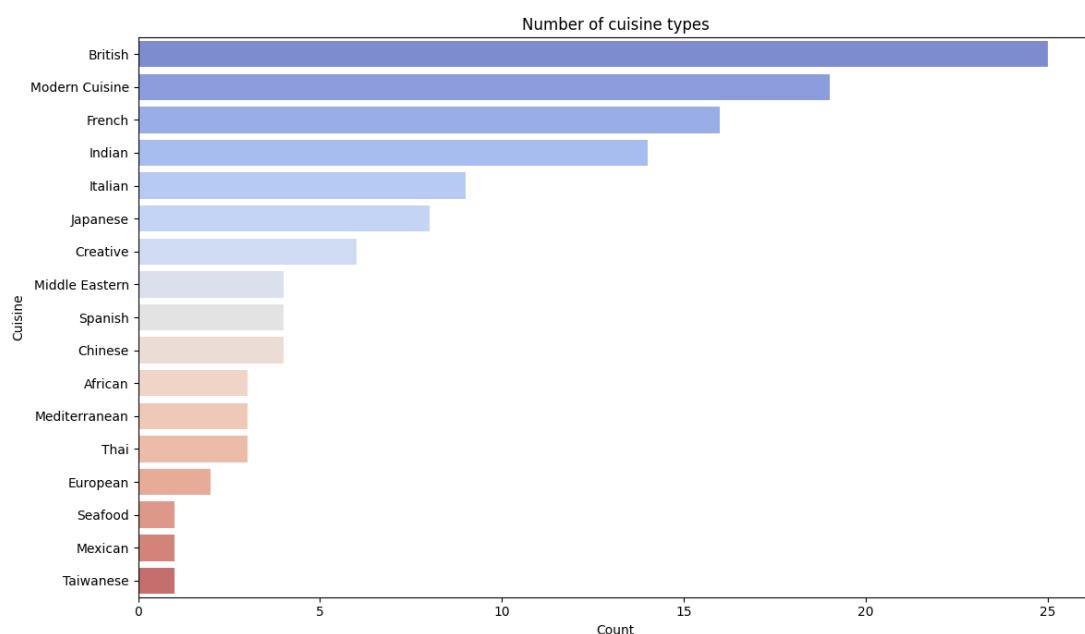
The chart illustrates the distribution of reviews for Michelin-rated restaurants from January 2023 to July 2024. Across this period, the number of reviews fluctuates, with noticeable peaks and troughs. The Bib Gourmand category consistently appears at the top of the review counts, particularly during May 2023, September 2023, and June 2024, where it reaches its highest points. 1-star Michelin restaurants also show a steady presence throughout the timeline, contributing a significant portion of the overall reviews, especially during February 2024. 2-star and 3-star Michelin restaurants contribute comparatively fewer reviews across most months but demonstrate visible increases during October 2023 and April 2024. The overall pattern shows a cyclical trend, with several months experiencing higher review activity, followed by periods of decline. This temporal analysis highlights the variability in review counts for restaurants with different Michelin distinctions over time (Figure 4.1.2).



**Figure 2-4.1.2. Number of Reviews Over Time by Michelin Distinction**

### 4.1.3 Number of Cuisine Types

The chart shows that British cuisine is the most frequently represented, with 25 instances, followed closely by Modern Cuisine at 23. French, Indian, and Italian cuisines also feature prominently, with counts of 16, 15, and 14, respectively. Other notable cuisines include Japanese and Creative, each appearing 12 and 10 times, respectively. The lower end of the distribution includes cuisines like Thai, European, Seafood, Mexican, and Taiwanese, all with counts ranging from 4 to 2. This distribution reflects the diversity of culinary representation among the restaurants, with a notable emphasis on British, Modern, and French cuisines (Figure 4.1.3).



*Figure 3-4.1.3. Number of Cuisine Types*

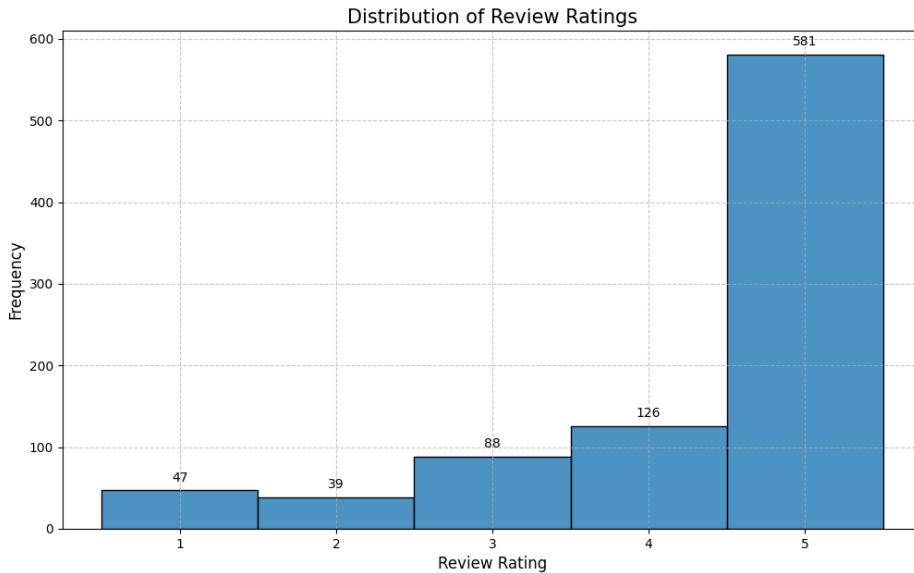
## 4.2 Detailed Findings for Research Question 1

This section aims to explore and answer the research question regarding the overall customer satisfaction with Michelin-rated restaurants. The findings are presented through the analysis of three hypotheses, each of which addresses a different aspect of customer satisfaction and the alignment between sentiment expressed in customer reviews and the review ratings. The analysis begins by examining the distribution of review ratings (H1), followed by an investigation into how sentiment scores from text analysis correspond with those ratings (H2). Finally, the section looks at the correlation between sentiment scores and review ratings to assess whether positive sentiment is strongly linked to higher ratings (H3).

### 4.2.1 Results of Hypothesis 1

The analysis of customer review ratings for Michelin-rated restaurants on Yelp strongly supports Hypothesis 1, which posited that the majority of customer reviews would demonstrate high levels of satisfaction, with most ratings concentrated in the 4-to 5-star range. Descriptive statistics reveal that the average rating for these restaurants is 4.31, with a median rating of 5 stars, indicating a generally high level of satisfaction among customers. The distribution of review ratings, as shown in Figure 4.2.1, further confirms this trend, with the vast majority of reviews falling within the 4- and 5-star categories. Specifically, out of 881 reviews, 581 received a 5-star rating, and 126 received a 4-star rating, collectively accounting for more than 80% of the total reviews. This skewed distribution towards the higher end of the rating scale highlights that customers generally perceive Michelin-rated restaurants favourably, consistent with the hypothesis. Only a small fraction of the reviews is in the lower rating categories, with

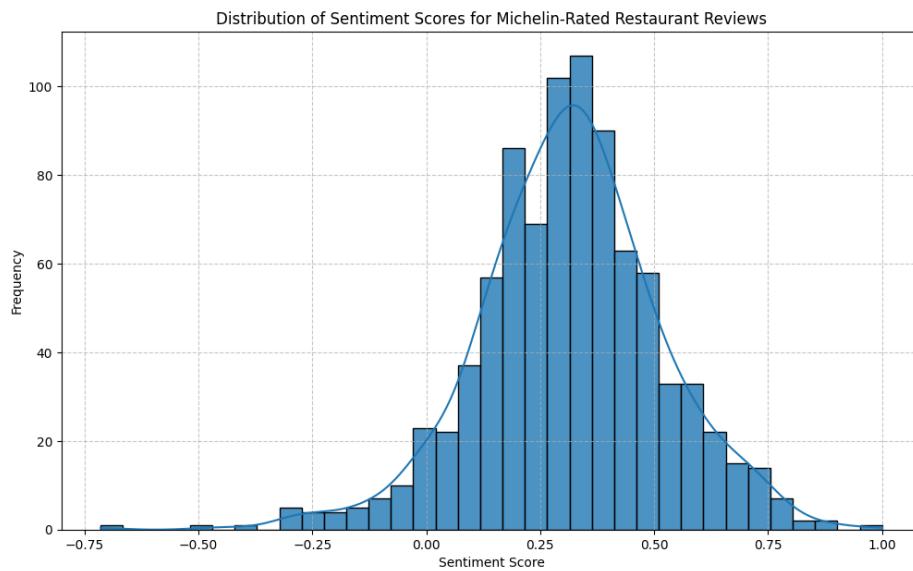
minimal ratings of 1 or 2 stars, suggesting that negative experiences are relatively rare for Michelin-rated establishments.



**Figure 4-4.2.1. Distribution of Review Ratings for Michelin-Rated Restaurants**

#### 4.2.2 Results of Hypothesis 2

The analysis for Hypothesis 2 (H2), which posited that the distribution of sentiment scores for customer reviews of Michelin-rated restaurants would align with the distribution of review ratings, reveals notable findings. As shown in Figure 4.2.2, the distribution of sentiment scores for customer reviews follows a roughly normal distribution, with most sentiment scores clustering around positive values (0.2 to 0.5). This distribution reflects an overall positive sentiment expressed in the reviews, consistent with the positive ratings observed in Figure 4.2.1.



**Figure 5-4.2.2. Distribution of Sentiment Scores for Michelin-Rated Restaurant Reviews**

### 4.2.3 Results of Hypothesis 3

The Pearson correlation coefficient of 0.564, with a highly significant P-value, indicates a moderate positive relationship between sentiment scores and review ratings for Michelin-rated restaurant reviews. This suggests that, in general, more positive sentiment is associated with higher ratings. However, as seen in the scatter plot with a regression line (Figure 4.2.3 (a)), the relationship is not perfectly linear, and sentiment scores alone do not fully explain the variability in review ratings. For example, sentiment scores vary significantly for ratings of 4 and 5, indicating that other factors beyond sentiment may also influence customer ratings. Overall, while the data supports a positive correlation between sentiment and ratings, it highlights the complexity of customer reviews and suggests that sentiment analysis is just one of several factors contributing to review ratings. Importantly, instances of high ratings accompanied by low sentiment scores are relatively rare, supporting the notion that sentiment scores

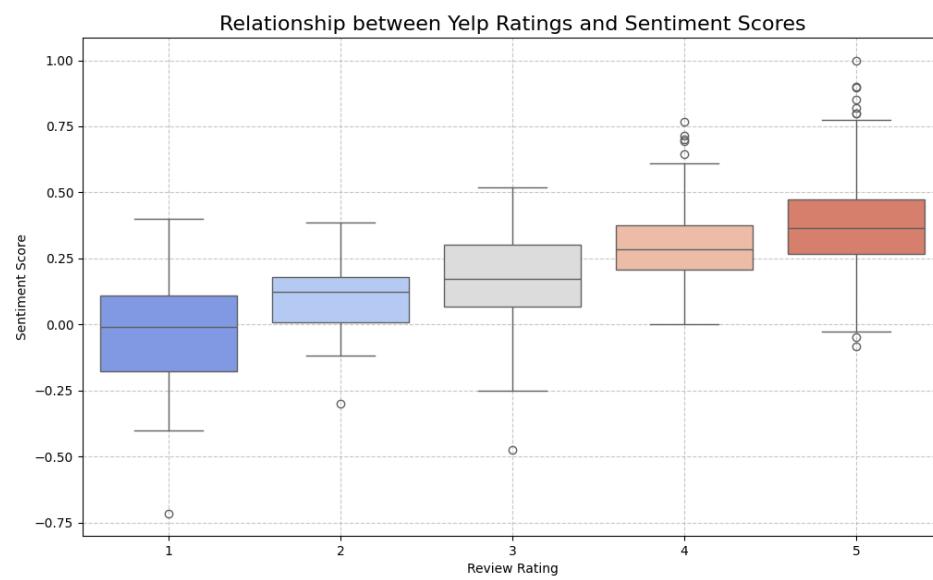
generally align with the overall rating, further validating the hypothesis.



**Figure 6-4.2.3 (a). Sentiment Score vs Review Rating with Regression Line**

The box plot provides a more detailed view of the distribution of sentiment scores across different Yelp ratings, making it particularly useful for observing how sentiment varies with rating levels. Unlike the scatter plot, which shows the overall trend between sentiment and ratings, the box plot illustrates the central tendency (median) and variability (interquartile range) of sentiment scores for each rating group. For example, 5-star ratings are associated with higher median sentiment scores and a more concentrated distribution, indicating that these reviews tend to express strong positive sentiment. In contrast, 1-star and 2-star ratings show more dispersed and generally negative sentiment scores. The presence of outliers in lower rating categories suggests that, although rare, some reviews may give a low rating despite more neutral or even positive sentiment, or conversely, a high rating with some level of dissatisfaction. Further analysis identified that there are only 4 instances within the dataset where high ratings (4 stars or above) were accompanied by low sentiment scores (negative sentiment). This result aligns with the expectation that high ratings are generally

associated with positive sentiment, supporting the hypothesis that there are minimal occurrences of high ratings paired with negative sentiment. The rarity of these cases highlights the overall consistency between customer sentiment and their rating behaviour, reinforcing the notion that sentiment analysis is a valid predictor of customer satisfaction as expressed through ratings.



**Figure 7-4.2.3 (b). Sentiment Score vs Review Rating with Regression Line**

## 4.3 Detailed Findings for Research Question 2

This section explores Research Question 2 (RQ2), which examines the relationship between the price level of Michelin-rated restaurants and the quality of their dining experience, as reflected in customer satisfaction and sentiment expressed through Yelp reviews. Two hypotheses guide this analysis. Hypothesis 4 (H4) tests whether there is a positive correlation between the price level of Michelin-starred restaurants and customer satisfaction, as indicated by Yelp ratings. Hypothesis 5 (H5) investigates whether price level correlates positively with sentiment scores in customer reviews.

### 4.3.1 Results of Hypothesis 4

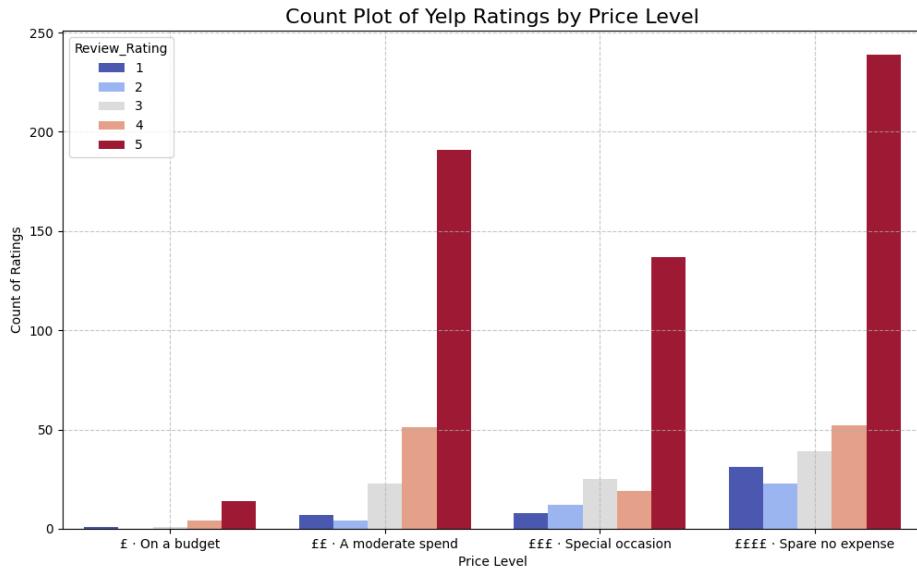
The analysis of the relationship between the price level of Michelin-rated restaurants and customer satisfaction, as reflected by Yelp ratings, reveals an inverse trend rather than the hypothesized positive correlation. Figure 4.3.1 (a) demonstrates that as the price level increases, the average Yelp rating tends to decrease slightly. Specifically, restaurants in the lower price categories ("£ · On a budget" and "££ · A moderate spend") both received an average Yelp rating of 4.50, indicating higher levels of customer satisfaction. In contrast, restaurants in the higher price categories ("£££ · Special occasion" and "££££ · Spare no expense") received lower average ratings of 4.32 and 4.16, respectively. This trend suggests that higher-priced Michelin-rated restaurants do not necessarily equate to higher customer satisfaction, as measured by Yelp ratings. Instead, more affordable options appear to be rated more favourably by Yelp users, possibly reflecting a higher perceived value for money or differing customer expectations at various price levels.



**Figure 8-4.3.1 (a). Average Yelp Ratings by Price Level**

The count plot of Yelp ratings across different price levels provides additional insights into the distribution of customer satisfaction relative to the pricing of Michelin-starred restaurants. As shown in Figure 4.3.1 (b), higher-priced restaurants, particularly those categorized as "Spare no expense," tend to receive more 5-star ratings, reflecting strong overall satisfaction among customers. However, a notable proportion of these high-end restaurants also received lower ratings (1-star and 2-star), indicating variability in customer experiences. Conversely, lower-priced restaurants show fewer total ratings but maintain a more consistent distribution towards higher ratings. This trend is reinforced by the Pearson correlation analysis, which reveals a weak negative correlation between price level and Yelp ratings, with a correlation coefficient of -0.129. This suggests that as the price level increases, Yelp ratings tend to decrease slightly, although the relationship is not strong. The associated P-value of 0.00012 indicates that this negative correlation is statistically significant. These findings suggest that while higher-priced Michelin-starred restaurants can garner high praise, they also evoke more

polarizing opinions compared to their more budget-friendly counterparts, leading to a slight decrease in overall ratings as prices rise.



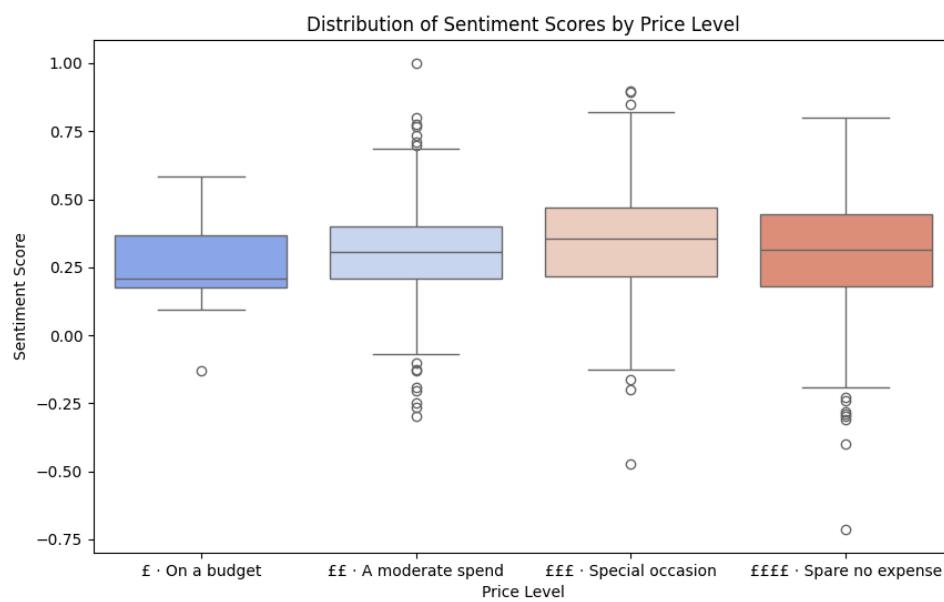
**Figure 9-4.3.1 (b). Count Plot of Yelp Ratings by Price Level**

### 4.3.2 Results of Hypothesis 5

The analysis of Hypothesis 5 (H5), which posited a positive correlation between the price level of Michelin-starred restaurants and sentiment scores in customer reviews, yielded unexpected results. The Pearson correlation coefficient between price level and sentiment score was calculated to be 0.008, indicating virtually no correlation between these two variables. Furthermore, the P-value of 0.803 suggests that this result is not statistically significant. This finding implies that the sentiment expressed in customer reviews does not appear to vary systematically with the price level of the restaurant.

In addition, the box plot in Figure 4.3.2 illustrates the distribution of sentiment scores across different price levels. It shows that while the median sentiment scores for all price levels are generally positive, there is no clear trend indicating that higher-

priced restaurants receive significantly higher sentiment scores. Each price level exhibits a wide range of sentiment scores, from negative to highly positive, further supporting the lack of a strong correlation between price and sentiment. This result challenges the assumption that more expensive Michelin-starred restaurants necessarily evoke more positive sentiment from customers, suggesting that factors other than price may play a more critical role in shaping customer sentiment.



*Figure 10-4.3.2. Distribution of Sentiment Scores by Price Level*

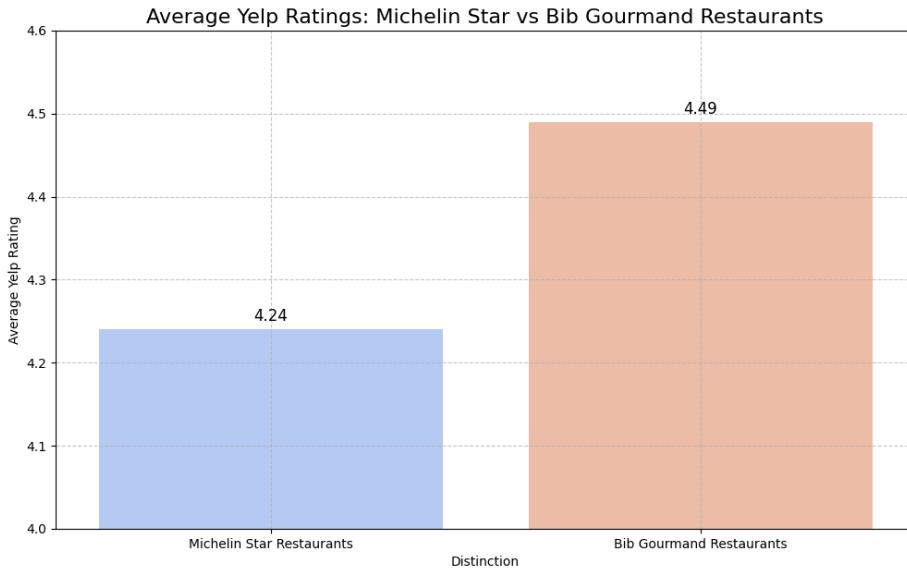
## 4.4 Detailed Findings for Research Question 3

The analysis presented in Section 4.4 aims to explore and compare customer satisfaction levels at Bib Gourmand-recommended restaurants and Michelin-starred restaurants, with a focus on understanding how these distinctions influence customer perceptions as reflected in Yelp reviews. By examining various metrics, including average Yelp ratings and sentiment scores, this section seeks to assess whether significant differences exist between the two categories of restaurants.

### 4.4.1 Results of Hypothesis 6

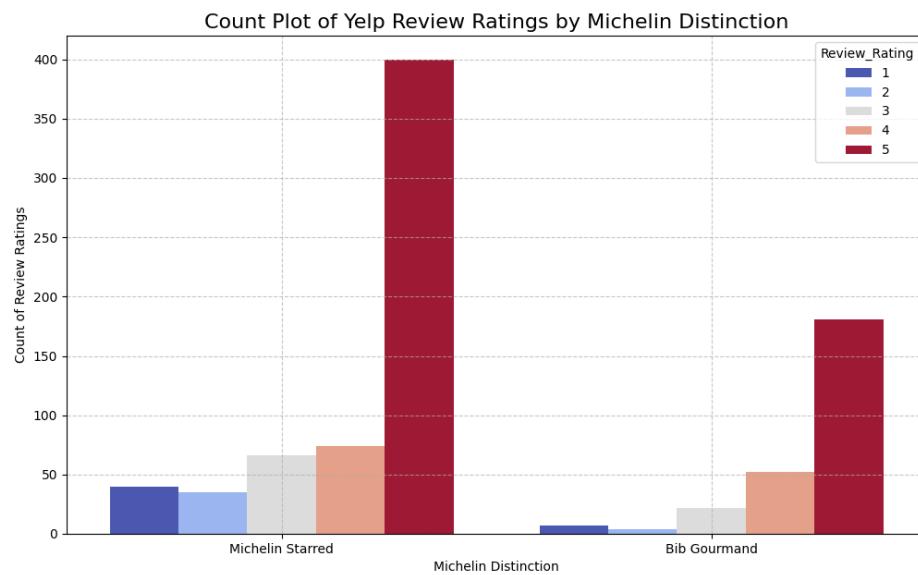
The analysis for Hypothesis 6, posited that customer satisfaction, as measured by Yelp ratings, would differ significantly between Bib Gourmand-recommended and Michelin-starred restaurants, which provides clear support for this hypothesis. Figure 4.4.1 (a) illustrates the average Yelp ratings for these two categories, with Bib Gourmand restaurants receiving an average rating of 4.49, notably higher than the average rating of 4.24 for Michelin-starred restaurants. This suggests that, on average, customers express higher satisfaction with Bib Gourmand establishments compared to Michelin-starred venues. Further statistical analysis using an independent t-test confirms the significance of this difference, with a calculated t-statistic of -3.03 and an associated P-value of 0.0025. This indicates that the difference in average ratings between the two groups is statistically significant at a standard confidence level ( $p < 0.05$ ). These findings suggest that despite the prestige associated with Michelin-starred restaurants, Bib Gourmand restaurants may offer a dining experience that resonates more positively with Yelp reviewers, possibly due to a perceived higher value for money or more accessible dining experiences. This highlights the complex relationship

between restaurant prestige and customer satisfaction, where more affordable options can sometimes outperform luxury venues in terms of perceived customer value.



**Figure 11-4.4.1 (a). Average Yelp Ratings: Michelin Star vs Bib Gourmand Restaurants**

In further support of these findings, the count plot in Figure 4.4.1 (b) visualizes the distribution of Yelp review ratings across the two categories. Michelin-starred restaurants show a higher concentration of 5-star reviews but also display a broader spread of lower ratings (1-star, 2-star, and 3-star). In contrast, Bib Gourmand restaurants, while also receiving a significant number of 5-star reviews, maintain a more consistent distribution towards higher ratings with fewer extremely low ratings. This suggests that while Michelin-starred restaurants are capable of delivering exceptional dining experiences, they also tend to evoke more polarized customer reactions compared to the relatively more consistent satisfaction levels observed with Bib Gourmand establishments.

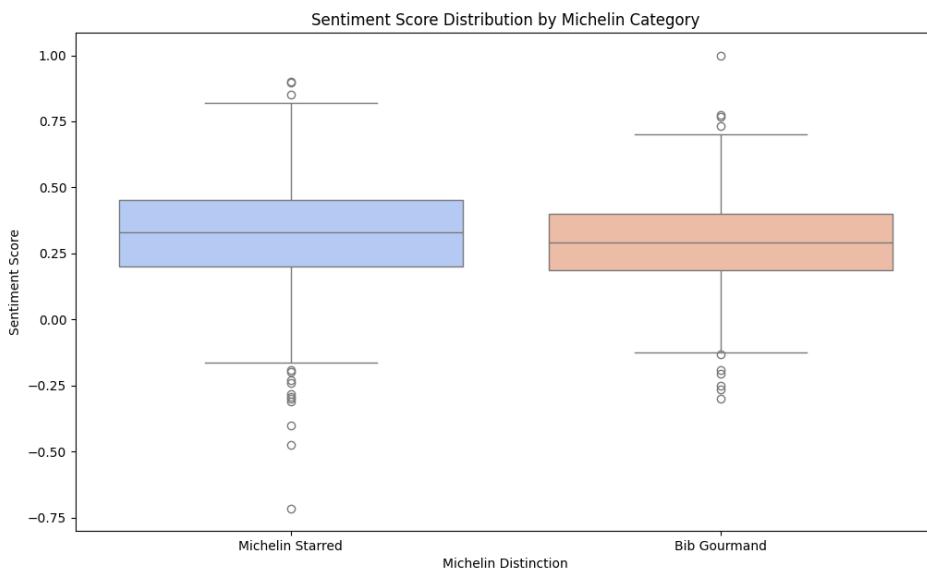


**Figure 12-4.4.1 (b). Count Plot of Yelp Review Ratings by Michelin Distinction**

#### 4.4.2 Results of Hypothesis 7

The analysis of Hypothesis 7, which proposed that the distribution of customer satisfaction, as measured by sentiment scores, would differ between Bib Gourmand-recommended restaurants and Michelin-starred restaurants, reveals nuanced findings. The average sentiment score for Michelin-starred restaurants is slightly higher at 0.32 compared to 0.29 for Bib Gourmand restaurants, suggesting that customers express marginally more positive sentiment towards Michelin-starred establishments. However, both categories exhibit a wide range of sentiment scores, indicating significant variability in customer experiences. As shown in Figure 4.4.2 (a), the box plot further highlights this variability, with both types of restaurants displaying a spectrum of sentiment scores, ranging from highly positive (above 0.5) to negative (below 0). The presence of outliers in both groups underscores the diversity of customer opinions. While the overall trend appears to favour Michelin-starred restaurants, the difference is

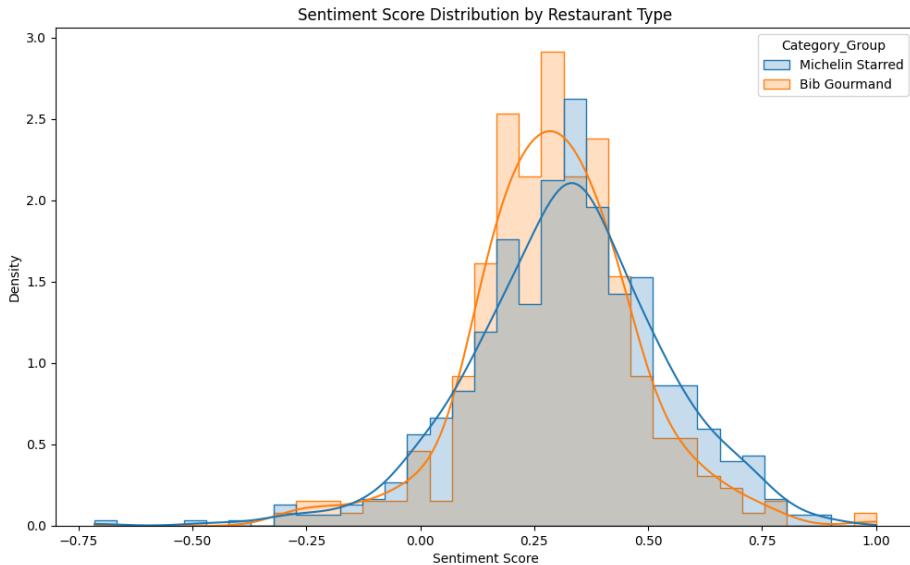
not statistically significant. An independent t-test yields a t-statistic of 1.89 and a P-value of 0.059, suggesting that the sentiment scores between Michelin-starred and Bib Gourmand restaurants do not differ significantly at the conventional 0.05 significance level. This implies that both types of establishments generally evoke similar levels of sentiment in customer reviews.



*Figure 13-4.4.2 (a). Sentiment Score Distribution by Michelin Category*

Figure 4.4.2 (b) provides a more detailed view by illustrating the distribution of sentiment scores across both restaurant types. The density plot reveals a similar overall distribution for both categories, with most sentiment scores clustering around positive values between 0.2 and 0.5. However, the distribution for Bib Gourmand restaurants shows a slightly broader spread, with more reviews falling in the neutral sentiment range (around 0.0 to 0.25). In contrast, Michelin-starred restaurants exhibit a tighter distribution around the higher sentiment scores, indicating that customers' experiences at these establishments tend to evoke consistently positive sentiment. Despite these distributional differences, the overlap in the two curves suggests that while there are

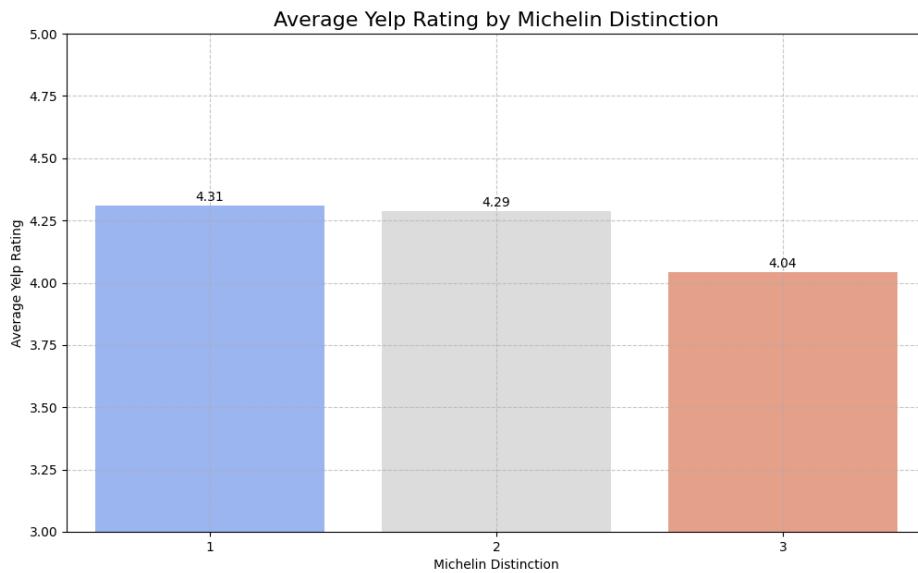
differences in sentiment between the two restaurant types, the distinctions may not be starkly pronounced.



**Figure 14-4.4.2 (b). Sentiment Score Distribution by Restaurant Type**

#### 4.4.3 Results of Hypothesis 8

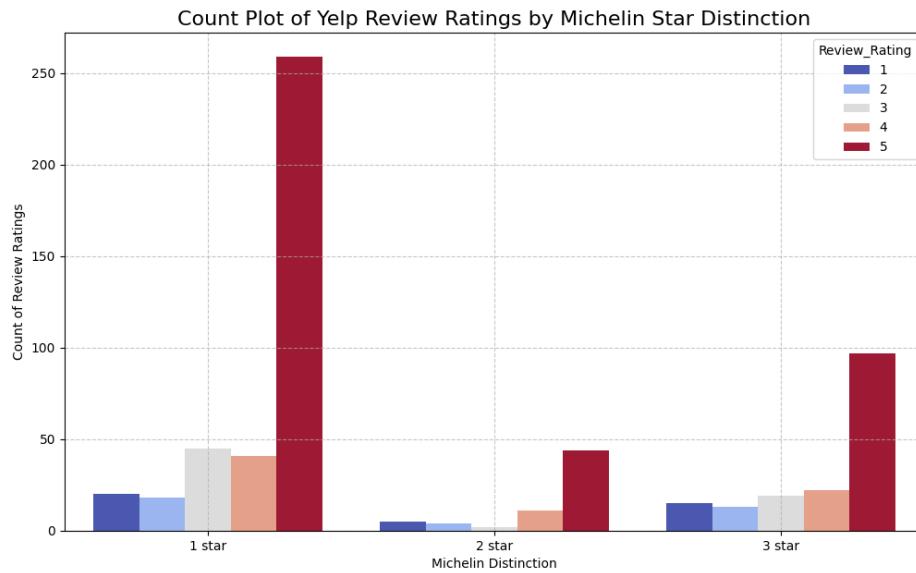
The analysis of Hypothesis 8 aimed to determine whether there are significant differences in Yelp ratings among restaurants with different Michelin star distinctions (1-star, 2-star, and 3-star). As shown in Figure 4.4.3 (a), the average Yelp ratings reveal slight variations across Michelin star categories. Specifically, 1-star restaurants have an average Yelp rating of 4.31, while 2-star and 3-star restaurants have slightly lower average ratings of 4.29 and 4.04, respectively. Although the differences are modest, this suggests that, on average, 1-star restaurants tend to receive slightly higher customer ratings on Yelp compared to their more prestigious 2-star and 3-star counterparts.



**Figure 15-4.4.3 (a). Average Yelp Rating by Michelin Distinction**

Further statistical analysis using an ANOVA test was conducted to assess the significance of the differences in Yelp ratings across Michelin distinctions. The ANOVA F-statistic is 2.78, with a P-value of 0.063. Although the P-value is slightly above the conventional threshold of 0.05, it suggests a trend towards significance. However, the results indicate that the differences in Yelp ratings between the Michelin star categories (1-star, 2-star, and 3-star) are not statistically significant at the 0.05 level. This implies that while there may be some variation in customer satisfaction, as measured by Yelp ratings, among 1-star, 2-star, and 3-star restaurants, these differences are not strong enough to be considered significant based on the data analyzed. In addition, as illustrated in Figure 4.4.3 (b), the count plot of Yelp review ratings by Michelin star distinction further visualizes these patterns. The majority of 1-star restaurants receive 5-star Yelp ratings, with a noticeable drop in ratings for 2-star and 3-star restaurants. Despite this variation in the count of ratings, the lack of statistical significance in the ANOVA test suggests that the distribution of these ratings across the different Michelin categories does not represent a significant difference in customer

satisfaction. This reinforces the observation that Yelp ratings across Michelin star distinctions exhibit some variability but do not present a substantial enough difference to be deemed statistically significant.

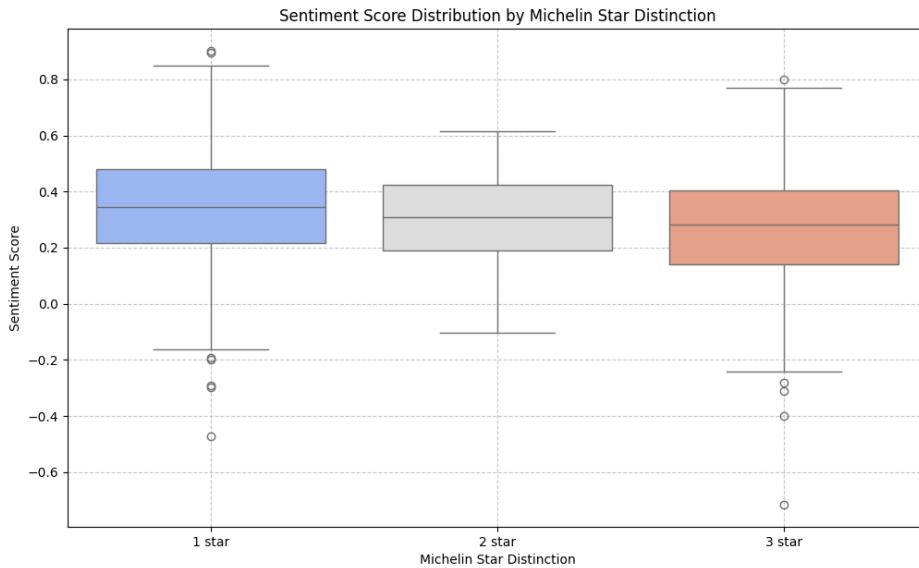


**Figure 16-4.4.3 (b). Count Plot of Yelp Review Ratings by Michelin Star Distinction**

#### 4.4.4 Results of Hypothesis 9

The analysis of sentiment score distributions across different Michelin star distinctions begins with the box plot in Figure 4.4.4 (a), which illustrates the variability in sentiment scores for 1-star, 2-star, and 3-star Michelin-rated restaurants. The box plot shows that the median sentiment score tends to decrease slightly as Michelin star distinctions increase, with the widest range of sentiment scores observed in the 1-star category. This visual representation suggests potential differences in how customers perceive their dining experiences across different Michelin star levels. To statistically assess these differences, an ANOVA test was conducted. The results reveal a significant difference in sentiment scores among the three Michelin star categories, as indicated by

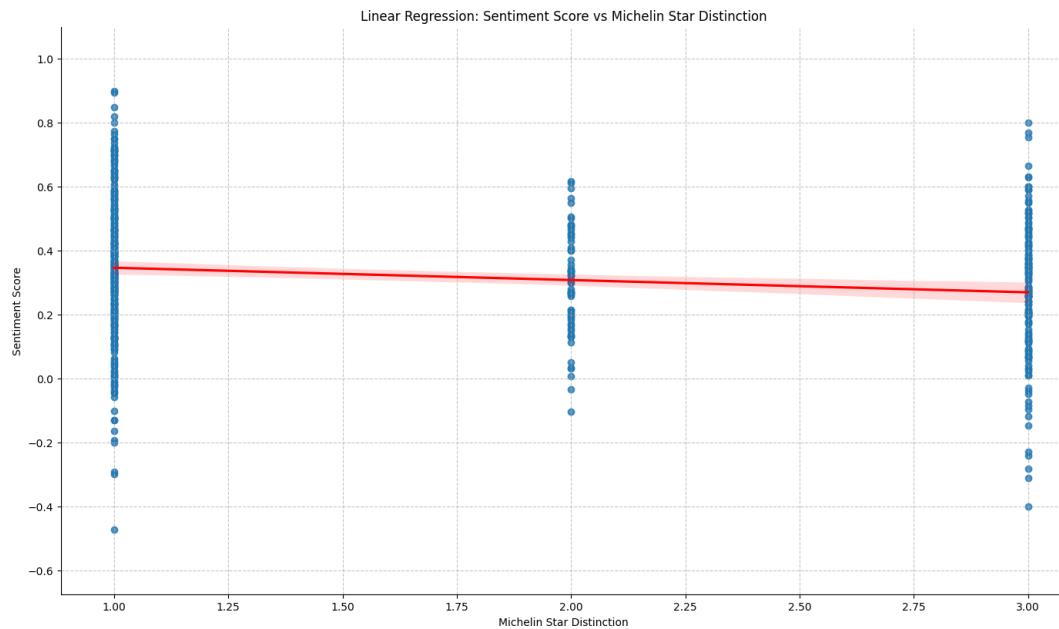
an ANOVA F-statistic of 8.02 and a P-value of 0.0004. These results suggest that the differences in sentiment scores between 1-star, 2-star, and 3-star restaurants are statistically significant, implying that Michelin star distinctions are associated with varying levels of customer sentiment in Yelp reviews.



**Figure 17-4.4.4 (a). Sentiment Score Distribution by Michelin Star Distinction**

Building on this finding, a linear regression analysis (Figure 4.4.4 (b)) was performed to further explore the relationship between Michelin star distinctions and sentiment scores. The regression results suggest a negative relationship, with a coefficient of -0.0385 for Michelin star distinctions. This indicates that, on average, higher Michelin star distinctions are associated with slightly lower sentiment scores. The regression model's R-squared value of 0.025 suggests that Michelin star distinctions explain a small proportion of the variability in sentiment scores. Although the relationship is statistically significant, as indicated by a P-value of 0.000 in the regression output, the magnitude of the effect is relatively small. This finding highlights that while Michelin star distinctions influence customer sentiment, other factors may

play a more substantial role in shaping customer perceptions as reflected in Yelp reviews.



*Figure 18-4.4.4 (b). Linear Regression: Sentiment Score vs Michelin Star Distinction*

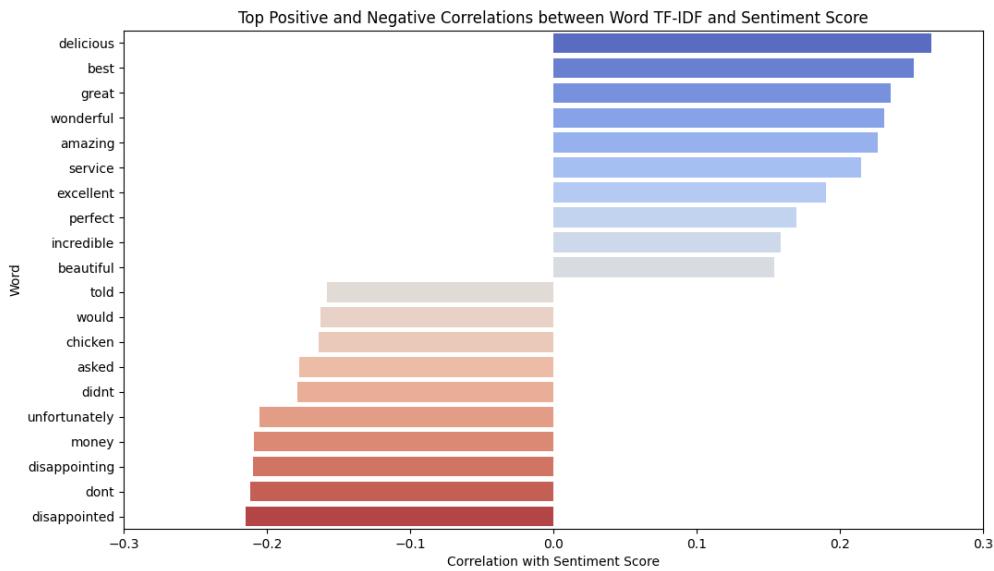
## 4.5 Detailed Findings for Research Question 4

The purpose of this section is to explore and analyze the various factors that influence customer decisions when choosing between Michelin-starred restaurants and Bib Gourmand-recommended establishments. By examining customer reviews and sentiment data, this section seeks to uncover the distinct patterns and themes that differentiate Michelin-starred restaurants, which are often associated with luxury and high-end dining, from Bib Gourmand-recommended restaurants, known for their good value and more casual dining experiences. The findings in this section will contribute to a deeper understanding of the motivations behind customer choices, highlighting the unique characteristics of each type of restaurant and how they meet the diverse expectations of diners.

### 4.5.1 Results of Hypothesis 10

The analysis of Hypothesis 10 focuses on identifying specific words or phrases that frequently appear in customer reviews of Michelin-rated restaurants and examining their correlation with sentiment scores. By applying TF-IDF vectorization to the reviews, the most significant words were extracted, and their correlation with sentiment scores was calculated. Figure 4.5.1 (a) visualizes the top positive and negative correlations between word TF-IDF scores and sentiment scores. Words like “delicious”, “best”, “great”, “wonderful”, and “amazing” show strong positive correlations, indicating that their frequent usage is associated with higher sentiment scores. These terms often reflect positive dining experiences and are commonly used to describe excellent food and service. Conversely, words such as “disappointed”, “don't”, “disappointing”, “money”, and “unfortunately” exhibit negative correlations with

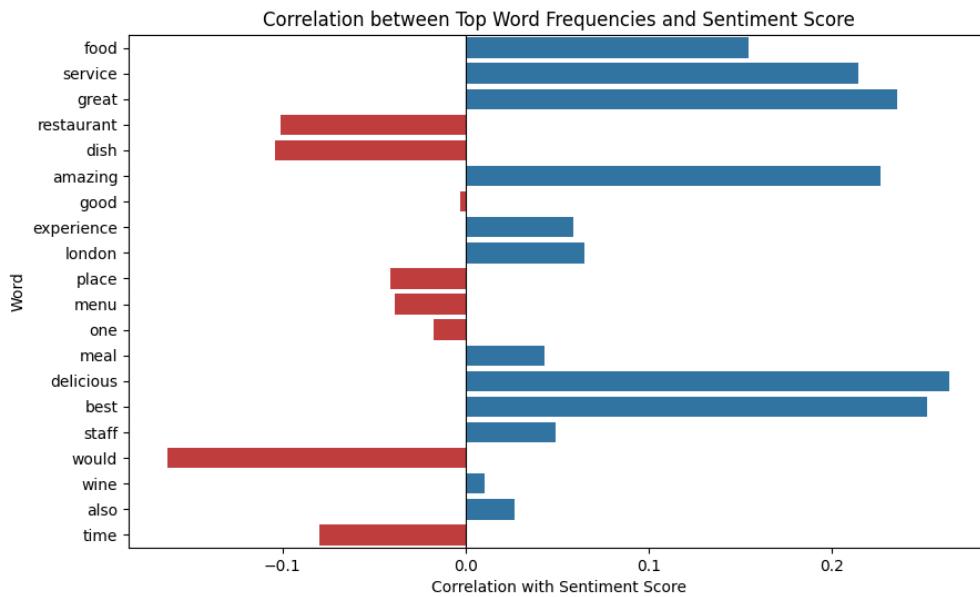
sentiment scores, reflecting customer dissatisfaction. These negative terms are more likely to be associated with reviews where customers encountered unsatisfactory experiences at Michelin-rated establishments.



**Figure 19-4.5.1 (a). Positive and Negative Correlations Between Word and Sentiment Score**

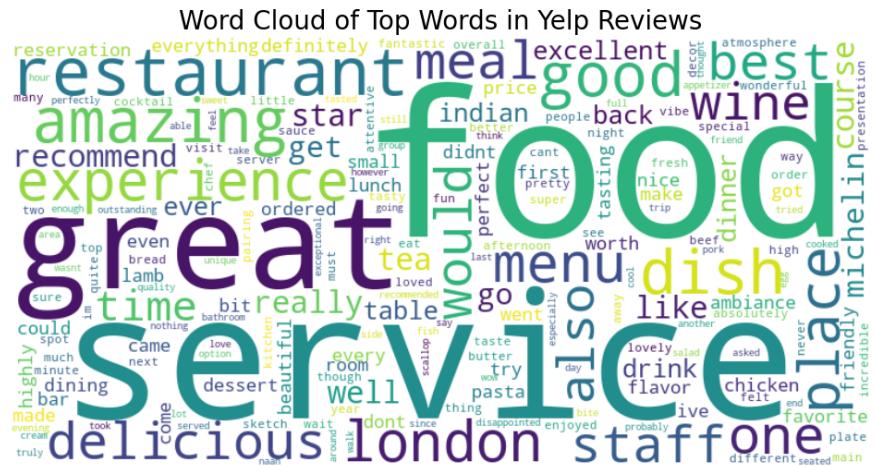
Figure 4.5.1 (b) depicts the correlation between the top word frequencies in customer reviews of Michelin-rated restaurants and sentiment scores. The chart highlights both positive and negative correlations. Words such as “food”, “service”, “great”, “amazing”, “delicious”, and “best” show positive correlations with sentiment scores, indicating that these terms are commonly associated with positive dining experiences and higher customer satisfaction. The frequent use of these words in reviews reflects a tendency towards favourable feedback when customers describe their experiences at Michelin-rated establishments. Conversely, words such as “restaurant”, “dish”, “place”, “menu”, and “time” display negative correlations with sentiment scores. These words may indicate more neutral or less enthusiastic experiences when used frequently in reviews. Interestingly, the word “would” shows a strong negative correlation, suggesting that it may appear in contexts where customers express unmet

expectations or conditions, such as phrases like "would have been better" or "would not recommend." This analysis illustrates that while certain terms are strongly linked with positive sentiment, others are more likely to accompany expressions of disappointment or dissatisfaction, thus offering a more nuanced understanding of customer feedback.



**Figure 20-4.5.1 (b). Correlation between Top Word Frequencies and Sentiment Score**

Figure 4.5.1 (c) illustrates a word cloud generated from the most frequent words in Yelp reviews for Michelin-rated restaurants. The size of each word in the cloud reflects its frequency, with larger words indicating higher occurrences in the reviews. Prominent words such as "food", "service", "great", "restaurant", and "experience" dominate the word cloud, underscoring their significance in customer feedback. Words like "delicious", "amazing", "best", and "wine" also appear frequently, reflecting key aspects that diners emphasize when describing their dining experiences at Michelin-rated establishments.

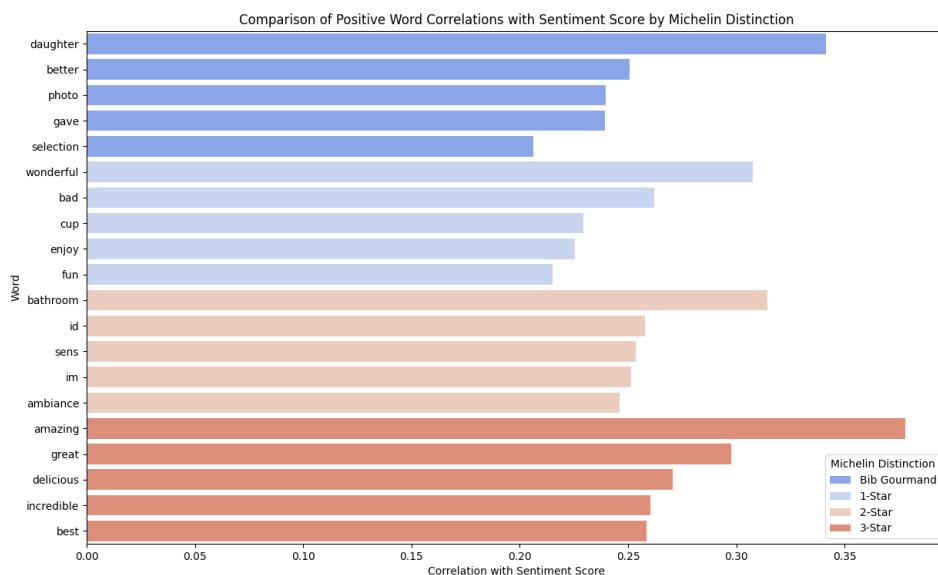


**Figure 21-4.5.1 (c). Word Cloud of Top Words in Yelp Reviews**

#### **4.5.2 Results of Hypothesis 11**

The analysis of Hypothesis 11 investigates whether specific words or phrases that frequently appear in customer reviews of Bib Gourmand and Michelin-starred restaurants (1-star, 2-star, and 3-star) exhibit significant differences in their correlation with sentiment scores across these categories. The results, as visualized in Figure 4.5.2 (a), demonstrate that the words most positively correlated with sentiment scores differ across Michelin distinctions. For Bib Gourmand restaurants, words like “daughter”, “better”, and “photo” exhibit stronger correlations with positive sentiment, reflecting the more casual and personal dining experiences typically associated with Bib Gourmand establishments. In contrast, 3-star Michelin restaurants feature words like “amazing”, “great”, “delicious”, “incredible”, and “best” which are more closely tied to luxurious and high-quality dining experiences. These words demonstrate a stronger positive correlation with sentiment scores in 3-star reviews, highlighting the

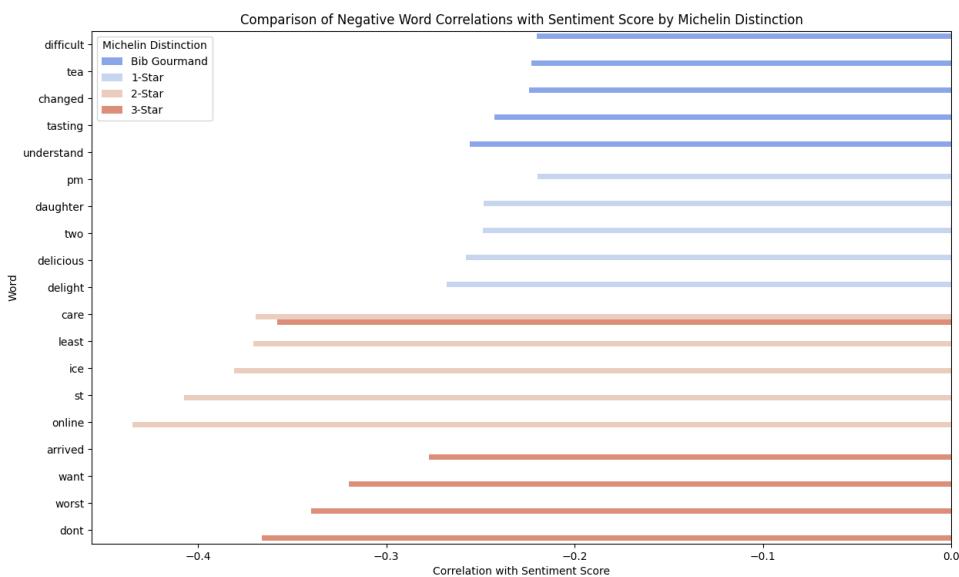
exceptional experiences that customers associate with these top-tier establishments. Meanwhile, 1-star and 2-star Michelin restaurants display a mix of correlations, with words like “fun”, “wonderful”, and “ambience” reflecting positive experiences. These findings illustrate how different customer expectations and experiences are reflected in the language used in reviews, with distinct patterns emerging across the Michelin distinctions.



**Figure 22-4.5.2 (a). Comparison of Positive Word Correlations with Sentiment Score by Michelin Distinction**

The visualization in Figure 4.5.2 (b) focuses on words that exhibit the most negative correlations with sentiment scores across Bib Gourmand and Michelin-starred (1-star, 2-star, and 3-star) restaurants. The analysis highlights that negative sentiment is driven by different factors depending on the Michelin distinction. For Bib Gourmand restaurants, words like “difficult”, “tea”, “changed”, “tasting”, and “understand” are strongly negatively correlated with sentiment scores, indicating that customer dissatisfaction often revolves around challenges in the dining experience or specific issues with the menu. In contrast, for 3-star Michelin restaurants, negative correlations

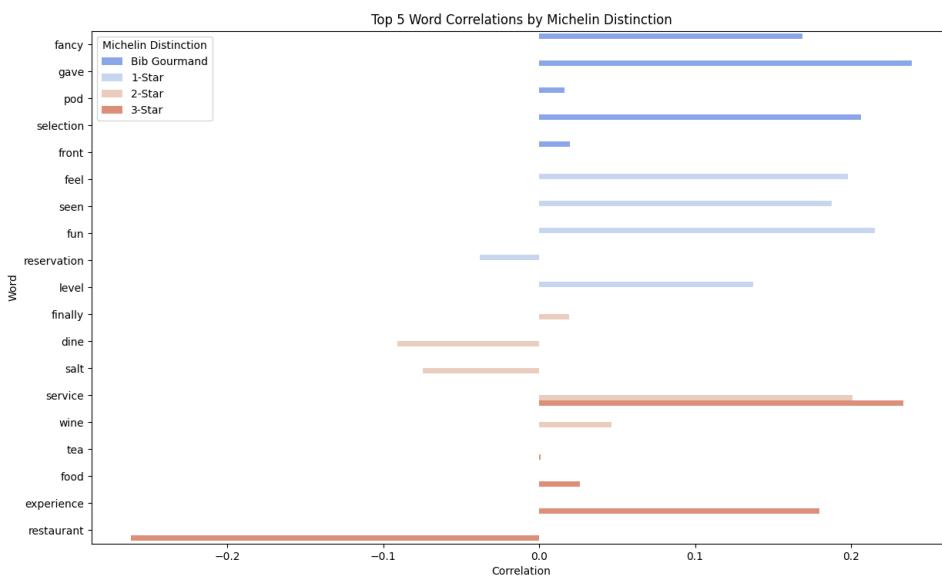
are observed with words like “care”, “worst”, and “arrived” suggesting that even in highly prestigious establishments, negative sentiment can be linked to service-related issues or unmet expectations. These findings underline the varying nature of customer dissatisfaction across different types of restaurants, with Bib Gourmand restaurants facing more operational or menu-related criticisms, while Michelin-starred establishments, particularly at the 3-star level, are critiqued for their service and overall experience.



**Figure 23-4.5.2 (b). Comparison of Negative Word Correlations with Sentiment Score by Michelin Distinction**

Figure 4.5.2 (c) visualises the top five-word correlations with sentiment scores for Bib Gourmand and Michelin-starred (1-star, 2-star, and 3-star) restaurants. The chart highlights the distinctiveness of word usage and its association with customer sentiment across these categories. For Bib Gourmand restaurants, words like “fancy”, “gave”, and “selection” appear with the highest correlation to sentiment, suggesting that customers in these establishments may focus on specific elements of the dining experience that are unique to more casual or innovative dining environments. For Michelin-starred

restaurants, particularly 2-star and 3-star venues, terms like “restaurant”, “service”, “experience”, and “food” feature prominently, reflecting a more traditional focus on the core aspects of the dining experience. Notably, 3-star restaurants show a negative correlation for the word “restaurant” indicating potential dissatisfaction tied to expectations in these elite establishments. The diversity of top words across these categories suggests that different factors drive customer satisfaction or dissatisfaction depending on the type of restaurant, with Bib Gourmand reviews emphasizing specific memorable elements and Michelin-starred reviews focusing more on the overall dining experience.



*Figure 24-4.5.2 (c). Top 5 Word Correlations by Michelin Distinction*

### 4.5.3 Results of Hypothesis 12

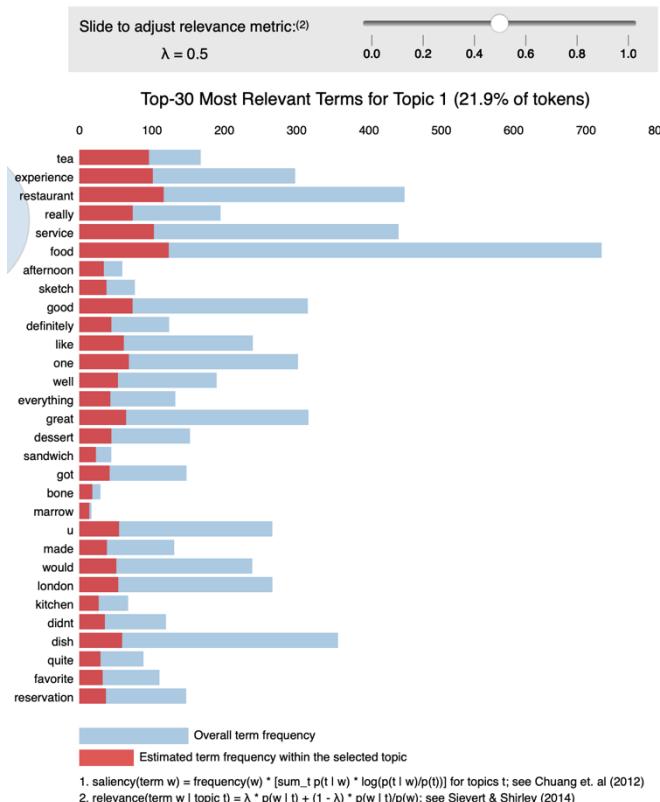
The results of Hypothesis 12, as evidenced by the intertopic distance map and the most relevant terms for each topic, reveal distinct thematic patterns in customer reviews of Michelin-rated restaurants. The reviews emphasize key aspects of the dining

experience, ranging from the quality of food and service to the overall atmosphere and specific dining occasions. Topic 1 reflects a focus on dining experiences, particularly afternoon tea and positive feedback on food and service. Topic 2 highlights detailed discussions on specific dishes and the fine dining experience, often in Michelin-starred establishments in prominent cities like London. Topic 3 addresses service quality and ordering experiences, with a balance between positive and negative feedback. Topic 4 emphasizes the overall dining experience, blending elements of food quality, service, and ambience. Finally, Topic 5 centres on fine dining, with particular attention to the professionalism of the staff, meal structure, and attention to detail. These thematic patterns collectively reflect diners' comprehensive evaluations of their experiences and expectations in Michelin-rated restaurants.



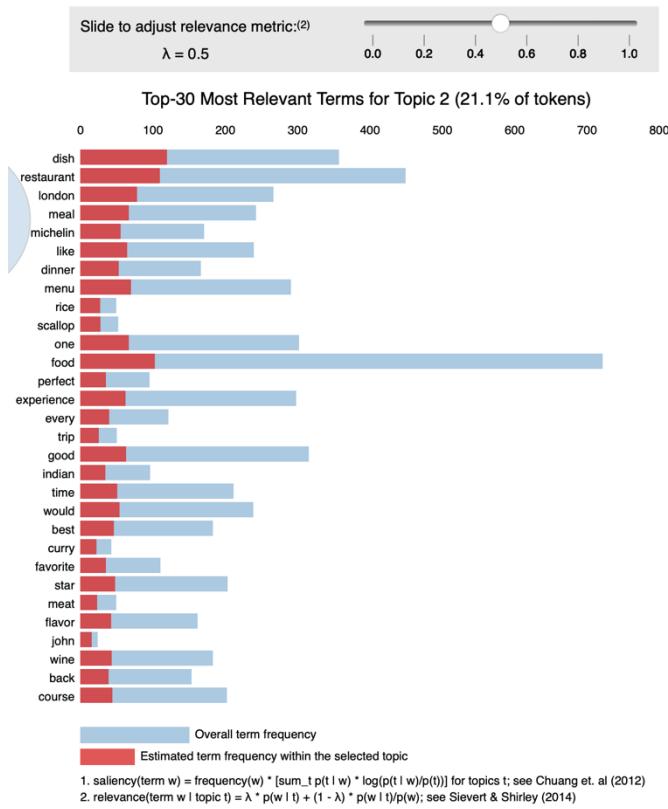
*Figure 25-4.5.3 (a). Intertopic Distance Map*

The most relevant terms for Topic 1, as shown in the visualization, reflect the central themes related to customer experiences in Michelin-rated restaurants. Notable terms include “tea”, “experience”, “restaurant”, “service”, and “food” indicating that the topic revolves around dining experiences, with particular emphasis on the quality of food and service. The term “afternoon” suggests that this topic may also pertain to specific dining occasions, such as afternoon tea, which is further supported by the presence of “sketch” and “dessert”. Additionally, terms like “well”, “everything”, and “great” hint at positive customer feedback and satisfaction. The frequent appearance of terms such as “reservation” and “favorite” suggests that securing a reservation and having a memorable dining experience are key elements in this topic. The distribution of terms points to a balanced mix of aspects related to both the food itself and the overall dining experience, supporting the idea that diners value both the culinary quality and the atmosphere or service provided by Michelin-rated establishments.



*Figure 26-4.5.3 (c). Top 30 Most Relevant Terms for Topic 1 ( $\lambda = 0.5$ )*

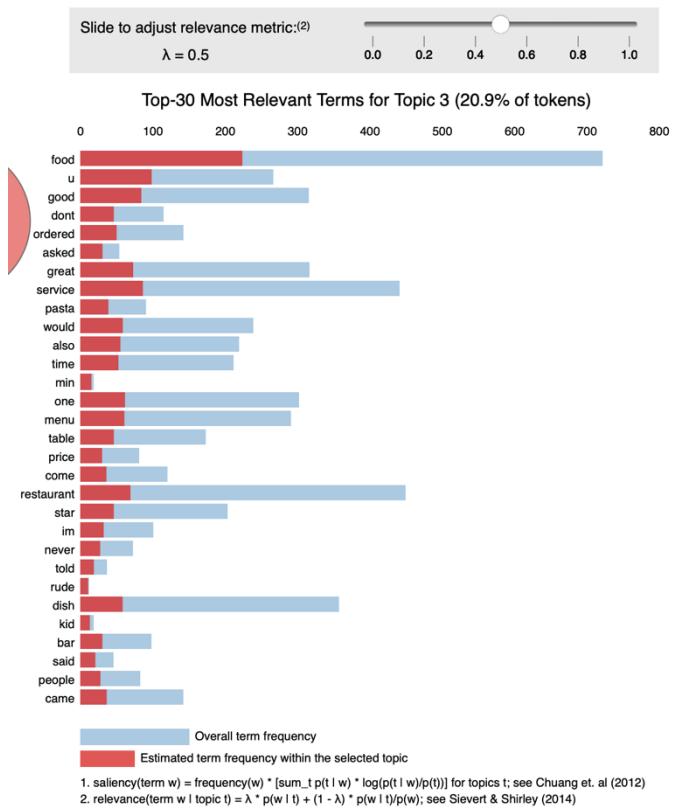
Topic 2 highlights key terms that revolve around specific dishes and the overall dining experience, particularly in Michelin-rated restaurants. Prominent terms such as “dish”, “restaurant”, “meal”, “Michelin”, and “menu” emphasize a focus on high-quality dining, with special attention to the presentation and content of meals. Geographic references like “London” suggest that these discussions may centre around restaurants in major cities known for their culinary excellence. Terms like “scallop”, “rice”, and “curry” point towards discussions on specific types of dishes that are often part of fine dining experiences. The frequent appearance of words such as “perfect”, “favorite”, and “experience” implies a high level of satisfaction and personal preference, reflecting customers' positive interactions with Michelin-rated establishments. Additionally, the inclusion of “wine” and “course” suggests that wine pairing and multi-course meals are significant components of the dining experience for customers. This topic, therefore, encapsulates detailed aspects of what diners expect and enjoy in Michelin-starred restaurants.



**Figure 27-4.5.3 (f). Top 30 Most Relevant Terms for Topic 2 ( $\lambda = 0.5$ )**

Topic 3 focuses on customer reviews that emphasize service quality, ordering experiences, and interactions within Michelin-rated restaurants. The most frequent term, “food” suggests that the core discussion revolves around the dishes served. However, terms like “service”, “ordered”, “asked” and “pasta” indicate that a significant portion of the discourse also addresses the ordering process and service interactions. Words such as “good”, “great”, and “star” reflect positive feedback, yet terms like “rude”, “never”, and “told” hint at instances of dissatisfaction or negative experiences. Additionally, “time” and “price” suggest that customers also reflect on the punctuality and value of their dining experience. The presence of “kid”, “bar”, and “table” points to various situational contexts in which these reviews are made, whether it's a family setting, a bar experience, or standard restaurant seating. Overall, this topic encapsulates

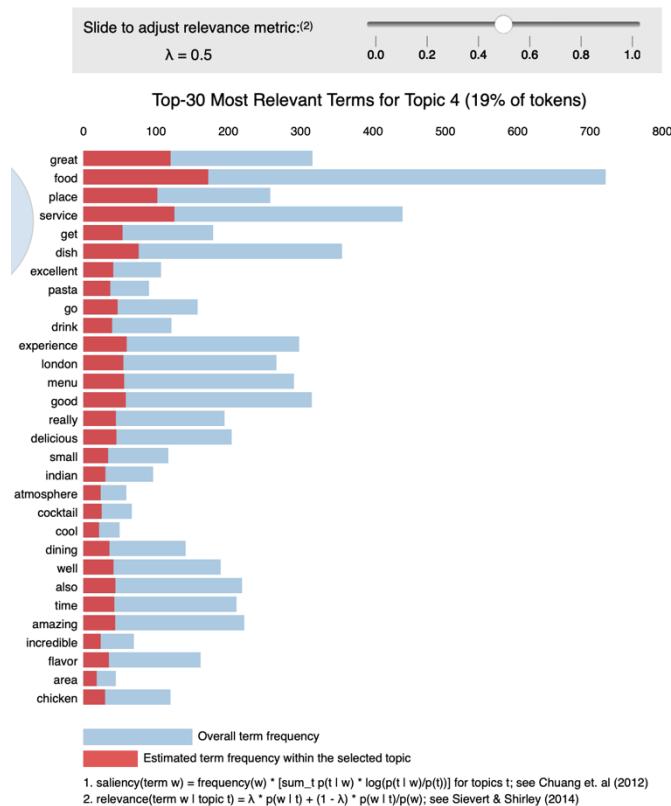
the varied aspects of customer experiences, balancing both the food quality and the service dynamics within high-end dining establishments.



**Figure 28-4.5.3 (i). Top 30 Most Relevant Terms for Topic 3 ( $\lambda = 0.5$ )**

Topic 4 is centred on discussions about the overall dining experience, with particular attention to the quality of food and service at Michelin-rated restaurants. The most prominent terms, such as “great”, “food”, and “place” indicate that many reviews highlight positive dining experiences, emphasizing the excellence of the dishes and the venue itself. The inclusion of “service”, “excellent” and “experience” further reinforces that customers highly value attentive service and the overall atmosphere of the restaurant. Words like “pasta”, “menu”, and “drink” suggest a focus on specific elements of the dining experience, such as the food offerings and beverages. Additionally, terms such as “atmosphere”, “cool”, and “amazing” imply that the ambience and unique qualities of the restaurant play an important role in customer

satisfaction. The presence of terms like “small”, “Indian”, and “cocktail” suggests that certain niche experiences or cultural influences are also being highlighted in these reviews. Overall, this topic encapsulates the multidimensional nature of the dining experience, blending elements of food quality, service, and ambience in customer perceptions.



**Figure 29-4.5.3 (l). Top 30 Most Relevant Terms for Topic 4 ( $\lambda = 0.5$ )**

Topic 5 revolves around the themes of fine dining and overall restaurant experience, with a particular focus on elements such as food, staff, and service. The most relevant terms like “restaurant”, “staff”, and “wine” suggest that customer reviews often emphasize the quality of the dining environment and the professionalism of the staff. Terms such as “pairing”, “course”, and “tea” point to discussions about the structure of meals, including wine pairings and multi-course experiences, which are characteristic of high-end dining. Words like “amazing”, “recommend”, and “delicious”

indicate that customers frequently highlight positive experiences and recommendations for others. The mention of specific elements such as “dessert”, “menu”, and “meal” further underlines the centrality of food quality in these reviews. Additionally, the terms “sweet”, “little”, and “lovely” hint at a nuanced appreciation for details in the dining experience, suggesting that both the overall meal and individual components contribute to customer satisfaction. Overall, this topic highlights the importance of food, service, and attention to detail in shaping the perceptions of diners in Michelin-rated restaurants.

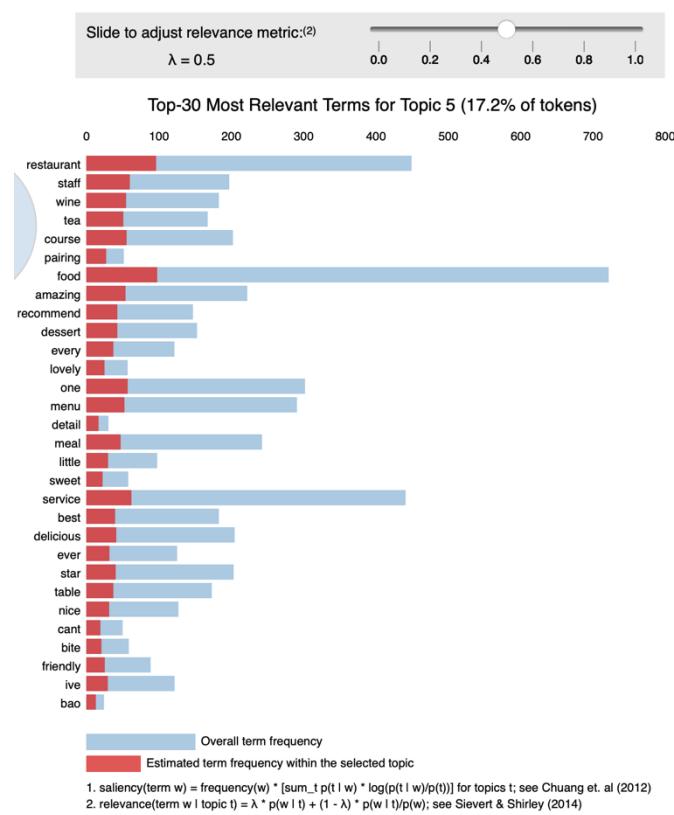


Figure 30-4.5.3 (o). Top 30 Most Relevant Terms for Topic 5 ( $\lambda = 0.5$ )

## CHAPTER 5. DISCUSSION

### 5.1 Discussion and Interpretation of Results

#### 5.1.1 *Interpretation of results for objective 1*

The results addressing Objective 1, which sought to evaluate the worthiness of Michelin-rated restaurants based on customer satisfaction as reflected in Yelp reviews, indicate a strong alignment between high review ratings and positive sentiment. The findings support the hypothesis that the majority of customer reviews for Michelin-rated restaurants would exhibit high levels of satisfaction, with most ratings falling within the 4- to 5-star range. This outcome is consistent with the existing literature that emphasizes the prestige and high expectations associated with Michelin-starred establishments (Rita et al., 2022; Kiatkawsin & Han, 2019). The skewed distribution of reviews towards the higher end of the rating spectrum confirms that customers generally perceive these restaurants favourably, affirming their culinary reputation.

The alignment between sentiment scores and review ratings further reinforces this notion. The sentiment analysis revealed a generally positive distribution of sentiment scores, which correlates moderately with higher review ratings. This suggests that customers' subjective expressions of satisfaction, as captured through text analysis, are consistent with the quantitative ratings they assign. The moderate Pearson correlation coefficient (0.564) indicates that while sentiment scores are a significant predictor of ratings, other factors may also influence customer ratings, such as specific dining experiences or expectations. This highlights the complexity of evaluating customer satisfaction solely based on sentiment analysis, as customer reviews often encapsulate multifaceted perceptions of their dining experiences.

Moreover, the rarity of high ratings accompanied by low sentiment scores further validates the hypothesis that positive sentiment generally aligns with high ratings. This finding suggests that Michelin-rated restaurants are largely successful in meeting or exceeding customer expectations, as reflected in the congruence between expressed sentiment and assigned ratings. Overall, the results support the conclusion that Michelin-rated restaurants, by and large, maintain their reputation for excellence, as perceived through the lens of consumer feedback on Yelp. However, the complexity of customer satisfaction, influenced by a range of factors beyond sentiment alone, underscores the need for a holistic approach when assessing the value of these establishments from the customer's perspective.

### ***5.1.2 Interpretation of results for objective 2***

The results for Objective 2, which examined the relationship between the price level of Michelin-rated restaurants and customer satisfaction, reveal findings that challenge common assumptions about fine dining. Contrary to Hypothesis 4, which proposed a positive correlation between higher price levels and greater customer satisfaction, the analysis suggests an inverse trend. Restaurants in lower price categories, such as "£ · On a budget" and "££ · A moderate spend," tend to receive higher Yelp ratings compared to their more expensive counterparts. This inverse relationship indicates that higher prices do not necessarily translate into higher customer satisfaction, as evidenced by the weak but statistically significant negative correlation ( $r = -0.129$ ,  $p = 0.00012$ ) between price level and Yelp ratings. The findings suggest that customers may perceive more affordable Michelin-rated restaurants as offering better value for money, a factor that significantly influences their overall satisfaction. These results are consistent with existing literature that highlights the importance of perceived value in

dining experiences, particularly in the context of price-sensitive customers (Rita et al., 2022). As customers become more attuned to the relationship between price and quality, they may place greater emphasis on receiving an exceptional experience for a reasonable cost. This trend is especially evident in the positive reception of Bib Gourmand restaurants, which offer high-quality dining at more accessible price points. The findings challenge the notion that exclusivity and higher prices inherently lead to superior customer experiences, instead highlighting that consumers may prioritize value and affordability when evaluating restaurants.

Hypothesis 5, which posited a positive correlation between price level and sentiment scores in customer reviews, was also not supported by the data. The analysis revealed no significant correlation between these two variables, with a near-zero Pearson correlation coefficient ( $r = 0.008$ ,  $p = 0.803$ ). This result suggests that the sentiment expressed in customer reviews does not systematically vary with the price level of the restaurant. Instead, sentiment appears to be influenced by other factors beyond price, such as the quality of service, atmosphere, or the personal preferences of the diners (Mathayomchan & Taecharungroj, 2020). The wide range of sentiment scores across all price categories further supports the idea that price alone is not a determinant of customer sentiment, highlighting the complexity of customer perceptions in the fine dining sector (Yalcinkaya & Just, 2022). In conclusion, these findings suggest that higher-priced Michelin-rated restaurants do not necessarily deliver a proportionate increase in customer satisfaction or positive sentiment. Instead, they underscore the importance of perceived value in shaping customer experiences. These insights contribute to the ongoing discussion in the literature regarding the nuanced relationship between price, value, and satisfaction in the restaurant industry, emphasizing that customers may not equate higher cost with higher satisfaction.

### ***5.1.3 Interpretation of results for objective 3***

The findings related to Objective 3, which aimed to identify the factors influencing customer choices between Michelin-starred restaurants and Bib Gourmand-recommended establishments, reveal distinct patterns in customer sentiment and language use that differentiate these two types of dining experiences. Hypothesis 10, which sought to identify specific words associated with high and low sentiment scores in Michelin-rated restaurant reviews, highlights the central role of food quality and service in shaping positive dining experiences. Words such as “delicious,” “great,” and “wonderful” are strongly correlated with positive sentiment, emphasizing that exceptional food and attentive service are critical drivers of customer satisfaction in Michelin-starred establishments. Conversely, negative sentiment is often linked to terms like “disappointed” and “money,” suggesting that unmet expectations, particularly regarding value for money, can lead to dissatisfaction. These results underscore the importance of both culinary excellence and perceived value in influencing customer sentiment. In addition, hypothesis 11 further explores the differences in word correlations with sentiment across Bib Gourmand and Michelin-starred restaurants, revealing nuanced variations in customer expectations and experiences. In Bib Gourmand establishments, words like “daughter” and “photo” are positively correlated with sentiment, reflecting the more casual, personal, and family-oriented experiences that these restaurants often provide. This contrasts with 3-star Michelin restaurants, where words such as “amazing,” “delicious,” and “incredible” are more closely tied to positive sentiment, underscoring the luxurious and high-quality dining experiences that customers associate with these top-tier venues. These distinctions illustrate how different types of restaurants meet diverse customer expectations, with Bib Gourmand restaurants catering to a desire for value and

approachable dining, while Michelin-starred establishments are more closely linked to premium experiences and exceptional food quality (Chiang & Guo, 2021).

Moreover, hypothesis 12 explores the thematic patterns that emerge in customer reviews, further highlighting the factors that influence dining choices. The topic modelling results reveal that customer reviews for Michelin-rated restaurants consistently emphasize key aspects such as food quality, service, and the overall dining atmosphere. For example, Topic 1 highlights specific dining occasions like afternoon tea, while Topic 3 focuses on service quality and interactions with staff, suggesting that both the culinary experience and the service environment are integral to customer satisfaction in Michelin-starred establishments. In conclusion, these findings contribute to a deeper understanding of the factors that shape customer perceptions of Michelin-rated and Bib Gourmand-recommended restaurants. They reveal that while food quality and service are universally important, the relative emphasis on these factors varies depending on the type of restaurant and the expectations associated with it (Kiatkawasin & Han, 2019). Michelin-starred restaurants are often evaluated based on their ability to deliver exceptional and luxurious experiences, while Bib Gourmand restaurants are appreciated for their value and the more personal, approachable experiences they offer.

## 5.2 Limitations of the Research

This study offers significant insights into customer satisfaction with Michelin-rated restaurants, yet it is subject to several broader research limitations. One major limitation is the geographic focus on restaurants in London. While this focus provides valuable insights into a specific market, it restricts the generalizability of the findings to other regions or countries with different culinary traditions, consumer preferences, and cultural contexts. The study's results may not fully reflect the dynamics of the restaurant industry in other locations, where local tastes, economic conditions, and cultural expectations could lead to different patterns in consumer behavior and restaurant evaluations. Expanding the geographic scope in future research would allow for a more comprehensive understanding of how these factors vary across different markets.

Another limitation is the reliance on Yelp reviews as the primary data source. Although Yelp provides a large volume of reviews, its user base may not represent the broader customer population. Yelp users tend to be more engaged and may have stronger opinions—either highly positive or negative—than the average diner, which could introduce bias into the sentiment analysis. Furthermore, the analysis is limited to textual data, excluding valuable non-textual feedback such as photos or videos, which could offer additional context and influence customer perceptions of their dining experiences. The sentiment analysis techniques used, including bag-of-words and TF-IDF models, while effective in identifying general trends, may not capture subtle linguistic nuances such as sarcasm or complex emotional tones. More advanced techniques, such as neural network-based sentiment analysis or context-aware models like BERT, could provide deeper insights into the data.

The study's temporal scope, focusing on reviews from 2023 to July 2024, further limits the research by potentially overlooking long-term trends in consumer behaviour, particularly those influenced by significant events like the COVID-19 pandemic. Excluding the pandemic period may miss out on lasting impacts on dining habits and preferences that have continued beyond the recovery phase. Additionally, the study did not consider other factors that could influence consumer opinions and expert ratings, such as pricing, restaurant accessibility, or emerging food trends, which are essential for a more comprehensive understanding of customer satisfaction.

Finally, while the research successfully identified broad patterns in customer sentiment, it did not deeply explore individual narratives and experiences that could provide richer, qualitative insights. A mixed-methods approach, integrating qualitative analysis such as detailed content analysis of reviews or interviews with customers, could offer a more nuanced understanding of the factors driving satisfaction in Michelin-starred restaurants. Despite these limitations, the study contributes important insights into the relationship between Michelin distinctions and customer satisfaction, offering a foundation for future studies to build upon and refine.

### 5.3 Implications for Future Research and Practical Applications

The findings of this study open up several avenues for future research while also providing practical insights for the restaurant industry. One key area for further exploration involves examining additional factors that influence customer satisfaction and perceptions of value at Michelin-rated restaurants. Future research could investigate how cultural differences across regions impact customer expectations and satisfaction, particularly by comparing reviews from various geographic areas. Expanding the study to include a wider range of data sources, such as customer surveys, interviews, or data from other review platforms, could provide a more comprehensive view of customer experiences. Additionally, exploring variables like ambiance, service quality, and specific menu offerings could help to deepen the understanding of what drives customer satisfaction in different Michelin-rated establishments.

From a practical standpoint, the insights gained from this study have significant implications for restaurant owners and managers. Michelin-rated restaurants, particularly those with higher price points, should focus on managing customer expectations to mitigate the risk of polarized reviews. Emphasizing value for money, even in high-end dining experiences, may help improve overall customer satisfaction. For Bib Gourmand restaurants, the results highlight the importance of maintaining a balance between quality and affordability, which seems to resonate strongly with customers. By leveraging these findings, restaurants can better tailor their services to meet customer needs and enhance their business outcomes, ensuring that they not only meet but exceed customer expectations, regardless of Michelin's distinction.

## CHAPTER 6. CONCLUSION

This study set out to explore the relationship between consumer sentiments expressed in Yelp reviews and the expert ratings provided by the Michelin Guide, focusing on Michelin-starred and Bib Gourmand restaurants in London. Through detailed sentiment analysis and a comprehensive examination of customer feedback, the research aimed to assess whether these prestigious Michelin-rated establishments meet consumer expectations and how they compare to Bib Gourmand restaurants, which are recognized for offering good value.

The findings of this study provide several key insights. First, customer satisfaction at Michelin-rated restaurants, as reflected in Yelp reviews, generally supports the prestigious reputation of these establishments. A significant majority of reviews indicate high satisfaction, with most ratings concentrated in the 4- to 5-star range. However, the analysis also revealed variability in customer experiences, particularly at higher-priced Michelin-starred restaurants, where elevated expectations sometimes led to more polarized reviews. This suggests that while Michelin-starred restaurants are recognized for their culinary excellence, they must continually manage consumer expectations to ensure consistent satisfaction.

Second, the comparison between Michelin-starred and Bib Gourmand restaurants highlights the complexity of consumer perceptions. Bib Gourmand restaurants received higher average Yelp ratings than Michelin-starred venues, indicating that customers perceive greater value in these more affordable options. The consistent positive feedback for Bib Gourmand establishments suggests that diners may prioritize value for money, even when evaluating high-quality dining experiences. This finding challenges the assumption that higher-priced restaurants automatically deliver superior

satisfaction, emphasizing the importance of perceived value in shaping customer perceptions.

Third, the sentiment analysis of Yelp reviews identified distinct thematic patterns that differentiate customer experiences across Michelin distinctions. While Michelin-starred restaurants were frequently associated with terms such as "luxury," "amazing," and "incredible," reflecting their focus on exceptional dining, Bib Gourmand reviews emphasized more casual, accessible experiences with words like "family," "value," and "personal." These patterns suggest that customers have varied expectations depending on the type of restaurant, with Michelin-starred establishments catering to a desire for high-end experiences and Bib Gourmand restaurants offering a more approachable dining option.

In conclusion, this research contributes to the growing body of literature on the relationship between expert evaluations and consumer-generated content in the restaurant industry. It highlights the importance of balancing price, value, and expectations in understanding customer satisfaction. The study also underscores the relevance of consumer feedback as a complement to professional reviews, offering a more nuanced perspective on dining experiences. Future research could expand on these findings by exploring other geographic locations or incorporating additional review platforms to assess the generalizability of the results. Overall, this study enhances our understanding of how Michelin distinctions and customer perceptions intersect, providing valuable insights for both restaurateurs and consumers in the competitive dining landscape.

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## APPENDICES

### Appendix 1. Additional Figures

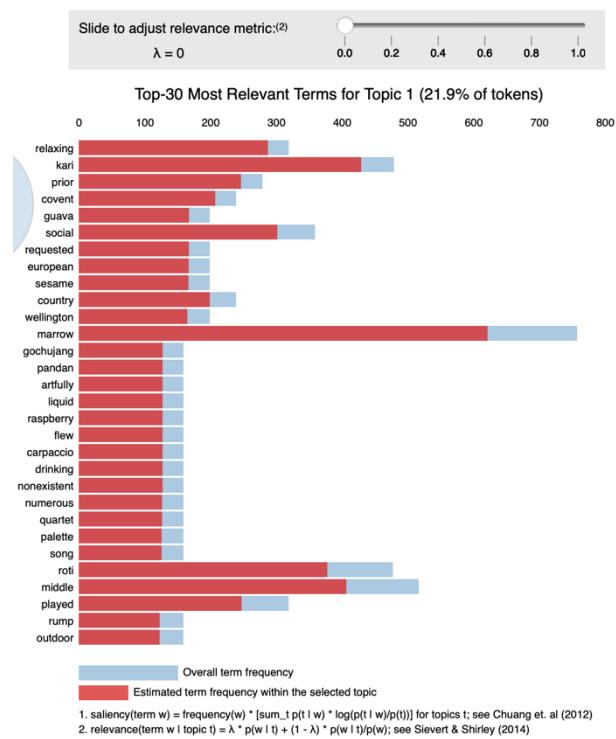
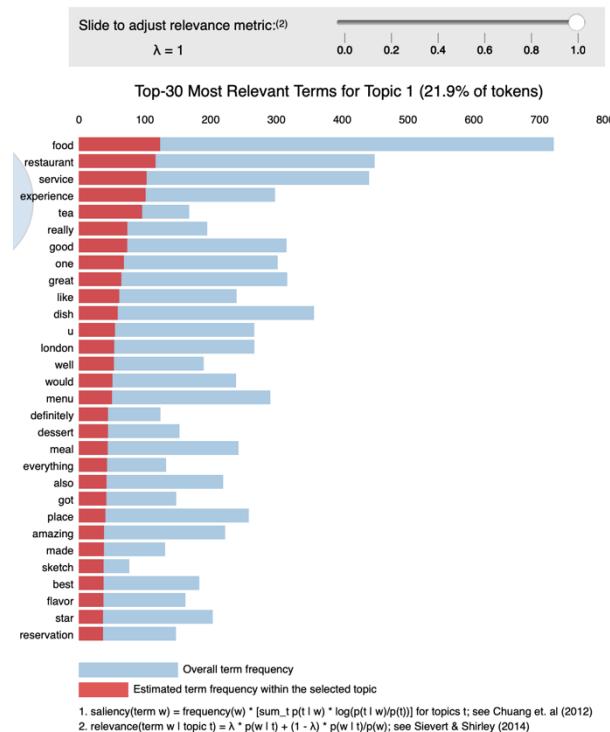
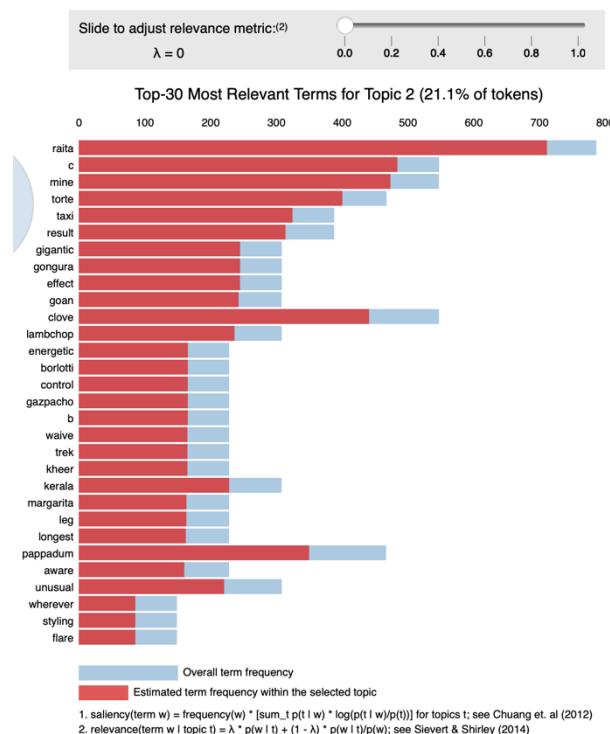
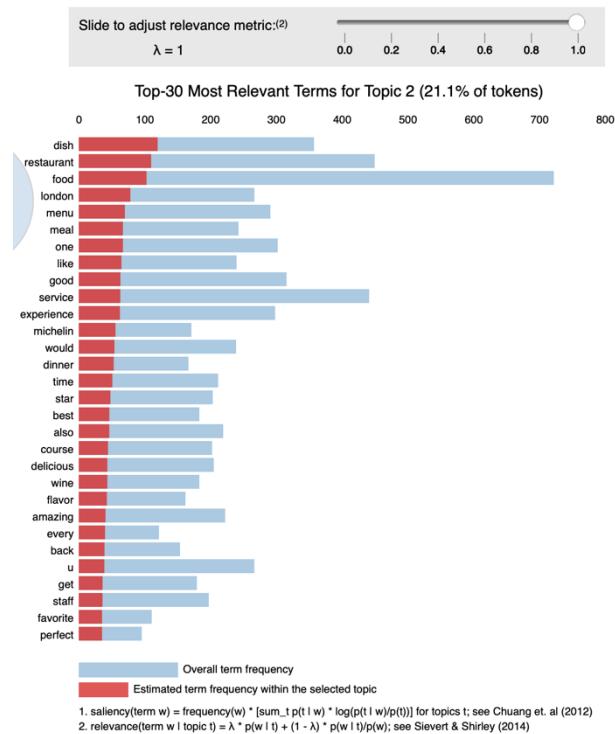
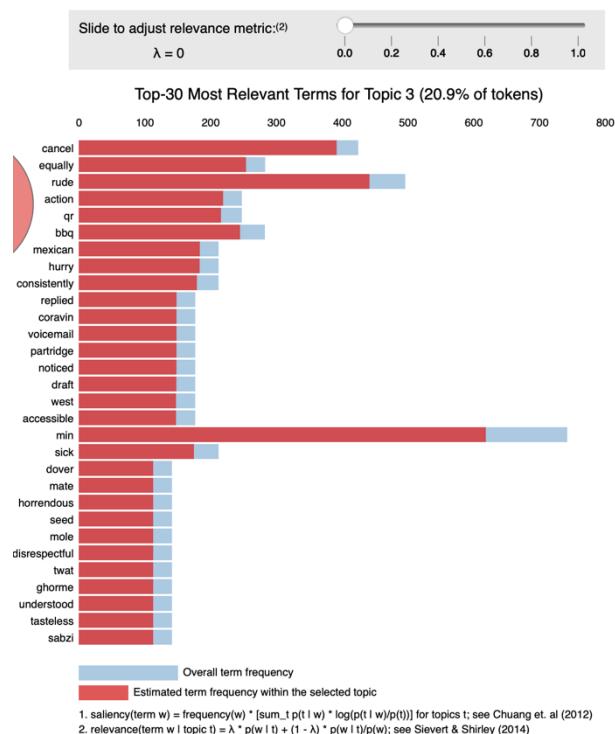
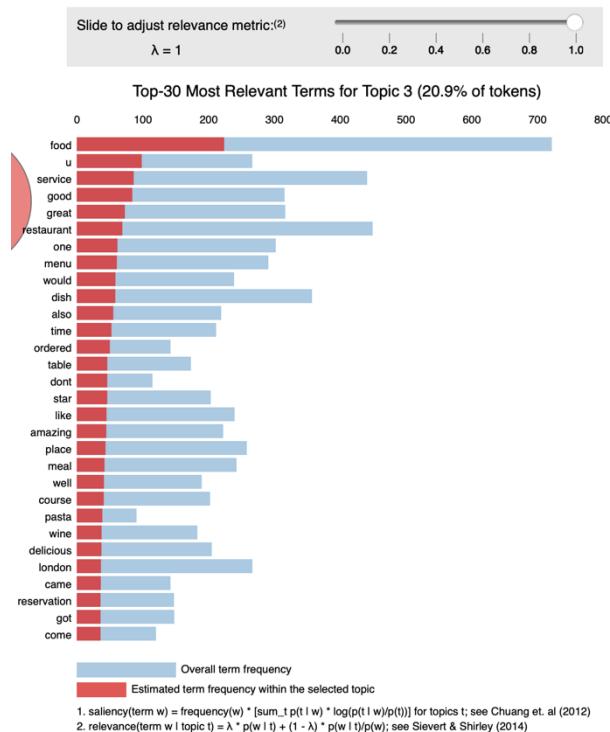
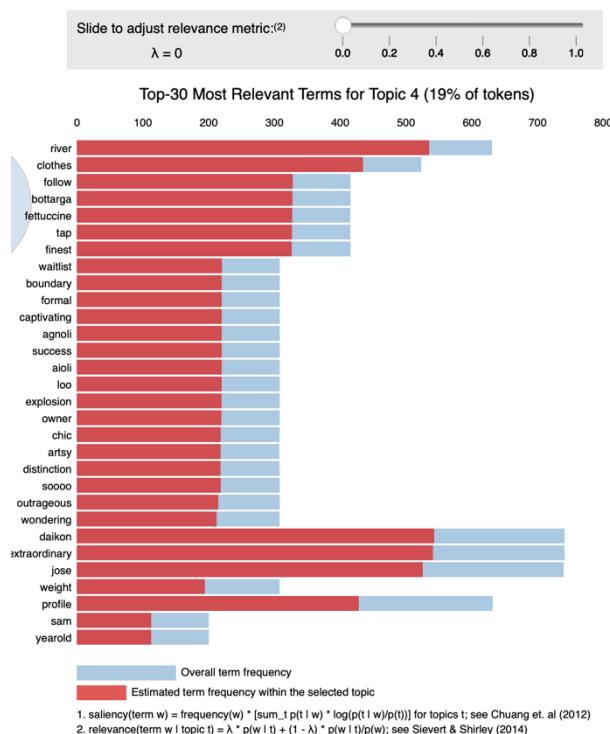
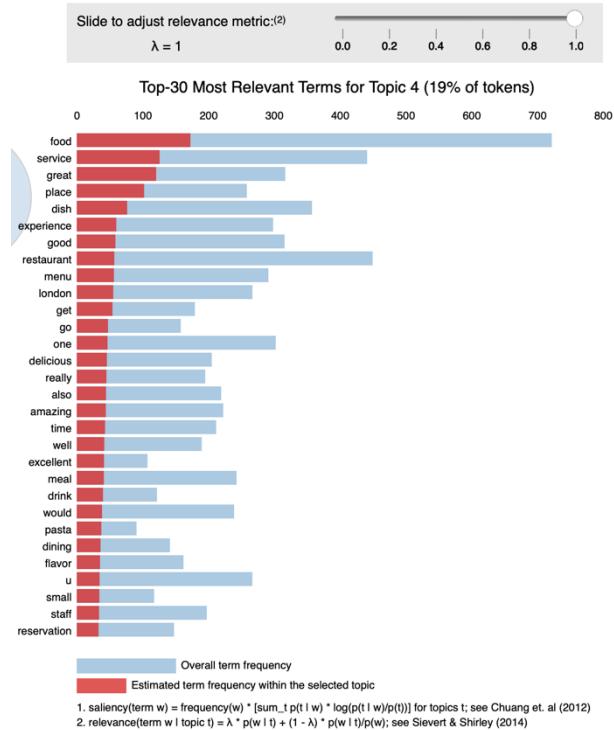
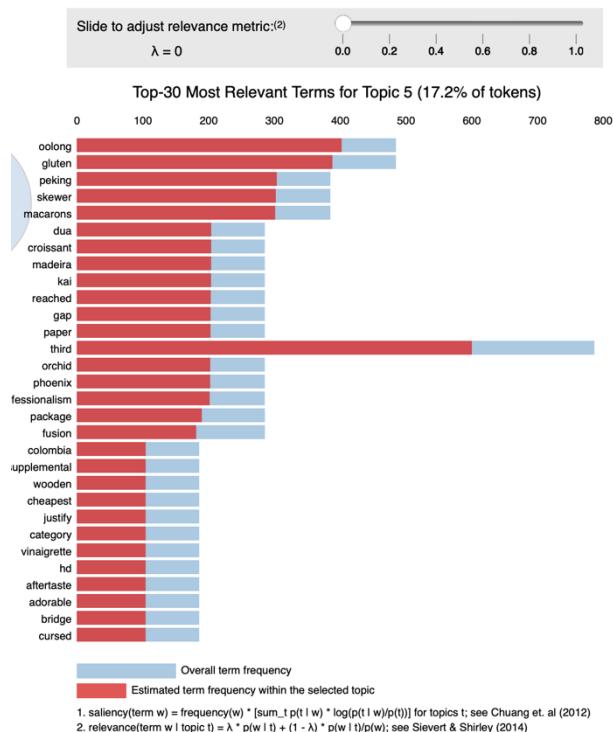


Figure 31-4.5.3 (b). Top 30 Most Relevant Terms for Topic 1 ( $\lambda = 0$ )

Figure 32-4.5.3 (d). Top 30 Most Relevant Terms for Topic 1 ( $\lambda = 1$ )Figure 33-4.5.3 (e). Top 30 Most Relevant Terms for Topic 2 ( $\lambda = 0$ )

Figure 34-4.5.3 (g). Top 30 Most Relevant Terms for Topic 2 ( $\lambda = 1$ )Figure 35-4.5.3 (h). Top 30 Most Relevant Terms for Topic 3 ( $\lambda = 0$ )

**Figure 36-4.5.3 (j). Top 30 Most Relevant Terms for Topic 3 ( $\lambda = 1$ )****Figure 37-4.5.3 (k). Top 30 Most Relevant Terms for Topic 4 ( $\lambda = 0$ )**

**Figure 38-4.5.3 (m). Top 30 Most Relevant Terms for Topic 4 ( $\lambda = 1$ )****Figure 39-4.5.3 (n). Top 30 Most Relevant Terms for Topic 5 ( $\lambda = 0$ )**

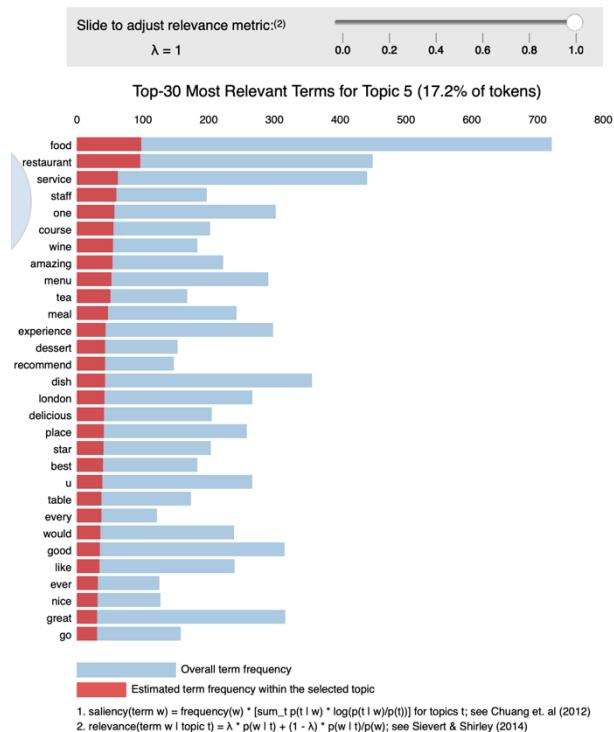


Figure 40-4.5.3 (p). Top 30 Most Relevant Terms for Topic 5 ( $\lambda = 1$ )

## Appendix 2. Ethics Application Form



Application 061847

### Section A: Applicant details

Date application started:  
Sat 1 June 2024 at 17:44

First name:  
Chun-cheng

Last name:  
Kuo

Email:  
ckuo4@sheffield.ac.uk

Programme name:  
MSc Data Science

Module name:  
INF6000 Dissertation  
Last updated:  
03/07/2024

Department:  
Information School [a.k.a iSchool]

Applying as:  
Undergraduate / Postgraduate taught

Research project title:  
A Sentiment Analysis of Yelp Reviews for Michelin Starred and Bib Gourmand Restaurants in London

Has your research project undergone academic review, in accordance with the appropriate process?  
Yes

Similar applications:  
- not entered -

### Section B: Basic information

Supervisor	
Name	Email
Adam Funk	a.funk@sheffield.ac.uk

Proposed project duration	
Start date (of data collection): Sat 22 June 2024	Anticipated end date (of project) Sat 25 January 2025

3: Project code (where applicable)	
Project externally funded? No	

Project code  
*- not entered -*

#### Suitability

Takes place outside UK?  
 No

Involves NHS?  
 No

Health and/or social care human-interventional study?  
 No

ESRC funded?  
 No

Likely to lead to publication in a peer-reviewed journal?  
 No

Led by another UK institution?  
 No

Involves human tissue?  
 No

Clinical trial or a medical device study?  
 No

Involves social care services provided by a local authority?  
 No

Is social care research requiring review via the University Research Ethics Procedure  
 No

Involves adults who lack the capacity to consent?  
 No

Involves research on groups that are on the Home Office list of 'Proscribed terrorist groups or organisations?  
 No

#### Indicators of risk

Involves potentially vulnerable participants?  
 No

Involves potentially highly sensitive topics?  
 No

#### Section C: Summary of research

##### 1. Aims & Objectives

The evolution of social media and online review platforms has significantly influenced how people make dining decisions. Among these platforms, Yelp has emerged as a crucial tool for consumers to share their experiences and for potential diners to gather insights. At the same time, the Michelin Guide remains a highly respected source for evaluating restaurants, with its star ratings and Bib Gourmand recommendations being synonymous with culinary excellence. This research project aims to investigate the intersection between these two influential sources of information by analysing consumer sentiments expressed in Yelp reviews of Michelin-starred and Bib Gourmand restaurants in London.

The primary aim of this research is to compare and contrast the sentiments found in consumer reviews on Yelp with the professional evaluations given by the Michelin Guide. This study will explore whether consumer opinions align with Michelin's expert ratings and how these perceptions influence dining choices. To achieve this aim, the research will focus on several specific objectives. Firstly, it will categorize and quantify the sentiment expressed in consumer reviews using sentiment analysis techniques. This will involve examining reviews for restaurants that have been awarded one, two, or three Michelin stars and those recognized with a Bib Gourmand distinction, creating a comprehensive sentiment profile for these establishments. Secondly, the research will explore the correlation between

Michelin's professional ratings and the sentiment scores from Yelp reviews. By identifying patterns of agreement or disagreement between expert and public opinions, the study aims to provide a deeper understanding of the impact Michelin awards have on consumer perceptions. Lastly, the study will analyse positive and negative reviews to investigate the relationship between consumer expectations and actual dining experiences. This will include identifying specific aspects of the dining experience that meet or exceed consumer expectations and those that lead to dissatisfaction.

Key research questions guiding this study include: How do consumer sentiments in Yelp reviews correlate with Michelin's professional ratings for restaurants in London? What aspects of the dining experience are most frequently mentioned in positive reviews, and how do these align with Michelin's criteria for awarding stars? In cases of negative feedback, what factors contribute to customer dissatisfaction, and how do these factors vary among restaurants with different Michelin ratings?

## 2. Methodology

Consumer reviews from Yelp will be collected manually to ensure compliance with platform terms and conditions. Each review will be individually copied and stored for analysis, focusing on Michelin-starred and Bib Gourmand restaurants in London. No usernames will be collected, thereby eliminating the need for anonymization. Only English comments will be included, and the total number of reviews collected will be between 500 and 1500. After data collection, the reviews will undergo preprocessing to clean the data by removing stop words, punctuation, special characters, and emojis. The cleaned data will then be analyzed using the VADER sentiment analysis tool to categorize sentiments as positive, negative, or neutral. Finally, a correlation analysis will be conducted to examine the relationship between Michelin's professional evaluations and the sentiment scores from Yelp reviews. Throughout the process, the research will comply with ethical standards and data protection regulations, ensuring that all data handling respects the privacy of individuals and adheres to legal requirements.

## 3. Personal Safety

Have you completed your departmental risk assessment procedures, if appropriate?

Not Applicable

Raises personal safety issues?

No

There are no personal safety issues associated with this research because it involves analyzing publicly available data from Yelp reviews, which does not require any direct interaction with human participants. The data collection and analysis will be conducted remotely using manual methods, thus eliminating any physical or mental risks to the researchers. Since the data collection will be done manually, no usernames or personal information will be collected, ensuring the privacy and confidentiality of the reviewers. Additionally, only English reviews will be included, and the number of reviews collected will be between 500-1500. Consequently, the research poses no threat to the personal safety or well-being of the researchers involved.

## Section D: About the participants

### 1. Potential Participants

I am looking to collect reviews from individuals who have left reviews on Yelp for Michelin-starred and Bib Gourmand restaurants based in London. The target group includes reviewers who have shared their dining experiences publicly on Yelp.

### 2. Recruiting Potential Participants

The potential participants will not be directly approached or recruited as this research involves analyzing publicly available data from Yelp reviews. The data consists of reviews left by individuals on Michelin-starred and Bib Gourmand restaurants in London. Since the reviews are already publicly accessible, no direct contact with the reviewers is necessary.

#### 2.1. Advertising methods

Will the study be advertised using the volunteer lists for staff or students maintained by IT Services? No

- not entered -

### 3. Consent

Will informed consent be obtained from the participants? (i.e. the proposed process) No

Informed consent will not be obtained from the participants because the research involves analyzing publicly available data from Yelp reviews. These reviews are already in the public domain and accessible to anyone, which means that the reviewers have implicitly consented to their information being publicly visible when they post their reviews. The research will ensure the anonymity of the reviewers by not collecting any personal information, thereby protecting their privacy and adhering to ethical standards. Therefore, obtaining explicit

informed consent from each reviewer is not necessary for this study.

#### 4. Payment

Will financial/in kind payments be offered to participants? No

#### 5. Potential Harm to Participants

What is the potential for physical and/or psychological harm/distress to the participants?

The potential for physical and/or psychological harm or distress to the participants in this study is minimal. However, analyzing reviews can reveal users' sentiments, which may unintentionally disclose their identities and cause discomfort. To address these privacy concerns, the complete dataset will not be made publicly available. If reviews are cited in the report, they will either be paraphrased or only limited anonymized excerpts will be shared. This approach ensures that the privacy of the reviewers is protected and reduces the risk of any harm or distress.

How will this be managed to ensure appropriate protection and well-being of the participants?

To minimize potential harm to participants, the research will not collect any personal information, ensuring no personal information is disclosed. The complete dataset will not be publicly shared, and access will be restricted to the research. Reviews cited in the report will be paraphrased or limited to anonymized excerpts to protect identities.

#### 6. Potential harm to others who may be affected by the research activities

Which other people, if any, may be affected by the research activities, beyond the participants and the research team?

Other than the users of the dataset, family members may also be affected. Their family members could potentially be exposed to bullying or harassment.

What is the potential for harm to these people?

The potential for harm includes the risk of bullying or harassment towards family members if identifiable information from the reviews is inadvertently disclosed.

How will this be managed to ensure appropriate safeguarding of these people?

To ensure appropriate safeguarding, the final research findings will not include any identifiable information from the reviews. Any user comments cited in the research will be paraphrased or anonymized to prevent identification and protect user privacy. This approach ensures that the identities of the users and their family members are protected, thereby minimizing the risk of harm.

#### 7. Reporting of safeguarding concerns or incidents

What arrangements will be in place for participants, and any other people external to the University who are involved in, or affected by, the research, to enable reporting of incidents or concerns?

Since all data are collected from Yelp Reviews and no direct interaction with participants is involved, there is no need for specific arrangements to enable reporting of incidents or concerns. The reviews are publicly available, and the research does not directly affect any individuals beyond their publicly shared reviews. Therefore, this aspect does not apply to the research.

Who will be the Designated Safeguarding Contact(s)?

My supervisor is Dr Adam Funk.

How will reported incidents or concerns be handled and escalated?

Reported incidents or concerns will be handled and escalated through a structured process. Initially, I will report any incidents or concerns to the Designated Safeguarding Contact (DSC), who is my supervisor. The DSC will ensure that all details are kept confidential and properly documented. If the issue requires further attention, the DSC will escalate it to the School of Information Ethics Team at ischool\_ethics@sheffield.ac.uk. This ensures that significant concerns are addressed by the appropriate authorities. The DSC will follow up on all escalated incidents to ensure they are resolved appropriately, providing feedback to the reporter and implementing necessary safeguarding measures.

### Section E: Personal data

#### 1. Use of personal data

Will any personal data be processed or accessed as part of the project?

Yes

Will any 'special category' personal data be processed or accessed as part of the project?

No

Provide the number of people whose personal data you expect to process or access.  
0

**2. Managing personal data**

Which organisation(s) will act as data controller(s) of the personal data?  
University of Sheffield only

Who will have access to the personal data?  
Only me and my supervisor can access the personal data.

What measures, processes and/or agreements will be put in place to manage the personal data?  
To manage the personal data, only my supervisor and I will have access to the data, which will be stored on the university's Google Drive. I will access this data solely from a password-protected computer. Once the project is completed, the data will be permanently deleted.

Will all identifiable personal data in digital or physical format be destroyed within a defined period after the project has ended?  
Yes

When will the identifiable personal data be destroyed?  
Once my degree is awarded.

**3. Third-party services**

Will any external third-party services not provided by the University be used to process or access personal data during the project?  
No

**4. Security of computers, devices and software**

Will personal data be processed or accessed on any computers or devices that are not managed by the University of Sheffield?  
Yes

Will all computers and devices that are not managed by the University of Sheffield be secured in accordance with the IT Code of Connection?  
Yes

Will any software not approved by the University of Sheffield be used to process or access data?  
No

Will any software be written or developed in order to process or access the personal data?  
No

**Section F: Supporting documentation****Information & Consent**

Participant information sheets relevant to project?  
No

Consent forms relevant to project?  
No

**Additional Documentation****External Documentation**

- *not entered* -

**Section G: Declaration**

Signed by:  
Chun-Cheng, Kuo  
Date signed:  
Tue 2 July 2024 at 13:48

**Official notes**

*- not entered -*

## Appendix 3. Approval Letter



Downloaded: 17/08/2024  
Approved: 03/07/2024

Chun-cheng Kuo  
Registration number: 230140903  
Information School [a.k.a iSchool]  
Programme: MSc Data Science

Dear Chun-cheng

**PROJECT TITLE:** A Sentiment Analysis of Yelp Reviews for Michelin Starred and Bib Gourmand Restaurants in London  
**APPLICATION:** Reference Number 061847

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 03/07/2024 the above-named project was **approved** on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:

- University research ethics application form 061847 (form submission date: 02/07/2024); (expected project end date: 25/01/2025).

If during the course of the project you need to deviate significantly from the above-approved documentation please inform me since written approval will be required.

Your responsibilities in delivering this research project are set out at the end of this letter.

Yours sincerely

Nia Hunt  
Ethics Admin  
Information School [a.k.a iSchool]

Please note the following responsibilities of the researcher in delivering the research project:

- The project must abide by the University's Research Ethics Policy: <https://www.sheffield.ac.uk/research-services/ethics-integrity/policy>
- The project must abide by the University's Good Research & Innovation Practices Policy: [https://www.sheffield.ac.uk/polopoly\\_fs/1.671066!/file/GRIPPPolicy.pdf](https://www.sheffield.ac.uk/polopoly_fs/1.671066!/file/GRIPPPolicy.pdf)
- The researcher must inform their supervisor (in the case of a student) or Ethics Admin (in the case of a member of staff) of any significant changes to the project or the approved documentation.
- The researcher must comply with the requirements of the law and relevant guidelines relating to security and confidentiality of personal data.
- The researcher is responsible for effectively managing the data collected both during and after the end of the project in line with best practice, and any relevant legislative, regulatory or contractual requirements.

## Appendix 4. Research Diary and Reflection

### A4.1 Dissertation Research Diary

**Meeting 1 (June) Date:** 17/06/2024 (2 pm)

#### Work completed:

- Discussed my dissertation ideas with my supervisor, focusing on sentiment analysis for restaurant reviews.
- I have compiled a list of Michelin-rated restaurants in London as the basis for the study.
- Raised concerns about research ethics and the collection of reviews from various websites.

#### Meeting contents:

- We explored the idea of predicting Michelin ratings through sentiment analysis of reviews by ordinary people.
- Discussed the ethical limitations of scraping reviews from sites like TripAdvisor and Google Maps due to their terms and conditions.
- My supervisor is currently seeking advice on acceptable data collection methods and the possibility of using an API, particularly for Google Maps.

#### Planned goals:

- Await further advice from my supervisor on the ethical implications of data scraping.
- Explore potential API options for collecting reviews legally.
- If necessary, prepare to use older secondary datasets of restaurant reviews and Michelin ratings as a backup plan.

**Meeting 2 (August) Date:** 06/08/2024 (3 pm)**Work completed:**

- Sent a partial draft of my dissertation, which we discussed during the meeting.
- My supervisor provided suggestions for the data section, advising that I explain why the dataset size is limited (881 reviews) due to manual collection to avoid automatic scraping.
- We discussed the need to add references supporting the methodology for RQ3 in the literature review.

**Meeting contents:**

- My supervisor suggested addressing the dataset limitations in the discussion section under "limitations."
- We talked about the simplification of Yelp ratings from the 1–5 star range to 0 or 1.
- My supervisor recommended using the gensim library for topic modelling (LDA) and mentioned that they would look for a paper with an algorithm they used previously to help improve the results.

**Planned goals:**

- I will revise the data section to include explanations and add relevant references to the literature review.
- My supervisor will look for a paper with a suitable algorithm to enhance the output.
- We have scheduled another meeting for August 14, 2024.

***Meeting 3 (August) Date:*** 15/08/2024 (3 pm)**Work completed:**

- Asked if I could drop the topic modeling analysis, which wasn't originally part of my plan.
- Suggested a slight change to the dissertation title.
- Received confirmation that these changes were acceptable.

**Meeting contents:**

- My supervisor reviewed the draft and confirmed that the work, without the topic modelling analysis, is satisfactory.
- Discussed the need to complete the remaining sections to the same standard.
- My supervisor suggested that topic modelling could be mentioned in the conclusion section as a potential area for future work.

**Planned goals:**

- Complete the remaining sections of the dissertation to the same quality as the draft.
- Include a mention of topic modeling in the conclusion as an idea for future research.
- Finalize any changes to the dissertation title and content.

***Meeting 4 (August) Date:*** 22/08/2024 (3 pm)**Work completed:**

- Submitted another draft of my dissertation for review.
- My supervisor confirmed that the work was on the right track, although I still have a few sections left to finish.

- I was reassured that my English writing was solid, which boosted my confidence.

**Meeting contents:**

- We talked about the word count being too high. My supervisor pointed out that I had repeated some of the research questions and hypotheses unnecessarily, which was added to the length.
- We discussed the possibility of merging the research questions and hypotheses section with the aims and objectives to make the writing more concise and avoid redundancy.
- My supervisor gave me advice on cutting down the word count and making the content more streamlined.

**Planned goals:**

- I need to revise my dissertation to reduce the word count and remove any repetitive content.
- I will merge the research questions and hypotheses section with the aims and objectives to make the structure clearer.
- I'll continue working on the unfinished sections to complete the draft.

## A4.2 Reflection on Research

### *Supervisor Feedback 1:*

#### **Reflection on feedback:**

After our first meeting, I realized that I needed to rethink my approach to data collection. Initially, I was excited about scraping reviews from websites like TripAdvisor and Google Maps to analyze Michelin-rated restaurants. But my supervisor pointed out that this method isn't allowed due to ethical issues, which was something I hadn't fully considered. This opened my eyes to how important it is to follow ethical guidelines, even if it means taking a different path than I originally planned.

I'm now looking into alternative ways to get the data I need. One option is using an API, but I know that might not work either, so I'll have to be ready with a backup plan, like using an older dataset. It's not ideal, but I understand now that being flexible is a key part of research. This feedback has shifted my perspective on how to approach my project—it's not just about getting the data but doing it in a way that's responsible and within the rules.

### *Supervisor Feedback 2:*

#### **Reflection on feedback:**

After reflecting on my second meeting with my supervisor, I realized how crucial it is to address the limitations of my dataset. Initially, I was focused on just collecting data and getting on with the analysis, but the conversation made me see that being transparent about the limitations, like only having 881 reviews due to manual collection, is equally important. I hadn't thought about how this could affect my results, and my supervisor's feedback shifted my perspective on this.

Another important takeaway was the recommendation to add more references to support the methodology for RQ3. I now see how important it is to back up my approach with solid literature. It's not just about doing the analysis but ensuring that my methods are grounded in previous research, which adds credibility to my work.

We also discussed simplifying the Yelp ratings, which at first I thought was a small detail, but now I understand it could have a big impact on how my results are interpreted. I'm also considering using the gensim library for topic modelling, thanks to my supervisor's suggestion.

### ***Supervisor Feedback 3:***

#### **Reflection on feedback:**

Reflecting on my third meeting, I found the discussion around changing my approach to be helpful. Initially, I was unsure whether dropping the topic modelling analysis was the right move, especially since it wasn't part of my original plan. However, after talking it through with my supervisor, I felt reassured that making these adjustments was fine, and it made me feel more confident about the direction of my dissertation.

One key takeaway was that while my work is still solid without the topic modelling, my supervisor suggested I could still mention it as a potential area for future research. This gave me a new perspective—it's okay to set aside certain methods now as long as I acknowledge their importance and leave room for further exploration.

Another point that stood out was the need to keep pushing forward with the remaining sections of my dissertation. It's easy to get stuck overthinking one part of the project, but this feedback helped me stay focused on completing the overall draft. The meeting was a good reminder that progress is more important than perfection at this stage.

### ***Supervisor Feedback 4:***

#### **Reflection on feedback:**

After reflecting on our fourth meeting, I decided not to drop the topic modelling analysis after all. I initially thought it might be too much to handle, but after considering my options, I realized that it adds significant value to my research. The challenge now is that the analysis generated too many results, and it's impossible to explain every single graph in detail.

During the meeting, we discussed ways to manage this, and I came up with a plan. Instead of trying to cover everything, I'll focus on explaining the most important and relevant graphs in my main discussion. This way, I can highlight the key findings without overwhelming the reader. For the remaining graphs that I can't fully explain in the main text, I'll include them in Appendix 1. This allows me to still present all my work without cluttering the main body of my dissertation.



