

Does brand personality affect consumer satisfaction? An application of text mining to restaurants

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## ABSTRACT

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Brand personality is a fundamental marketing construct that may be leveraged for competitive advantage. Researchers and market research firms often measure brand personality in consumer surveys. This approach is expensive, unscalable, and inefficient for tracking perceptions that constantly change over time. This research thus explores an alternative to the tracking of consumers' brand personality perceptions. Online reviews offer textual data that can be extracted for marketing research. This research captures consumers' brand personality and brand attribute (e.g., perceived price and perceived quality) perceptions of 40 restaurants, as reflected in 4,000 online reviews, using a deep-learning algorithm. It then investigates the effect of brand personality dimensions and brand attributes on consumer satisfaction. Findings indicate a strong and independent effect of *sincere*, *exciting*, and *sophisticated* brand personalities on consumer satisfaction while *competence* and *ruggedness* dimensions do not influence satisfaction. In addition, this study found support for an effect of additional brand attributes (i.e., perceived price, perceived quality, interpersonal service quality, psychic cost, time/effort cost) on satisfaction, with psychic cost perceptions having the greatest impact on consumer satisfaction.

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## INTRODUCTION

The importance of developing a clear and distinctive brand personality is widely discussed in the literature since Aaker's (1997) seminal paper. Brand personality is defined as "the set of human personality traits that are both applicable to and relevant for brands" (Azoulay & Kapferer, 2003, p. 151). Consumers associate brands with human traits which is often explained by anthropomorphism. The importance of brand personality is connected to its role in consumers' self-expression and creation of identity (Belk, 1988; Kassarian, 1971; Malär et al., 2011; Puzakova et al., 2013). Several studies aimed at developing measures for brand personality (Avis et al., 2014; Azoulay & Kapferer, 2003; Geuens et al., 2009; Rauschnabel et al., 2016). Aaker's (1997) brand personality scale is the most commonly used metric within the literature (Eisend & Stokburger-Sauer, 2013). She developed a five-dimensional brand personality scale that includes *sincerity*, *excitement*, *competence*, *sophistication*, and *ruggedness*.

A variety of studies discussed the effect of brand personality on emotional ties (Biel, 1993), brand trust (Louis & Lombart, 2010; Rampl & Kenning, 2014; Sung & Kim, 2010), brand loyalty (Fournier, 1998; Kim et al., 2001; Molinillo et al., 2017; Ramaseshan & Stein, 2014), brand attachment (Louis & Lombart, 2010), brand awareness (Molinillo et al., 2017), preference and usage (Sirgy, 1982), purchase intention (de la Paz Toldos-Romero & Orozco-Gómez, 2015; Swaminathan et al., 2009), and consumer satisfaction (Brakus et al., 2009; Nysveen et al., 2013)

There are limited empirical studies on the influence of brand personality on consumer post-purchase behavior (Lee et al., 2009). While there are several studies that investigate the effect of brand personality on loyalty (e.g., Lin, 2010; Molinillo et al., 2017; Ramaseshan & Stein, 2014; Su & Tong, 2015; Sung & Kim, 2010; Zentes et al., 2008), the relationship between brand personality and satisfaction has received considerably less attention. Geuens et al. (2009)

suggested more research is needed to understand the consequences of brand personality and Louis and Lombart (2010) called for more research on the effect of brand personality on satisfaction. Although some studies indicate there is a relationship between brand personality and satisfaction (e.g., Brakus et al., 2009; Nysveen et al., 2013), the effect of specific brand personality dimensions on satisfaction still needs more investigation (Hosany et al., 2006). Keller and Lehmann (2006) also suggested more research is needed for understanding which brand personality dimensions are associated with loyalty; which is a consequence of consumer satisfaction (Brakus et al., 2009; Nysveen et al., 2013). In the context of chain restaurants, Lee et al. (2009) indicates the effect of brand personality on satisfaction, but called for more research on other categories of restaurants (e.g., fine-dining, casual).

To address this call for more research, this research investigates the effect of the five brand personality dimensions (Aaker, 1997) on consumer satisfaction. This is done by analyzing the reviews of 40 restaurants across North America in which consumers write a free-form review and give the businesses a rating from one-star (most negative) to five-star (most positive). The one-to-five-star rating is used as an accurate proxy to individual-level consumer satisfaction. The results indicate *sincerity*, *excitement*, and *sophistication* dimensions are positively associated with consumer satisfaction while *competence* and *ruggedness* do not have a significant effect.

To measure brand personality, marketers generally rely on consumer surveys (e.g., Siguaw et al., 1999). This approach requires market research that is expensive, and in the fast-paced business environment, the conclusions can get outdated very soon (Hu et al., 2019b). One alternative approach is using text mining on User Generated Content (UGC). With this approach, companies can track their and competitors' brand personality over time and verify the distinctiveness of their brand personality profile. Lee et al. (2009) mentioned it is essential for



brand managers in the restaurant industry to develop a marketing tool for constantly monitoring brand personality.

When brand personality is measured in consumer surveys, consumers are often explicitly asked to rate their brand perceptions for a number of traits (i.e., adjectives such as down-to-earth, small-town, and feminine). In contrast, this research uses a state-of-the-art deep learning method that calculates the probability of a posted review being semantically associated with a trait. For example, using this approach, the sentence “Owners have done a classy job in decor and service was positively artesian.” has a 95% probability to be associated with *sophistication*. The statement “This place is brilliant; small, quiet and with a great vibe.” is associated with *sincerity* with a 90% probability.

The amount of UGC has increased considerably over the past years. This development creates a new opportunity for marketers for using automated tools to capture useful insights. Some researchers tried to identify different marketing concepts through textual or visual UGC including capturing market structure and brand attributes (Lee & Bradlow, 2011), key dimensions of quality and brand map (Tirunillai & Tellis, 2014), brand image (Liu et al., 2020), brand association network (Klostermann et al., 2018), purchase intention (Colicev et al., 2019), purchasing behavior (Goh et al., 2013), sales and commercial performance (e.g., Chevalier & Mayzlin, 2006; Nepomuceno et al., 2020; Tirunillai & Tellis, 2012). In particular, multiple articles focused on using online reviews for capturing different marketing constructs through text mining (Anderson & Simester, 2014; Büschken & Allenby, 2016; Chevalier & Mayzlin, 2006; Van Laer et al., 2019).

In addition, researchers associate word usage to different psychological terms such as emotionality, social relationships, honesty, and deception using automated word count methods

(e.g., Mogilner et al., 2011; Tausczik & Pennebaker, 2010). Adamopoulos et al. (2018) aimed at extracting human personality from features of textual data. There is also an attempt by Hu et al. (2019b) to predict brand personality indirectly from user imagery and employee imagery captured from textual data. Unlike Hu et al. (2019b), this study tries to capture brand personality directly from the text. The advantage of the method used in this study is two-fold: First, this approach does not need data regarding user imagery and employee imagery, which is not easily available for all companies. Second, manually coding textual datasets is not required, which increases the scalability and cost-efficiency of this approach.

In addition to brand personality dimensions, this research also considers the impact of other brand attributes that consumers consider in their choices (hereinafter referred to as choice criteria, in line with the service literature; Baker et al., 2002; Zeithaml, 1988) on consumer satisfaction. Research around satisfaction suggests perceived cost (monetary and non-monetary) and perceived quality are the core predictors of satisfaction (e.g., Parasuraman et al., 1994; Voss et al., 1998). This study therefore captures choice criteria in the context of restaurants from the text and investigate its relationship with satisfaction. Choice criteria include perceived quality, interpersonal service quality, price perception, and non-monetary price perception which are separated into time/effort and psychic costs (Baker et al., 2002; Zeithaml, 1988).

This research contributes to the literature on brand personality by providing empirical evidence on the effect of individual dimensions of brand personality (i.e., excitement, sincerity, and sophistication) on satisfaction within the restaurant industry. This study also contributes to research on consumer satisfaction by investigating the effect of choice criteria on satisfaction and shedding light on the importance of psychic cost as the most impactful variable among all the analyzed variables. In addition, this study also contributes to the marketing literature on text

mining by using online reviews for capturing brand personality that can be used as an alternative to survey-based approaches.

Considering the impact of brand personality on relevant marketing outcomes, it is essential for brand managers to frequently monitor brand personality to understand if they are truly developing a salient brand personality that can distinguish them from competitors. With regards to managerial contributions, this study provides an example of a cost-efficient, scalable approach to tracking brand personality that can be used for brand positioning. Moreover, this study identifies three brand personality dimensions (i.e., sincerity, excitement, and sophistication) that are particularly important in driving consumer satisfaction. Investments in marketing activities and brand experiences that strengthen these dimensions are therefore promising. Among the variables considered in this research, psychic cost is demonstrated to be the most impactful for satisfaction. Therefore, restaurant managers would benefit from a focus on decreasing psychic costs by eliminating the elements that cause an uncomfortable or unpleasing atmosphere.

## **THEORETICAL BACKGROUND**

### **Brand Personality**

Brand personality is one of the most important concepts in consumer-brand relationship research (Fetscherin & Heinrich, 2015). Brand personality has a symbolic component that helps consumers to express themselves and communicate their identity (Belk, 1988; Lannon & Cooper, 1983); which is important for developing a strong consumer-brand relationship (CBR; Fournier, 1998).

Two slightly different definitions are widely used in the literature for brand personality. Aaker (1997, p. 347) defined brand personality broadly as “*the set of human characteristics associated with a brand*”. The second widely used definition is by Azoulay and Kapferer (2003, p. 151) that is confined to human personality traits: “*the set of human personality traits that are both applicable and relevant for brands*”. In both definitions, there is an assumption that consumers see brands as people and associate them with human-like characteristics.

Aaker (1997) developed a brand personality scale that has 42 items and aggregated them into five dimensions: sincerity, excitement, sophistication, competence, ruggedness. According to Aaker (1997), three dimensions are close to human big five personality dimensions. Sincerity is close to agreeableness with traits like honest and being friendly, while excitement is close to extroversion. Competence is close to conscientiousness which expresses reliability and responsibility. However, sophistication and ruggedness are different than human personality dimensions. Sophistication is associated with traits like upper-class and glamorous while ruggedness relates to being tough, outdoorsy, and adventurous (see Table 2 for the full list of traits). Brand personality also has been applied in the restaurant context and is mentioned to be a good differentiator between restaurants (Ali & Sharma, 2014; Kim et al., 2011; Lee et al., 2009; Lin & Huang, 2012; Siguaw et al., 1999). For example, McDonald’s is perceived as being more competent and exciting than Burger King (Siguaw et al., 1999). Several brands like Wendy’s are mentioned to lack a favorable and distinctive brand personality (Siguaw et al., 1999). Murase and Bojanic (2004) applied brand personality in the restaurant context and found brand personality of McDonald’s and Wendy’s are different cross-culturally. Musante et al. (2008) developed a modified version of Aaker’s brand personality dimension that can be replicated for

restaurants, which consists of 18 items and four dimensions (i.e., sophistication, excitement, sincerity, and competence).

Several studies criticized Aaker's five brand personality traits (Avis et al., 2014; Azoulay & Kapferer, 2003; Geuens et al., 2009; Oklevik et al. 2020; Rauschnabel et al., 2016). Azoulay and Kapferer (2003) mentioned some of Aaker's dimensions are not relevant to personality traits (e.g., age and social class). Lack of generalizability of the scale is also a concern (Austin et al., 2003; Low & Lamb, 2000; Romaniuk & Ehrenberg, 2012). Avis et al. (2014) mentioned some of the adjectives in the scale have a different meaning for different brands (e.g., *wholesome* in the context of food versus clothing). The scale also does not replicate across cultures (Aaker et al., 2001; Azoulay & Kapferer, 2003). For example, only three dimensions (i.e., *sincerity*, *excitement*, and *sophistication*) are captured in Spain and *peacefulness* replaced *ruggedness* in Japan (Aaker et al., 2001).

### **Brand Personality and Consumer Satisfaction**

Consumer satisfaction is a combination of cognitive and affective factors (Gallarza et al., 2011). That is why there are different definitions for consumer satisfaction in the literature. Consumer satisfaction is defined broadly as a psychological state that results from a discrepancy between emerging emotion and the expectations which are accumulated from previous purchases (Oliver, 1981), the gap between costs and the rewards of consumption with relation to the expected outcomes (Churchill & Surprenant, 1982), and the consumer's cognitive response to being reimbursed adequately or inadequately for their sacrifices (Howard & Sheth, 1969). These definitions can be summarized as a collection of different responses (emotional or cognitive) of varying intensity in a given time period (e.g., after consumption, based on accumulated experiences) that are aimed at the main components of consumption (Giese & Cote, 2000).

In an online service context, Aaker et al. (2004) indicate that consumers judge service transgression differently based on the brand personality (i.e., exciting brand versus sincere brands) which is due to different expectations from different brand personalities. Ouwersloot and Tudorica (2001) suggested that brand personality has the potential to influence satisfaction through impacting expectations. Clemenz et al. (2012) demonstrate consumers develop different expectations according to different brand personalities. In satisfaction research, expectation disconfirmation is mentioned to be one of the main drivers of satisfaction (e.g., Cadotte et al., 1987; Anderson et al., 1994; Tse & Wilton, 1988; Voss et al., 1998). Thus, it can be hypothesized that brand personality can impact consumer satisfaction outcomes, as it can give rise to different expectations across brands.

There are multiple studies that investigate the effect of brand personality on consumer-brand relationship especially for brand trust, brand loyalty and satisfaction (see Table 1 for a comprehensive list). Among all dimensions of brand personality, sincerity and excitement are the most widely replicated and have a positive effect on loyalty in both consumer packaged goods (CPG) and retail environments (Roy et al., 2016; Sung & Kim, 2010; Teimouri et al., 2016; Zentes et al., 2008). When measured by Geuens et al.'s (2009) scale, responsibility and activity are the dimensions that are found to influence loyalty for CPGs (Japutra & Molinillo, 2019; Molinillo et al., 2017). The dimensions (i.e., responsibility and activity) in Geuenes's scale are conceptually similar to sincerity and excitement (Molinillo et al., 2017), which reiterates their importance. In the context of restaurants, Kim et al. (2011) found that sincerity and sophistication influence loyalty positively. Multiple studies found positive effect of brand personality on loyalty for CPG, but they did not investigate the effect of each dimension

individually (Brakus et al., 2009; Nysveen et al., 2013; Ramaseshan & Stein, 2014). This effect is also replicated in hospitality context (Li et al., 2020; Sop & Kozak, 2019; Unurlu & Uca, 2017). In addition to loyalty, multiple studies found positive effect of brand personality on brand trust for CPG (Ha & Janda, 2014; Villagra et al., 2021). Lee and Back (2010) also found competence and sophistication increase brand trust for upscale hotels. Although diverse studies show the link of brand personality on trust and loyalty in different contexts and with different brand personality scales (see Table 1) little is known about the importance of individual brand personality dimensions on consumer satisfaction.

Brakus et al. (2009) mentioned brand personality is a better predictor of satisfaction than loyalty. Several studies found brand personality positively affect satisfaction for CPG (Bilgili & Ozkul, 2015; Brakus et al., 2009), communication services (Kim & Lee, 2008; Nysveen et al., 2013), automotive (Mabkhot et al., 2016), tourism (Hultman et al., 2015), and restaurants (Lee et al., 2009). McNeil and Young (2019) found *excitement* affects satisfaction alongside service quality and price for gourmet food trucks. Japutra and Molinillo (2019) used Geuens et al.'s (2009) scale and found responsible and active brand personalities positively influence satisfaction for CPG. Lombart and Louis (2012) used a brand personality scale proposed by Ambroise and Valette-Florence (2010) in a retail context and demonstrated four brand personality dimensions (i.e., congeniality, originality, conscientiousness, and preciousness) have a direct effect on satisfaction. Based on the literature on the effects of brand personality dimensions, this research examines the following hypotheses:

H1a: Sincerity positively relates to consumer satisfaction.

H1b: Excitement positively relates to consumer satisfaction.

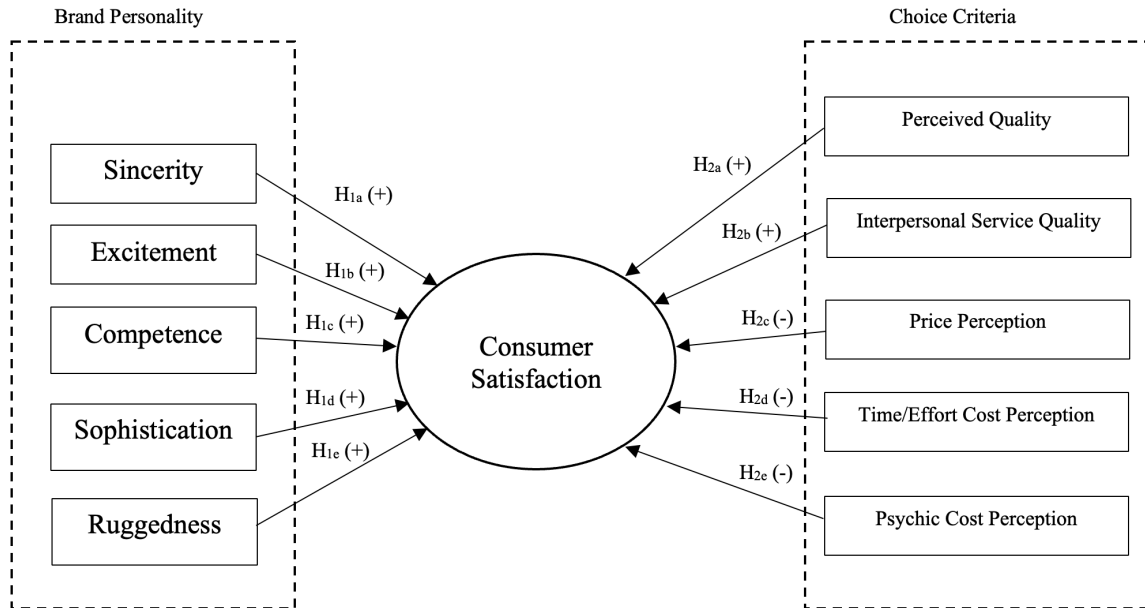
H1c: Competence positively relates to consumer satisfaction.

H1d: Sophistication positively relates to consumer satisfaction.

H1e: Ruggedness positively relates to consumer satisfaction.

**Figure 1**

*Conceptual framework*



### **Choice Criteria and Satisfaction**

Past studies discovered a range of variables that can affect consumer satisfaction with different levels of abstraction. Researchers can analyze the effect of micro-level (e.g., employees' uniform) features or more abstract levels (e.g., service quality in general; Oliver, 2014). A micro-level approach can provide the maximum information whereas it requires a complicated data collection that is not easily accessible to every brand (Oliver, 2014).



**Table 1***Literature on the relationship between brand personality and three CBR constructs*

<b>Paper</b>	<b>BPS</b>	<b>Significant BP Dimensions</b>	<b>Context</b>	<b>Brand Trust</b>	<b>Brand Loyalty</b>	<b>Satisfaction</b>
Molinillo et al. (2017)	G	Responsibility, Activity	CPG	✓	✓	
Teimouri et al. (2016)	A	Sincerity, Excitement	CPG		✓	
Japutra and Molinillo (2019)	G	Responsibility, Activity	CPG	✓	✓	✓
Brakus et al. (2009)	A	Not individually	CPG, Hotel		✓	✓
Lin, (2010)	A	Competence, Sophistication, Peacefulness	CPG		✓	
Nysveen et al. (2013)	A	Not individually	Communication services		✓	✓
Sung and Kim (2010)	A	Sincerity, Excitement	CPG	✓	✓	
Ramaseshan and Stein (2014)	A	Not individually	CPG, Fast-food		✓	
Zentes et al. (2008)	A	Sincerity, Excitement	Retail		✓	
Kim et al. (2011)	A	Sincerity, Sophistication	Restaurant		✓	
Lee et al. (2009)	A	Not individually	Restaurant			✓
Li et al. (2020)	A	Not individually	Hotel		✓	

*Note:* BPS: Brand Personality Scale, BP: Brand Personality, CPG: Consumer Packaged Goods, A: (Aaker, 1997), G: (Geuens et al., 2009), AVF:(Ambrose & Valette-Florence, 2010)

**Table 1**  
*Continued*

<b>Paper</b>	<b>BP S</b>	<b>Significant BP Dimensions</b>	<b>Context</b>	<b>Brand Trust</b>	<b>Brand Loyalty</b>	<b>Satisfaction</b>
Lee and Back, (2010)	A	Competence, Sophistication	Hotel	✓		
Sop and Kozak (2019)	A	Not individually	Hotel		✓	
Unurlu and Uca (2017)	A	Not individually	Hotel		✓	
Ha and Janda (2014)	G	Not individually	Automotive	✓		
Villagra et al. (2021)	A	Not individually	Variety of products	✓	No Direct Relationship	
Lombart and Louis (2012)	A VF	Congeniality, Originality, Conscientiousness, Preciousness	Retail		✓	✓
Roy et al. (2016)	A	Sincerity, Excitement	Online Retail		✓	
Kim and Lee (2008)	A	Not individually	Communication Services		No Relationship	✓
Hultman et al. (2015)	A	Not individually	Tourism			✓
This Study	A	Sincerity, Excitement, Sophistication	Restaurant, fast-food, Café			✓

*Note:* BPS: Brand Personality Scale, BP: Brand Personality, CPG: Consumer Packaged Goods, A: (Aaker, 1997), G: (Geuens et al., 2009), AVF:(Ambroise & Valette-Florence, 2010)

In addition to brand personality, this study investigates the relationship between choice criteria and consumer satisfaction. As mentioned by Zeithaml (1988) and Baker et al. (2002), important choice criteria dimensions are perceived quality, interpersonal service quality, perceived price, time/effort cost perception, psychic cost perception. Perceived quality is defined as “superiority or excellence” which is subjective to each consumer (Zeithaml, 1988, p. 3). The distinction between objective quality and perceived quality is also highlighted by several researchers (Dodds & Monroe, 1985; Jacoby et al., 1985; Parasuraman et al., 1985). Perceived

quality is mentioned to be one of the main predictors of satisfaction (Parasuraman et al., 1994; Voss et al., 1998). In the context of restaurants, there are multiple studies that demonstrated the relationship between food quality and satisfaction (Ha & Jang, 2010; Jang & Namkung, 2009; Namkung & Jang, 2007).

H2a: Perceived quality positively relates to consumer satisfaction.

As mentioned by Mazursky and Jacoby (1986), in retail contexts, consumers assess the quality of both services and goods. Human interactions are critical for increasing satisfaction and re-purchase behavior in a restaurant setting as well (Stevens et al., 1995). Bei and Chiao (2001) suggest service quality leads to satisfaction. Ryu et al. (2012) also mentioned that service and food quality shape restaurant image, which results in perceived value and consequently satisfaction. In the context of restaurants, a few studies indicate that both service quality and food quality are the main predictors of satisfaction (Ryu & Han, 2010; Qin & Prybutok, 2009). This current study focuses on interpersonal service quality, which refers to the interactions of employees and consumers (Parasuraman et al., 1985) and has been shown to influence patronage in retail contexts (Baker et al., 2002).

H2b: Interpersonal service quality positively relates to consumer satisfaction.

Perception of price is distinguished from the objective price, and it is one of the main predictors of perceived value (Zeithaml, 1988) and satisfaction (Voss et al., 1998). Bei and Chiao (2001) indicated the important effect of price perception on consumer satisfaction. In this study, cost perceptions refer to expensive or unfair price perceptions. Therefore, the greater the price perceptions associated with a brand, the less satisfied consumers are likely to be.

H2c: Price perception negatively relates to consumer satisfaction.

In addition to monetary cost perceptions, nonmonetary costs (i.e., time costs, search costs, and psychic costs) directly or indirectly affect consumers' perception of cost (Zeithaml, 1988). Although time/effort cost and psychic cost are often intertwined, they are distinguished in the literature (Baker et al., 2002; Zeithaml 1988). The time/effort cost is incorporated to capture the amount of time and effort the consumer is sacrificing for the purchase (Zeithaml, 1988). The psychic cost indicates the consumers' perception of mental sacrifice which is proposed to negatively affect satisfaction (Zeithaml, 1988). Both time/effort cost and psychic cost are demonstrated to influence patronage negatively in retail environments (Baker et al., 2002).

H2d: Time/effort cost perception negatively relates to consumer satisfaction.

H2e: Psychic cost perception negatively relates to consumer satisfaction.

## **METHOD**

Text mining methods that depend on word occurrence are the most common in the marketing literature (e.g., Berger & Milkman, 2012; Borah & Tellis, 2016; Tirunillai & Tellis, 2014). In these studies, Linguistic Inquiry and Word Count (LIWC; Pennebaker et al., 2015) and Latent Dirichlet Allocation (LDA; Blei et al., 2003) are among the most popular methods (Puranam et al., 2017; Tirunillai & Tellis, 2014; Toubia et al., 2019; Zhong & Schweidel, 2020). However, this approach to text mining has its limitations. First, two sentences like “what is your age?” and “how old are you?” are semantically similar, but do not have a single word in common. Second, as mentioned by Berger et al. (2020), some words are naturally more likely to appear in reviews (e.g., the word “laptop” in laptop reviews). The current study therefore uses a novel approach to extracting brand personality dimensions, using a state-of-the-art deep learning method called Bidirectional and Auto-Regressive Transformers (BART; Lewis et al., 2019), which is not dependent on the word-occurrence and can distinguish the context of words in different

sentences. To the best of the author's knowledge, this is the first study in marketing literature that is using this approach for text mining.

## **Dataset**

One economic lens regarding the importance of online reviews is information asymmetries (Kamerer, 2014). Due to information asymmetries in buyer-seller relations, buyers have to engage in a complicated and expensive process to determine characteristics of services (i.e., experience goods) before purchase (Nayyar, 1990). Therefore, online reviews have become the main source of getting information when considering different alternatives particularly when information asymmetries exist (e.g., in restaurant and hospitality contexts)

In recent years, online reviews have been used extensively to capture marketing constructs. Reviews reflect consumer perceptions and preferences (Moon & Kamakura, 2017), and provide insights regarding writing styles, opinions, and personality (Berger et al., 2020). Using UGC, past research measured preference (Decker & Trusov, 2010), product features and market structure (Archak et al., 2011; Ghose et al., 2012; Lee & Bradlow, 2011; Moon & Kamakura, 2017; Netzer et al., 2012), and brand positioning (Aggarwal et al., 2009; Tirunillai & Tellis, 2014). Puranam et al. (2017) analyzed restaurant reviews to trace temporal changes in consumer opinion. Melumad et al. (2019) investigate the linguistic characteristics of UGC and captured emotions from the text. Herhausen et al. (2019) extracted linguistic style, and high and low arousal emotions from UGC. Liu et al. (2019) analyzed reviews to investigate the impact of several content dimensions (e.g., price and quality perceptions) on sales.

This research employs a publicly available dataset provided by Yelp<sup>1</sup>, a source of business reviews. This public dataset has been used in previous research (e.g., Asghar, 2016; Chen and Lurie 2013; Luca, 2016; Qiu et al., 2020) for different tasks such as sentiment analysis and prediction. Yelp is one of the most important sources of word of mouth and rating for consumers in restaurant industry. For example, Luca (2016) found that even a one-star increase in Yelp's restaurant rating can increase revenue by five-to-nine percent. Anderson and Magruder (2012) also found that restaurants sell out reservations more frequently (by 19 percentage points) given an extra half-star rating on Yelp.

The dataset contains over eight million reviews. This study analyzes a subset of this data. First, data was filtered to include only restaurants and food categories. The time frame of reviews ranges from 2006 to 2018 and reviews differ in length, ranging from one-word reviews like "Awesome!" to reviews that consist of a few sentences. As reviewers often talk about different features of the restaurant in different sentences, reviews were split into sentences so that each sentence represents a case. Only the sentences that contain 40 to 140 characters (one standard deviation from the mean) are analyzed, to remove outliers and short sentences which do not have enough depth. As some restaurants have a very small number of reviews, only restaurants with more than 40 reviews on Yelp were included (one standard deviation from the mean). Finally, to limit the scope of the study, 40 North American restaurants were randomly selected. These can be categorized into casual dining (210 restaurants), fast food (13), and coffee shops (7), according to the categories provided by Yelp, and included chain restaurants (e.g., McDonald's) and local ones. For each restaurant, a random set of 100 reviews was selected (see the list of restaurants in Appendix 1). Thus, the final sample consists of 4,000 rows of data. Yelp

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<sup>1</sup> <https://www.yelp.com/dataset>

categorize restaurants based on price range which ranges from 1 (cheapest) to 4 (most expensive). The sample only include restaurants with price range of 1 to 3, and attire was casual for the selected restaurants, according to Yelp (see Appendix 1).

### **Multi-label Classification**

One of the most effective natural language processing (NLP) algorithms in recent years is based on transformer architectures which are introduced by Vaswani et al. (2017). These models are widely used in different tasks like question-answering, translation, and classification. In transformers, the numerical representation of each word depends on the surrounding words which can give the model a good understanding of the context. Unlike Recurrent Neural Network (RNN) models that are popular for NLP tasks, transformer architectures use a combination of attention-based models and Convolutional Neural Networks (CNN). In RNNs each token is fed into the model one by one, while transformers deal with an entire sequence in each iteration which is why they are faster and more efficient. In recent years, pre-trained models are widely used as they are trained on massive textual data and then can be fine-tuned for different tasks like question-answering or text classifications.

For classification, this research employed Facebook Bart (Lewis et al., 2019) that is pre-trained on the dataset introduced by Williams et al. (2017) for Multi-Genre Natural Language Inference (MultiNLI). The MultiNLI dataset has 433K of sentence pairs that include 10 different genres of written and spoken English text (Face-to-face, Telephone, 9/11, Travel, Letters, Oxford University Press, Slate, Verbatim, Government, and Fiction). The MultiNLI task is used to train the model to understand if two sentences entail each other or contradict each other. The pre-trained model on MultiNLI can understand the semantic similarity of two sentences even if they do not have a single word in common. (e.g., “what is your age?” and “how old are you?”). This

approach to text classification is proposed by Yin et al. (2019) and it is called zero-shot learning. The novelty of this approach is that it does not require manually labelling data for training the model. This increases the cost-efficiency and scalability of the method.

### **Brand Personality Scale**

As mentioned, multiple studies discuss the limitations of Aaker's brand personality scale. That is why using adjusted versions of Aaker's scale is common in the literature. Sincerity and excitement are mentioned to be most significant and relevant that is why some studies only used only a part of the dimensions (Aaker et al., 2004; Eisend & Stokburger-Sauer, 2013; Hosany et al., 2006; Smit et al., 2007; Swaminathan et al., 2009). Several studies used different analyses (e.g., confirmatory factor analysis) to come up with an adjusted measure (e.g., Ang & Lim, 2006; Kim et al., 2001; Malär et al., 2012; Zentes et al., 2008). In addition, new scales have been developed to measure brand personality (Ambroise & Valette-Florence, 2010; Azoulay & Kapferer, 2003; Geuens et al., 2009). Only a few studies employed the newly created measures (e.g., Garsvaite & Caruana, 2014; Goldsmith & Goldsmith, 2012; Gordon et al., 2016) thus they are not widely validated. Despite the limitations of Aaker's (1997) brand personality scale, it is the most popular scale in the literature and its antecedents and consequences are widely studied and replicated (Eisend & Stokburger-Sauer, 2013). In addition, as confirmed by Lee et al. (2009) Aaker's brand personality can be applied in restaurant context.

Consequently, this research used the brand personality scale proposed by Aaker (1997). First, it captured all the 42 traits from the text as dimensions and aggregated them into the mentioned big five personality traits (see Table 2). Using the mentioned classification method, the probability that each sentence is associated with each trait is calculated. Table 5 includes the top five sentences with the highest probability of association to each brand personality. The method



is doing a good job classifying a sentence like “Owners have done a classy job in decor and service was positively artesian.” to sophistication and “Very small joint but unique and interesting.” to excitement.

**Table 2**

*Brand personality scale (Aaker, 1997)*

Sincerity	Excitement	Competence	Sophistication	Ruggedness
down-to-earth	daring	reliable	upper class	outdoorsy
family-oriented	trendy	hardworking	glamorous	masculine
small-town	exciting	secure	good looking	western
honest	spirited	intelligent	charming	adventurous
sincere	cool	technical	feminine	athletic
real	young	corporate	smooth	tough
wholesome	imaginative	successful		rugged
original	unique	leader		
cheerful	up-to-date	confident		
sentimental	independent			
friendly	contemporary			

Several traits are removed from each dimension as they have low item-total correlation (below 0.2) which negatively affects the reliability of the scale. This is aligned with previous studies that improved the scale with the same approach (e.g., Ang & Lim, 2006, Nysveen et al., 2013). “*corporate*” and “*technical*” is removed from *competence*, “*young*” and “*independent*” from *excitement*, and “*small-town*” from *sincerity* (see Table 4 for the full list). For *sophistication*, “*feminine*” is removed which is aligned with Grohmann (2009) who demonstrates feminine brand personality is divergent from the *sophistication* dimension. For *ruggedness*, the trait “*tough*” is removed to improve Cronbach’s alpha. For ruggedness even after the removal, the remaining four traits have satisfactory reliability scores but are still lower than other dimensions (about 0.67) and no further modifications could improve the score. This can be justified as the *ruggedness* dimension has some issues that are mentioned in previous studies:

The trait “*western*” is not a personality trait which is a criticism mentioned in several studies (e.g., Geuens et al., 2009; Oklevik et al., 2020). Azoulay and Kapferer (2003) raised concerns regarding traits such as “*feminine*”, “*young*”, and “*western*” and argued these dimensions should not be included in the scale. Furthermore, “*masculine*” and “*outdoorsy*” have very low semantic similarities in different contexts. This is aligned with Grohmann (2009) who demonstrates masculine brand personality is divergent from the ruggedness dimension. Finally, Caruana et al. (2007) indicate problems regarding reliability, convergent and nomological validity with the ruggedness dimension. Musante et al. (2008) also found ruggedness is not replicable in the restaurant context.

**Table 3**

*Descriptive analysis of variables*

Variable	Mean	Std Dev	Minimum	Maximum	Sum
Sincerity	0.277	0.447	0	1	1106
Excitement	0.569	0.495	0	1	2275
Competence	0.492	0.500	0	1	1969
Sophistication	0.416	0.493	0	1	1662
Ruggedness	0.065	0.246	0	1	258
Time Effort Cost Perceptions	0.109	0.311	0	1	434
Psychic Cost Perceptions	0.349	0.477	0	1	1395
Monetary Price Perceptions	0.097	0.296	0	1	387
Quality Perceptions	0.557	0.497	0	1	2226
Service Quality	0.185	0.388	0	1	739

**Table 4***Measure reliability test and improvements*

Dimensions	Original Coefficient Alpha	Removed Traits	Improved Coefficient Alpha
Sincerity	0.87	"small-town"	0.88
Excitement	0.89	"young", "independent"	0.91
Competence	0.87	"corporate", "technical"	0.92
Sophistication	0.88	"feminine"	0.91
Ruggedness	0.55	"tough"	0.67

*Note: All the removed traits have an item-total correlation of below 0.2*

By aggregating each dimension for each restaurant, we can see the brand's positions in terms of brand personality. For example, Figure 2 illustrates that McDonald's and Pizza Hut have low associations with sincerity and excitement, while local small restaurants like Flancer's or Chili Man are more strongly associated with these brand personality dimensions.

### **Consumer Satisfaction Measure**

Consumer satisfaction is often measured through surveys (McNeal & Lamb, 1979). Giese and Cote (2000) defined consumer satisfaction as a summarization of a collection of different responses (emotional and cognitive) with different intensity which is done often shortly after consumption and aimed at the most important aspects of consumption. According to this definition, consumer's ratings on a review in form of stars (from 1 star to 5 star) is an appropriate measure for consumer satisfaction.

**Table 5***Top five sentences with the highest probability of association to each brand personality*

Dimensions	Text	Probability
Competence	This tried and true downtown eatery stays consistent and delivers quality year after year.	0.99203
	The Starbucks on 75th and McDowell does an excellent and consistent job of doing this.	0.98603
	It looks like White Oaks has not changed, serving excellent food and taking caring of its customers.	0.98508
	Matt is slinging a phenomenal job! Thanks Matt!	0.98226
	Well managed, good service and amazing food at a fair price.	0.98185
Sophistication	Spectacular seating area that worked for our group, with a quaint fireplace.	0.99319
	Very nice, clean, and try the Philly sandwich with the works and mayo jalapeno sauce	0.99131
	formal and classy, good food, great atmosphere and views.	0.9908
	It's very clean and well decorated.	0.98573
	Freshness and quality was great.	0.97921
Sincerity	And it was a very genuine greeting.	0.9754
	She is wonderful and wears a genuine smile.	0.9711
	The place is clean there's a lady here named Lala that is a genuine sweet and wonderful person...	0.9388
	Had my first visit and Vic is the best.	0.9239
	Mario, who delivered my order with a smile, was the same.	0.8790
Excitement	This place is new and has been updating their menu quite often.	0.9712
	Seriously, order the prickly pear chicken sandwich! Atmosphere is casual and cool.	0.96037
	It's a hyped up Asian coffee shop! Their drinks are more aesthetic than tasty .	0.95336
	If you choose to eat in your car, they have new order screens which makes this Sonic look fresh and new.	0.94796
	Freshness and quality was great.	0.94545
Ruggedness	He says it's the best he's had.	0.82356
	but my hubby and i planned a quick bike ride and a shake and James came to assist us even though we missed the closing by a few...	0.80769
	'should we just get up and leave.' We should have left.	0.79928
	Matt is slinging a phenomenal job! Thanks Matt!	0.79463
	These guys know what they're doing	0.78067

## Choice Criteria Measures

Scholars often use surveys to capture choice criteria factors such as *perceived quality* (Aaker & Jacobsn, 1994; Parasuraman et al., 1985; Phillips et al., 1983; Zeithaml, 1988). In recent years, few studies tried to capture perceived quality (e.g., Tirunillai & Tellis, 2014; Hu et al., 2019a) and perceived price (Liu et al., 2019) through text mining. Similarly, this study used a state-of-the-art deep learning method on the text of reviews to measure choice criteria dimensions (i.e., perceived quality, interpersonal service quality, price perception, psychic cost, and time/effort cost perceptions). Table 6 illustrates all the dimensions that are replicated from Baker et al. (2002) but measured through the same text mining approach that is used to capture brand personality. In this study, monetary and non-monetary costs are representing negative or unfair perceptions (e.g., too much money, high time sacrifice, uncomfortable atmosphere). The top five sentence with the highest probability of association to the five choice criteria dimensions are illustrated in Table 7. When aggregated for each restaurant, McDonald’s and Wendy’s are associated with the lowest perceived quality and highest psychic cost among the restaurants included in the sample (Figure 2).

**Table 6**

*Choice criteria scale (Zeithaml 1988; Baker et al., 2002)*

Perceived quality	Interpersonal Service Quality	Price Perception	Psychic Cost	Time/Effort Cost
High quality	Treated well	Expensive	Unpleasant atmosphere	Time sacrifice
	High-quality service Prompt service	Too-much money	Uncomfortable atmosphere Displeasing atmosphere	Search effort Shopping effort

## RESULTS

As expected and discussed in previous studies, perceived price, perceived quality, and perceived service quality were correlated (Bei & Chiao, 2001; Zeithaml, 1988). For this reason, multicollinearity statistics and the highest condition index were examined. The highest condition index was 3.46, which is less than the threshold of 10 for moderate multicollinearity, and much less than the threshold of 30 for strong multi-collinearity. Also, the variable inflation values (VIF) were less than 3.6 for all the variables, which is satisfactory.

The analysis consisted of linear regression without the transformation of variables for maximum interpretability. The result shows that *sincerity (H1a)*, *excitement (H1b)*, and *sophistication (H1c)* have a significant positive effect on consumer satisfaction, while *competence (H1d)* and *ruggedness (H1e)* did not have a significant effect (Table 8).

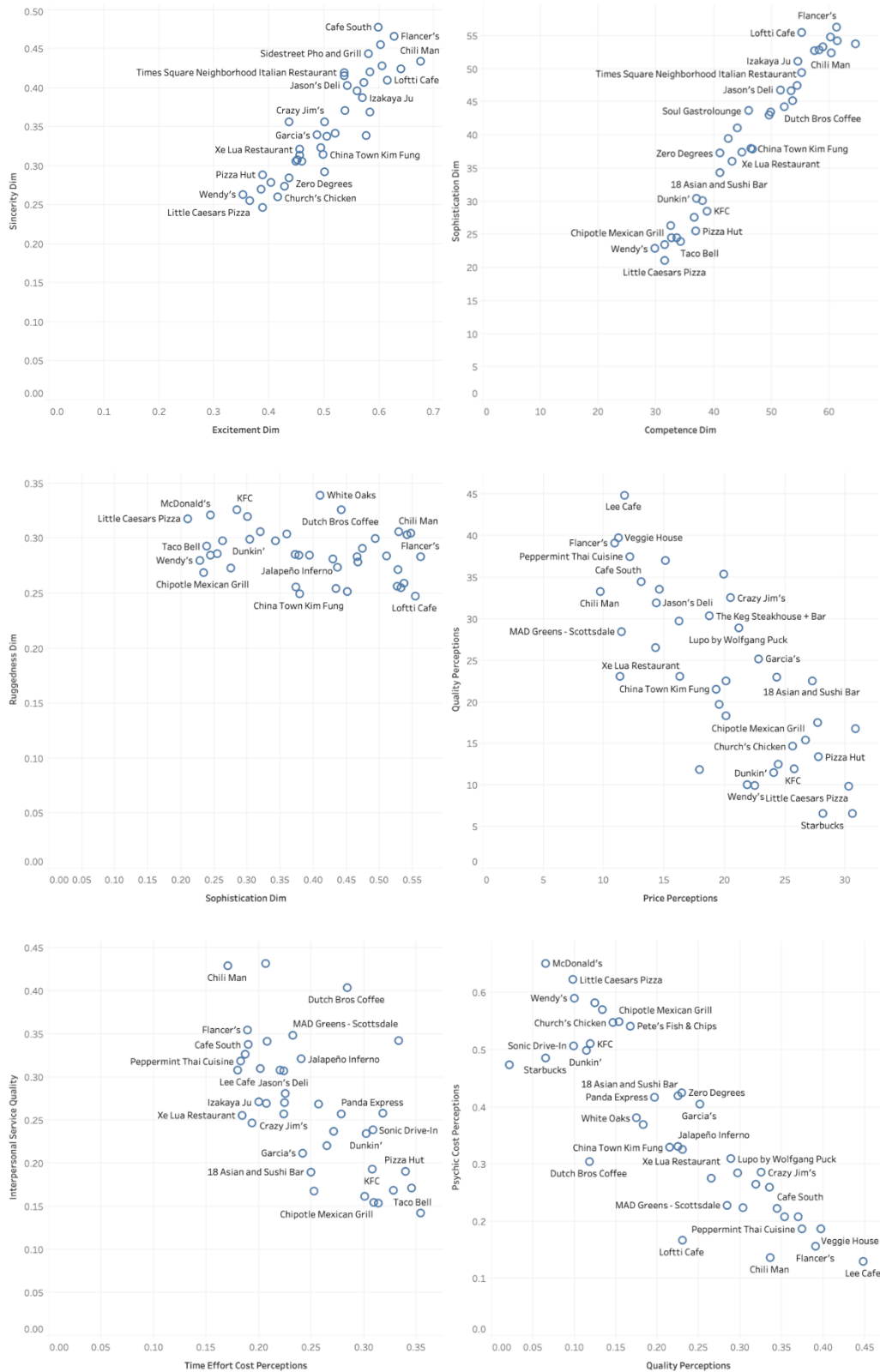
All choice criteria (i.e., quality, service, monetary, and non-monetary cost perceptions) have a significant relationship with consumer satisfaction, supporting H2a to H2e. While quality and service perceptions have a positive effect on satisfaction, other cost perceptions including psychic cost (H2e), time/effort (H2d), and price perception (H2c) have a negative effect, as predicted (Table 8). Quality perception and psychic cost have the strongest relation with consumer satisfaction among all measures, based on standardized regression coefficients.

**Table 7***Top five sentences with the highest probability of association to each choice criteria dimensions*

Dimensions	Text	Probability
Interpersonal Service Quality	The five stars is for fantastic customer service.	0.995
	She exhibited model customer service and deserves to be recognized.	0.994
	The service outstanding; always had a refill on my drink, gave good recommendations and was easy to talk to.	0.993
	Smiling customer service, friendly atmosphere, clean pickup.	0.992
	Their most impressive attribute, is their customer service.	0.992
Perceived Quality	Quality of fish is head and shoulders above 90% of the sushi restaurants in the GTA.	0.982
	This place was Great and the food was delicious! I couldn't give 5 stars only because the service wasn't the best.	0.980
	First time here and I loved it!! The food was great and their menu is pretty big; from salads, to soups, pastas and sandwiches.	0.965
	Such tasty food and such an eclectic menu!! Small dining area and limited parking but so worth the trip and any wait.	0.960
	Great tasting food, big portions and at a decent price.	0.950
Price Perception	Overpriced and kind of strange environment, I like more traditional mexican food.	0.997
	Spending that kind of money, i would rather go downtown to another Izakaya	0.997
	Definitely couldn't justify the price.	0.996
	To have paid \$14 plus tax and tip it's really not worth going back for a second try.	0.996
	Extremely rude coworkers!! Prices are overly too much! They don't accept cash AND you have to buy tartar sauce too ?	0.996
Time/Effort Cost	I have gone here maybe 4 times an every single time my order has been incorrect or missing something!! Don't waste your time stopping here!	0.900
	Made a point to drive over 30 min to this place...	0.896
	Please go to any other location do not waste your time or money at this location.	0.893
	Please drive a little out of your way and avoid this location.	0.888
	Save your time and money...try some other place.	0.882
Psychic Cost	This Starbucks is pretty slow and unfriendly.	0.999
	Poor service, poor attitude, out of products, and they took forever to get us our food.	0.999
	Horrible waiting staff/customer service, mediocre food.	0.998
	Overpriced and kind of strange environment, I like more traditional mexican food.	0.998
	Really bad experience all around.	0.998

**Figure 2**

*Brand personality dimensions aggregated for each restaurant*





**Table 8***The result of linear regression (full model)*

Variable	Parameter Estimate	Standardized Estimate	Standard Error	t Value	Pr >  t	Variance Inflation
Intercept	2.672	0.000	0.054	49.660	<.0001	0.000
Sincerity	0.151	0.042	0.059	2.540	0.011	1.863
Excitement	0.254	0.079	0.056	4.530	<.0001	2.045
Sophistication	0.420	0.129	0.067	6.270	<.0001	2.890
Competence	0.025	0.008	0.070	0.360	0.722	3.217
Ruggedness	-0.005	-0.001	0.081	-0.060	0.951	1.051
Psychic Cost Perceptions	-0.744	-0.221	0.061	-12.220	<.0001	2.227
Time Effort Cost Perceptions	-0.292	-0.057	0.068	-4.270	<.0001	1.197
Monetary Price Perceptions	-0.176	-0.032	0.072	-2.460	0.014	1.186
Quality Perceptions	0.701	0.217	0.074	9.420	<.0001	3.616
Interpersonal Service Quality	0.188	0.046	0.060	3.140	0.002	1.430

*Note: Adjusted R-square = 0.411, Mean Squared Error (MSE) = 1.50, F Value = 280.72, Prob (F Statistics) < .0001*

A stepwise regression was carried out in addition to the full model in order to remove the insignificant variables. By comparing the stepwise model (Table 9) to the full model (Table 8), it is evident that the removed variables (i.e., competence and ruggedness) do not contribute to the explanatory power of the model, as the R-square does not improve with or without them. The adjusted R-square of the model is 0.41 with a Mean Squared Error of 1.50 stars.

Overall, this research finds support for most hypotheses, and lends further support to previously identified relationships between brand personality, choice criteria and consumer satisfaction by using text mining, a cost-effective and scalable alternative to conventional consumer surveys.

**Table 9***The result of stepwise linear regression*

Label	Parameter Estimate	Standardize d Estimate	Standard Error	t Value	Pr >  t	Variance Inflation
Intercept	2.67526	0.000	0.053	50.450	<.0001	0.000
Sincerity	0.15491	0.043	0.058	2.680	0.007	1.770
Excitement	0.25508	0.079	0.056	4.570	<.0001	2.028
Sophistication	0.42606	0.131	0.065	6.590	<.0001	2.690
Psychic Cost Perceptions	-0.7464	-0.222	0.060	-12.390	<.0001	2.186
Time Effort Cost Perceptions	-0.29196	-0.057	0.068	-4.300	<.0001	1.184
Monetary Price Perceptions	-0.17748	-0.033	0.071	-2.490	0.013	1.179
Quality Perceptions	0.71053	0.220	0.069	10.320	<.0001	3.101
Interpersonal Service Quality	0.18791	0.046	0.060	3.150	0.002	1.425

*Note: Adjusted R-square = 0.411, Mean Squared Error (MSE) = 1.50, F Value = 351.05, Prob (F Statistics) < .0001*

## GENERAL DISCUSSION

This study is an extension to the literature on brand personality by providing evidence on the function of each brand personality dimension and choice criteria on satisfaction within restaurant industry. Lee et al. (2009) demonstrate brand personality has a positive effect on satisfaction in the context of restaurants. The present study extends Lee et al. (2009) by investigating the effect of each brand personality dimension and demonstrating sincerity, excitement and sophistication are positively associated with satisfaction while ruggedness and competence are not significant. This is aligned with Lin and Huang (2012) who found sincerity, excitement, sophistication has a positive influence on purchase intentions for coffee chains; which is mentioned as a consequence of consumer satisfaction and other CBR constructs (e.g., Dash et al., 2021; Hayes et al., 2020). In addition, the findings support the significant and positive association of perceived quality, and

interpersonal service on satisfaction, while perceived price, psychic cost, and time/effort cost have a negative association as expected. More importantly, the findings indicate psychic cost has the highest impact on satisfaction among all the variables.

Based on the findings, this study contributes to the literature in three ways. First, with providing empirical evidence on the effect of individual dimensions of brand personality on satisfaction within restaurant industry. Second, this study contributes to the research on satisfaction by supporting the effect of choice criteria factors on satisfaction. Third, it contributes to the marketing literature on text mining by proposing a novel method for capturing brand personality and choice criteria from online reviews.

Restaurants spend millions of dollars on creating a pleasing atmosphere but the majority of them do not build brand personalities (Siguaw et al., 1999). Considering the importance of developing a unique brand personality, Lee et al. (2009) mentioned the importance of having a marketing analytics tool for constantly monitoring brand personality perceptions. Measuring brand personality with the proposed method is scalable and cost-efficient. Through this approach brand managers can also capture competitors' brand personalities frequently which can be used as an instrument for better positioning. Then the insights can be used for all many marketing activities (e.g., communications, advertising, décor, colors, logo, and employee training and appearance) which should be consistent with target positioning in terms of brand personality (Lee et al., 2009). On the other hand, this study supports the importance of all choice criteria dimensions on satisfaction especially psychic cost that has the highest destructive capacity according to the results. Thus, brand managers in restaurant industry should prioritize eliminating the elements that increase psychic cost perceptions (e.g., uncomfortable, and unpleasing atmosphere).

Oliver (2014) mentioned individual level satisfaction is like a black box which can be influenced by a number of factors such as expectation (i.e., negative disconfirmation), fairness (e.g., service at the next table), regret, and objective good or bad experience. This increases the complexity of modeling consumer satisfaction at the individual level. Brand managers can also use the proposed method as an efficient tool for predicting and modeling consumer satisfaction at the individual level.

### **Limitations and Future Studies**

As discussed, there have been numerous studies that used online reviews for capturing different constructs through text mining techniques (Chen & Lurie, 2013; Lee & Bradlow, 2011; Li et al., 2020; Melumad et al., 2019; Moon & Kamakura, 2017; Puranam et al., 2017).

However, these methods are new and have limitations that need to be acknowledged. One issue which is mentioned by Berger et al. (2020) is construct validity as sometimes the text gives false proof of construct. This is particularly a big problem for dictionaries or lexicon-based models as they lack the ability to understand the context of each sentence (Berger et al., 2020). The recent deep learning models contextualize text to a greater extent. Although this limitation applies to this study, it presumably has a smaller impact on the results compared to prior studies. To ascertain the accuracy of deep learning models, it would be beneficial to employ human coders on a sub-sample of the data and quantify the accuracy of the proposed model for further validation (Berger et al., 2020). Another limitation is concurrent validity which can be assessed using multiple NLP techniques for capturing the same constructs (Hartmann et al., 2019). Another way to tackle this limitation is replicating this study by doing experiment or survey in addition to text mining which is recommended by prior studies (Van Laer et al., 2019). Future

studies could capture brand personality, choice criteria and satisfaction in a consumer survey to validate the current findings.

In addition to validation, a multi-method approach could result in new insights in future studies. Surveys including additional measure could shed light on the effect of consumer individual differences (e.g., demographics, socioeconomic status, lifestyle preferences) on brand personality and choice criteria perceptions, as well as subsequent satisfaction ratings. Because Yelp provides the reviewers' unique ID, some individual differences of consumers related to past purchase and rating history can also be captured from online review. Using this data, future studies could perform customer segmentation based on past purchase features such as restaurant type, price range, location, and purchase frequency. One example can be clustering the users that previously reviewed expensive (vs. casual) restaurants, as this could be a proxy for price sensitivity.

The reader should bear in mind that the current is based on a lay definition of brand personality construct rather than the formal definition of construct provided by Aaker (1997). The proposed method is not trained for capturing brand personality, and it is not using a dictionary that is specifically developed to capture brand personality. The novel approach used in this study is in contrast with the two alternative approaches that are used in the literature. The first common approach is manually labelling a sub-sample of reviews using human coders for training the classifier (e.g., Hennig-Thurau et al., 2015). The second approach includes developing a dictionary-based text classifier for the sole purpose of capturing a construct (e.g., Yarkoni, 2010). This is accomplished by initially using a survey to measure brand personality, and then calculating the correlation of the words used in the reviews to each brand personality dimension.

There are several problems associated with using online reviews. First, businesses may use fake reviews or invite biased reviews to inflate their ratings or give their competitors negative reviews (Luca & Zervas, 2016). Even though Yelp has an automated mechanism for detecting suspicious reviews, fake reviews may still exist. To limit the likelihood of catching fake reviews, this study is using a random set of 100 reviews for each restaurant. Future studies might use a larger set of reviews for further improvements. Second, the influence of existing ratings on future perceptions should be acknowledged. Customers are more likely to develop a positive perception about a brand that already has a good rating (Cheung & Lee, 2012). Third, extremely positive or negative reviews in Yelp are more useful in purchase decisions than moderate ones, and negative reviews are more influential than positives (Roh & Yang, 2021). This leads to negativity bias that is mentioned as a limitation of using online reviews (Aggarwal & Zhai, 2012). This potential problem could be amplified as the distribution of review stars is skewed to extremes (both positive and negative; see Appendix II). Finally, self-selection bias is mentioned as a limitation of using online reviews (Li & Hitt, 2008). This is because consumers select restaurants that they might enjoy as well as those they wish to review.

This study uses a limited sample that consists of three types of restaurants (i.e., casual dining, fast food, and coffee shop) with low to medium price-range and casual attire (see Appendix 1). Thus, findings might not be generalizable to high-end restaurants. Future studies can extend the finding by investigating other types of restaurants such as fine dining. As expectations differ for different types of restaurants, investigating the moderating effect of different restaurant types is also suggested.

Another limitation is a bias that happens as this study only captures one side (negative or positive) of choice criteria dimensions. For example, in the case of perceived price, as the

method is only measuring unfair prices, when customers do not mention price in the review, this will be accounted as a low score in perceived price. Arguably this should not invalidate the results as customers often talk about the most important aspects of their experience. Therefore, in this study it is assumed that when customers do not talk about pricing, the price is perceived as fair. Future studies can capture control variables to avoid this bias.

Oliver (2014) mentioned complex individual-level feelings that drive satisfaction such as fairness (e.g., service at the next table) and regret. Namkung and Jang (2009) also found service fairness influences satisfaction in the context of restaurants. Future studies can use the same method to capture other complex individual-level experiences like regret or fairness to gain a better understanding of individual-level satisfaction. There is also abundant room for future progress in capturing the features of environment (e.g., design and ambient) and brand experience from the UGC and investigate its effect on brand personality and satisfaction.

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## APPENDIX I

### Appendix 1a

*List of restaurants in the sample*

<b>Name</b>	<b>Category</b>	<b>Price Range</b>	<b>Restaurant Attire</b>
18 Asian and Sushi Bar	Restaurant	2	Casual
Crazy Jim's	Restaurant	2	Casual
Flancer's	Restaurant	2	Casual
Garcia's	Restaurant	2	Casual
Izakaya Ju	Restaurant	2	Casual
Jalapeño Inferno	Restaurant	2	Casual
Jason's Deli	Restaurant	1	Casual
Lee Cafe	Restaurant	2	Casual
Lupo by Wolfgang Puck	Restaurant	3	Casual
Miki's Restaurant	Restaurant	1	Casual
Peppermint Thai Cuisine	Restaurant	2	Casual
Sidestreet Pho and Grill	Restaurant	1	Casual
Soul Gastrolounge	Restaurant	2	Casual
Sugar Bowl	Restaurant	1	Casual
Thai Orchid Garden Restaurant	Restaurant	2	Casual
The Keg Steakhouse + Bar	Restaurant	3	Casual
Times Square Neighborhood Italian Restaurant	Restaurant	2	Casual
Veggie House	Restaurant	2	Casual
White Oaks	Restaurant	1	Casual
Xe Lua Restaurant	Restaurant	1	Casual

*Note:* Price range is between 1 (lowest price) to 4 (highest price) which is extracted from Yelp.com. Restaurants are classified into “classy” and “casual” in terms of attire in Yelp.com

## Appendix 1b

### *List of Coffee Shops in the sample*

<b>Name</b>	<b>Category</b>	<b>Price Range</b>	<b>Restaurant Attire</b>
Cafe South	Coffee Shop	2	Casual
Dunkin'	Coffee Shop	1	Casual
Dutch Bros Coffee	Coffee Shop	1	Casual
Loftti Cafe	Coffee Shop	1	Casual
MAD Greens - Scottsdale	Coffee Shop	2	Casual
Starbucks	Coffee Shop	2	Casual
Zero Degrees	Coffee Shop	2	Casual

*Note:* Price range is between 1 (lowest price) to 4 (highest price) which is extracted from Yelp.com. Restaurants are classified into “classy” and “casual” in terms of attire in Yelp.com

## Appendix 1c

### *List of Fast Foods in the sample*

<b>Name</b>	<b>Category</b>	<b>Price Range</b>	<b>Restaurant Attire</b>
Chili Man	Fast Food	1	Casual
China Town Kim Fung	Fast Food	2	Casual
Chipotle Mexican Grill	Fast Food	1	Casual
Church's Chicken	Fast Food	1	Casual
KFC	Fast Food	1	Casual
Little Caesars Pizza	Fast Food	1	Casual
McDonald's	Fast Food	1	Casual
Panda Express	Fast Food	1	Casual
Pete's Fish & Chips	Fast Food	1	Casual
Pizza Hut	Fast Food	1	Casual
Sonic Drive-In	Fast Food	1	Casual
Taco Bell	Fast Food	1	Casual
Wendy's	Fast Food	1	Casual

*Note:* Price range is between 1 (lowest price) to 4 (highest price) which is extracted from Yelp.com. Restaurants are classified into “classy” and “casual” in terms of attire in Yelp.com

## APPENDIX II

### Appendix 2

*Distribution of satisfaction score (review stars)*

