

LEVERAGING DIGITAL PERSUASION STRATEGIES: ENHANCING  
SUSTAINABLE RESTAURANT CHOICES THROUGH THIRD-PARTY  
DELIVERY PLATFORMS

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In Partial Fulfillment  
of the Requirements for the Degree  
Doctor of Philosophy

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by  
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The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

LEVERAGING DIGITAL PERSUASION STRATEGIES: ENHANCING  
SUSTAINABLE RESTAURANT CHOICES THROUGH THIRD-PARTY  
DELIVERY PLATFORMS

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## DEDICATION

To those whose love shaped my strength,  
whose belief quieted my doubts,  
and whose presence lit the way through the long nights.

I would like to thank my loving family, especially my parents, Ye Qi and Hui Zhu, and my grandparents, Qingzhi Zhao and Dawen Zhu. Thank you for your endless patience, unconditional support, and steadfast encouragement. Your quiet strength and unwavering belief carried me through countless pages and countless hours.

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ABSTRACT

This study investigates how digital persuasion strategies influence consumers' sustainable restaurant choices on third-party food delivery (TPFD) platforms, drawing on persuasion theories, the Cognitive-Affective Processing System (CAPS) theory, and Wilson's dichotomy theory. Across three studies, the research examines individual motivation and social influence strategies, the moderating roles of green self-identity and social norms, and integrates cognitive, affective, and contextual factors. Data from 696 participants collected via Prolific were analyzed using SPSS 26, Hayes' PROCESS macro, and AMOS. Results show that reciprocity and social proof strategies significantly enhance perceived persuasiveness and strengthen consumers' intentions to choose sustainable restaurants through TPFD applications. This research contributes to extending persuasion theories into digital food delivery contexts and offers practical insights for platform designers, restaurant operators, and policymakers aiming to promote eco-friendly dining behaviors and sustainable consumption.

# CHAPTER 1

## INTRODUCTION

### 1.1. Background of the study

Food consumption, an essential daily activity, has been revolutionized by technology. Mobile third-party food delivery (TPFD) applications now enable consumers to conveniently receive meals without the need to visit stores. For instance, employees can order their meals in advance and have them delivered at lunchtime, allowing for more rest during their busy workday without waiting at a restaurant. Families can also enjoy dinners in the comfort of their own homes, creating a more relaxed dining experience. Additionally, the growth of TPFD has created more job opportunities for delivery drivers, contributing to the slow economic recovery following the COVID-19 pandemic (Ha Thu, et al., 2023; Hoang et al., 2021; Li, et al., 2020). These benefits have made food delivery a rising trend in the hospitality industry, particularly within the foodservice sector, and it is expected to further influence consumer lifestyles in the near future. A recent report from DoorDash, a leading TPFD platform, revealed that 70% of consumers ordered food delivery in the past month. Approximately 75% of respondents reported ordering food via the app at the last minute when needed, and 33% of consumers in 2024 ordered more through the platform compared to 2023 (DoorDash, 2024). As TPFD continues to grow, it is clear that this trend is reshaping consumer habits. However, with the increased frequency of consumer usage, significant sustainability challenges have emerged, such as the rise in disposable packaging waste and emissions from delivery-related activities. Simultaneously, consumer interest in sustainability has surged, reflecting broader societal shifts toward environmentally conscious behavior. In response to these growing demands,

some TPFD platforms have introduced eco-friendly options, including features like "order without disposable silverware," bulk ordering, and green delivery choices. Furthermore, TPFD platforms hold significant potential to promote sustainable restaurant options, including those that offer organic products, source ingredients locally, and provide other environmentally friendly menu items. These efforts not only support sustainable food consumption but also align with customers' growing preferences for environmentally responsible choices.

As reflected in the Chinese proverb, "*Food is the god of the people*" (民以食为天), food is a primary concern for human beings. Maslow (1954) also highlighted that food and drink are fundamental components of basic needs in his hierarchy of needs. In today's fast-paced social environment, particularly in the aftermath of the COVID-19 pandemic, consumers have become increasingly inclined to order food from outside rather than prepare meals at home, making the use of TPFD services a widely adopted and convenient option (de Souza et al., 2022). Additionally, studies in the fields of food science and nutrition indicate that food consumption can significantly influence individuals' moods, emotions, and mental health, including the prevention of depression (AlAmmar et al., 2020; Eaton et al., 2020; Firth et al., 2020). All of this evidence underscores the essential role of food in human life. However, with improvements in living standards and the growing availability of knowledge, consumers now expect more from food beyond basic functions. They increasingly seek restaurant options that benefits personal health and contributes to the well-being of the broader environment. For example, in recent years, sustainable restaurants offering organic ingredients have become a popular choice among consumers, reflecting a greater concern for the

nutritional value of their meals. This trend aligns with consumers' growing awareness and desire to pursue a healthy lifestyle. Moreover, as global warming and related environmental issues become more prominent concerns, people are increasingly willing to contribute to environmental protection. This is evident in their higher expectations for corporate social responsibility (CSR) practices from enterprises and they are more willing to support restaurants with environmentally responsible operations. As a result, the concept of sustainability has gained widespread understanding and acceptance among the general public. Moreover, consumers' willingness to practice sustainable behaviors is also increased in their daily lives but only need a slightly nudge toward choosing sustainable dining establishments.

## **1.2. Statement of the problem**

Sustainable behaviors have been increasingly discussed in the hospitality industry in recent years. Across the lodging, tourism, and foodservice sectors, scholars have analyzed the sustainable practices of companies and consumers from various perspectives, including those of employees and customers. In the area of food production and consumption, studies have also explored sustainable practices from both consumer and employee perspectives. For example, Seo et al. (2024) found that organizational constraints influence employees' food waste behaviors through internal limitations, and they discussed strategies for encouraging more sustainable practices in the foodservice sector. Similarly, discussions on promoting sustainable restaurant practices as alternatives to conventional operations have been explored by scholars (e.g., Alae-Carew et al., 2022; Seo et al., 2023). All of these studies seek to envision a more sustainable future for the restaurant and foodservice industry, aligning with ongoing global sustainability missions.

Technological development enhances people's daily lives and also opens up new possibilities for the future. Factories have increased efficiency and productivity through automation and advanced technologies, while communication has become easier and more immediate thanks to the internet and mobile devices. Moreover, renewable energy solutions, such as solar and wind, contribute to reducing environmental impacts. Additionally, innovations in electronic technologies, such as big data, blockchain, and AI-related functions, offer significant potential for adoption in the restaurant industry. For example, Nair and Gupta (2021) explored the application of AI-generated technologies in social media and digital marketing, highlighting their transformative potential. Zhang et al. (2023) examined the role of informational technology in sustainable digital marketing, particularly its implications for senior adults. Additionally, Galanakis et al. (2021) emphasized the potential of innovative technologies, such as internet communication technologies and blockchain, to encourage consumers to purchase from sustainable restaurants in the post-Covid era. Previous studies have analyzed how these technologies can improve foodservice operators' service quality (Park et al., 2021; Sachani et al., 2021; Wong et al., 2022) and enhance consumer satisfaction (Recuero-Virto & Valilla-Arróspide, 2022; Tai et al., 2021; Wu et al., 2021).

One prominent technology used by both restaurant operators and consumers is third-party food delivery (TPFD) platforms, which make ordering food from restaurants easier through delivery services. The transactions via TPFD platforms exceeded \$70 billion in the U.S. in 2021 (Du et al., 2023), highlighting the rapid growth and significant future potential of this trend. The Covid-19 pandemic accelerated the growth of TPFD services and reshaped consumer purchasing habits and behaviors (Muangmee et al., 2021).

Despite growing interest in sustainability within restaurant operations and consumption (Reichheld et al., 2023), there remains a significant research gap in how to effectively encourage sustainable consumer choices on TPFD platforms choices that benefit both personal health and the environment.

The Cognitive-Affective Theory (CAT), proposed by Mischel and Shoda (1995, 2008), states that an individual's behavior in a given situation is determined by the interaction between the person's cognitive-affective features and the characteristics of the situation (Dingess & Wilt, 2020). This implies that consumers' purchasing behaviors can be influenced by environmental adjustments, such as receiving new information, persuasive messages, or other external or internal stimuli.

Persuasion is a form of influence where one person seeks to modify another's behavior or opinions by conveying information, emotions, reasoning, or a combination of these, while still allowing the individual the autonomy to make their own choice (Dubov, 2015). Scholars have examined persuasion from various perspectives and developed multiple theories, such as protection motivation theory, theory of planned behavior, and elaboration likelihood model, to explain its mechanisms (Cameron, 2009). However, at its core, persuasive communication aims to shape, reinforce, or change others' responses through the use of different types of messages (Miller, 2013).

Persuasion strategies are a series of actions designed to convince consumers to purchase a product, relying not solely on rational considerations but primarily on emotional and sentimental factors (da Silva et al., 2021). For instance, a study on food advertising on television identified three major categories of persuasion strategies: the power of advertising, prize offerings, and brand benefit claims (da Silva et al., 2021).

Additionally, Cozzio et al. (2020) suggest that cognitive and affective appeals also significantly influence consumers' choices, particularly regarding ethical restaurant consumption. Cialdini (2007) further summarized six key persuasion strategies that effectively shape individuals' intentions and behaviors.

In conclusion, the growing interest in sustainable consumer behaviors has led to extensive research on sustainability in the restaurant industry, including eco-friendly practices, consumer attitudes, and the impact of communication strategies on sustainable decision-making. However, much of this literature primarily focuses on traditional dining settings or general consumer attitudes toward sustainability, without adequately exploring how digital platforms applications, such as TPDF, can serve as effective channels for promoting sustainable behaviors. The unique characteristics of TPDF, such as limited face-to-face interaction with restaurant providers and digital functions, influencing and shaping consumers' restaurant decision making process. While previous studies have examined consumer behavior in digital contexts (i.e., AI generated technologies, blockchain transportation system, and information technology), they have not sufficiently investigated the role of digital persuasion strategies in driving sustainable restaurants choices through TPDF applications. This gap is critical, as understanding how to effectively leverage digital tools to nudge consumer behavior can provide actionable insights for foodservice operators and contribute to achieving broader sustainability goals. By addressing this gap, the study aims to bridge the disconnect between existing literature on consumer sustainability and the untapped potential of digital persuasion strategies in the TPDF context.

### **1.3. Dichotomy theory**

Dichotomy means people artificially divide one class into two distinct subclasses based on a specific and unique attribute or characteristic logically (Encyclopædia Britannica, 2024). Wilson (1887) provided the concept of dichotomy into the public administration area and tried to clearly understand politics and administration separately. Wilson used purpose as an attribute to re-identify the meaning and tools for policies and administration which provided a meaningful influence in literature. Similar to the public administration sector, dichotomy theory was also applied to other disciplines and helping scholars to understand different issues effectively, such as the category of individualism vs. collectivism (e.g., Dabiriyani Tehrani & Yamini, 2022; Rajkumar, 2021; Saracevic et al., 2022) in the field of sociology, cognitive vs. emotion in psychology area (e.g., Dean et al., 2022; Liu et al., 2022; Uban et al., 2021), and verbal vs. nonverbal language in communication sector (e.g., Dragomir et al., 2021; Kim, 2024; Tulanbaeva, 2023). Thus, this study was also tried to understand the research questions based on the dichotomy theory via artificially divided consumers' purchasing motivations attributes to internal and external categories.

### **1.4. Research questions**

In line with the overall research purpose, the primary research problem is to identify effective persuasion strategies that influence consumers' sustainable purchasing behaviors when using TPDF applications to place food orders. This study draws on Wilson's dichotomy theory (1887) to categorize persuasion strategies into two major types: internal individual motivation and external social influence, reflecting both internal and external factors. Thus, three specific research questions have been posed:

1. How do digital persuasion strategies impact consumers' pro-environmental behavioral intentions when using TPFD platforms?
2. What roles do green self-identity and social norms play in moderating the effectiveness of individual motivation strategies and social influence strategies on consumers' perceived persuasiveness and behavioral intentions when using TPFD platforms?
3. What's the comprehensive process and factors that influencing consumers' pro-environmental behavioral intentions?

### **1.5. Research purposes**

The purpose of this study is to explore how digital persuasion strategies can effectively influence sustainable consumer behavioral intentions on TPFD platforms. This study will analyze the different persuasion strategies and classify them into two broad categories: internal individual motivation based and external social influence based on the dichotomy theory. By identifying and evaluating these strategies, the study seeks to understand how they shape consumer choices toward sustainable restaurants options. Specifically, the research aims to achieve the following objectives:

1. To identify and evaluate internal individual motivated-based persuasion strategies that effectively encourage consumers to choose sustainable restaurant options on TPFD platforms.
2. To investigate the moderating role of green self-identity in the relationship between internal individual motivated-based strategies and consumers' perceived persuasiveness and behavioral intentions.

3. To identify and evaluate external social influence-based persuasion strategies that influence consumers' decisions to choose sustainable restaurant options on TPFDD platforms.
4. To examine the moderating role of social norms in the relationship between social influence strategies and consumers' perceived persuasiveness and behavioral intentions.
5. To assess the overall impact of digital persuasion strategies on influencing consumers' sustainable behavioral intention in the context of TPFDD, providing insights for platform designers and businesses to encourage eco-friendly choices.

## **1.6. Significant of the study**

The current study is expected to expand the understanding of how digital persuasion strategies can effectively encourage sustainable consumer behavior on TPFDD platforms. As these platforms continue to grow in popularity, understanding how to influence consumer choices toward more sustainable behaviors is essential for addressing environmental challenges such as greenhouse gas emissions and food waste. This study will offer valuable insights into how persuasion strategies applied to the TPFDD platforms can encourage consumers to make more food ordering from sustainable restaurants, which benefits both individual health and the broader ecological system. Specifically, this study uses dichotomy theory to analyze and reclassify persuasion strategies into two major categories, filling a gap in the existing literature, such as the persuasion theories and the consumer behaviors understanding in social activities sectors, especially in the foodservice area. Furthermore, this research extends existing theories of persuasion and pro-environmental behavioral intentions by applying them in the context of digital food

ordering, an area that has been underexplored in the sustainability section. Besides, this study also will provide a guideline for understanding and shaping consumers behavior in other contexts, such as in-store dining with innovative technologies, sustainable product marketing, and community-driven sustainability campaigns. Additionally, this study aims to expand the current knowledge on understanding the relationships between persuasion strategies and consumers' perceived persuasiveness by examining the moderating effects of green self-identities and social norms. In terms of practical significance, the findings of this study have the potential to inform platform designers, policymakers, and businesses about how to create more effective interventions that drive pro-environmental consumer behaviors, making it a timely and relevant contribution to the field while offering several practical suggestions as well.

## **1.7. Organization of the dissertation**

This dissertation is organized into five chapters, each addressing a key aspect of the research. The first chapter introduces the research topic, outlines the problem statement, research questions, and presents the significance of this study. It provides an overview of the blueprint of this research. The second chapter reviews relevant literature to establish the theoretical foundation of this study. It discusses key concepts, research models, findings from previous studies, and hypotheses, identifying gaps that this dissertation aims to fill. Chapter three is the research methodology section. It explains the research design, major methodology of conducting this study, as well as the process of data collection and analysis. The sampling procedures, data collection instruments, and analytical techniques are detailed in this chapter. Chapter four presents the results of the data analysis. It discusses the findings in relation to the research questions and

hypotheses. Chapter 5 includes a discussion of the results and their implications. In the fifth chapter, the findings of this study are interpreted and critically evaluated. In addition, both theoretical and practical implications are identified. Additionally, a brief summary, the limitations of the current study, and suggestions for future research are included in Chapter 5 as well.

# **CHAPTER 2**

## **LITERATURE REVIEW**

### **2.1. Introduction**

This section includes a comprehensive literature review of the research topic. Fundamental theories of cognitive-affective theory and persuasion theories are discussed first. Three sub-studies were conducted from the fundamental theories review. In study 1, theoretical framework was built based on the persuasion strategies of individual motivation, perceived persuasiveness, proenvironmental behavioral intentions, and green self-identity. Similarly, this section discussed the persuasion strategies of social influence-based, perceived persuasiveness, pro-environmental behavioral intentions, and social norms in study 2, leading to the study's hypotheses as well. Lastly, by discussing modified extended theory of value-attitude-behavior, the research framework was built for a comprehensive analysis for study 3.

### **2.2. Sustainable restaurants**

With the growth of the global economy, individuals now have higher expectations for dining experiences beyond merely fulfilling basic living needs (Fukase & Martin, 2020). They seek restaurant options that are not only convenient and enjoyable but also nutritionally diverse, safe, and beneficial to personal health. Additionally, in recent years, consumers' growing awareness of environmental protection has driven a trend toward patronizing sustainable purchasing (Rustam et al., 2020). Sustainable restaurants are establishments that actively work to reduce their environmental footprint by adopting eco-friendly measures, including recycling, using renewable energy sources, managing

waste responsibly, minimizing food waste, and offering organic menu options (Joshua et al., 2023). Based on this definition, sustainable restaurants go far beyond simply offering organic or plant-based dishes. They also include those that serve clean meat, prioritize seasonal and locally sourced ingredients, adopt low-carbon cooking methods, and use eco-friendly packaging and delivery processes.

Currently, sustainable restaurant operations are a widely discussed topic among scholars across various fields. For instance, in the agricultural sector, Lajoie-O'Malley et al. (2020) discuss how the application of digital agriculture and sustainable food systems could enhance food production and security in the near future. Within food science, researchers have explored updated sustainable plant protein sources, such as mung beans (Brishti et al., 2021). Additionally, studies have examined consumer preferences and behaviors toward restaurants with sustainable practices. For example, Azzurra et al. (2019) found that food safety concerns significantly influence consumers' decisions to dine at establishments offering organic options, with female and younger consumers showing a stronger preference for such restaurants. Similarly, Hansmann et al. (2020) identified that access to transparency about restaurant sourcing and environmental practices, financial capacity, and knowledge are critical determinants in shaping consumers' restaurant choices. Moreover, technology's role in promoting sustainable restaurant practices has been a subject of focus. Rana et al. (2021) assessed the potential of blockchain technology in supporting traceable and transparent sourcing in the restaurant industry, while Simeone and Scarpato (2020) investigated how social media platforms can influence consumers' awareness of sustainable claims made by restaurants.

While these discussions highlighted the potential of sustainable restaurant models, an essential gap remains in understanding how to actively promote consumers' choice of such restaurants via modern consumer interfaces, such as the TPFD platforms which was used more frequently by consumers these days. The discussions on sustainable restaurants emphasize their potential to meet the needs of a growing, health-conscious, and environmentally aware global population. While ongoing interdisciplinary exploration underscores the critical role of sustainable restaurant sector in promoting ecological well-being and supporting public health, further research is needed to understand how to effectively encourage consumers to support restaurants that implement sustainability practices in their daily lives.

### **2.3. Third-party delivery platforms**

To meet the evolving needs of consumers, in addition to dine-in and pick-up services, many restaurants now provide food delivery services. This rise in online food delivery emerged as a solution to enhance convenience, allowing consumers to place orders online while restaurants prepare the food and arrange for delivery to the desired location (Li et al., 2020). Some restaurants manage their own websites, employ in-house delivery personnel, and facilitate direct food delivery services. However, with recent advancements in technology, most establishments choose to build a partnership with specialized third-party food delivery platforms (TFDP). Compared to traditional delivery methods, using TFDPs requires fewer employees, as restaurants no longer need to hire dedicated drivers. Additionally, these platforms expand the restaurant's reach to a broader audience (Shankar et al., 2022). For consumers, TFDPs offer distinct advantages, such as avoiding travel and waiting time, reducing order misunderstandings through clear digital

communication, and offering potential discounts from the platforms. Nowadays, working people seek work-life balance in their lives and are willing to spend their time on more meaningful activities instead of wasting it on waiting for food in a restaurant. TFDPs satisfied their needs, allowing the consumers to place customized orders by tapping screens on their digital devices anywhere, making meals accessible at their preferred time and location, providing more flexibility to satisfy individuals' daily schedule, saving their cooking or dining out time (Ali et al., 2020).

The rapid acceptance of TFDPs by both restaurants and consumers reflects their mutual benefits. The online food delivery sector has seen exponential growth, with revenue from these services rising from \$242.09 billion in 2023, and expected to reach \$746.55 billion by 2033 (The Brainy Insights, 2024). In the United States alone, the market's value was estimated at \$28.37 billion in 2023, with an expectation of more than double increased on revenue, exceeding \$65 billion by 2032 (Research and Markets, 2024). These statistics underscore the considerable growth potential for third-party delivery services in the near future.

Moreover, the COVID-19 pandemic fundamentally shifted consumer preferences, particularly in the area of food consumption. Demand for contactless ordering and delivery systems became essential during the pandemic and is expected to remain popular as a preferred method for food purchases (Hong et al., 2021). Collectively, these developments suggest that TFDPs will continue to grow in popularity, establishing themselves as an enduring trend in the foodservice industry.

However, as with many innovations, the development of the third-party food delivery industry has created new environmental concerns and issues even as it provides

significant benefits to citizens. For example, for convenience, restaurants often use disposable packaging materials for foods, such as single-use plastics, Styrofoam, and other non-biodegradable materials, which increase waste and negatively impact our environment (Molina-Besch, 2020). Additionally, carbon emissions from fossil fuel-powered delivery vehicles, especially in urban areas with high traffic, contribute to increased air pollution (Janairo, 2021; Li et al., 2020). Therefore, TFDPs share a responsibility to collaborate with restaurants to encourage consumers to choose more sustainable restaurant options and eco-friendly practices that reduce the environmental impact of food delivery when placing orders via their mobile devices. For instance, TFDPs could highlight or promote restaurants offering sustainable menu items on the app's opening page, such as establishments sourcing locally, offering plant-based options, or prioritizing low-carbon dining practices.

## **2.4. Cognitive-affective theory**

The Cognitive-Affective Theory (CAT), also known as the Cognitive-Affective Processing System Theory, was proposed by Mischel and Shoda in 1995 (Figure 1). In personality psychology, traditional theories held that an individual's traits and behavioral dispositions were stable and invariant, thus explaining interpersonal differences in social behavior (Mischel & Shoda, 1995). This perspective suggests that an individual's attitudes, decision-making processes, and behaviors are consistent across different situations. However, based on experimental evidence, Mischel and Shoda (1995) introduced a new perspective, asserting that an individual's behavior is variable and influenced by situational factors, a significant departure from the foundational assumptions of personality psychology.

In CAT, Mischel and Shoda (1995) propose that situational contexts and stimuli interact with mediating cognitive-affective units, including encoding processes, expectancies and beliefs, affects, goals and values, and competencies and self-regulatory plans, ultimately shaping an individual's behavioral response. According to their framework (Mischel & Shoda, 1995), "encodings" refer to "categories (constructs) for the self, people, events, and situations (both external and internal)" (p. 253). Encodings represent the process by which an individual translates cognitive and affective information into stable and meaningful patterns of social action across diverse situations. "Expectancies and beliefs" (p. 253) are conceptualized as beliefs about the social world, anticipated behavioral outcomes in specific situations, and perceptions of self-efficacy. These elements are linked to individuals' expected outcomes, influencing their predictions about potential actions and their likely consequences before engaging in a behavior. Additionally, in CAT, "affects" are defined as "feelings, emotions, and affective responses (including physiological reactions)" (p. 253). This component reflects an individual's emotional and affective state, impacting their willingness to engage in particular behaviors when they anticipate positive emotional outcomes. "Goals and values" encompass "desirable outcomes and affective states, aversive outcomes and affective states, goals, values, and life projects" (p. 253). This category implies that human behavior is often self-serving, as individuals pursue rewarding and enjoyable outcomes across different contexts. Lastly, "competencies and self-regulatory plans" are described as "potential behaviors and scripts that an individual can enact, along with plans and strategies for organizing action, influencing outcomes, and managing one's

behavior and internal states” (p. 253). These strategies draw on an individual’s existing knowledge, prior experiences in similar contexts, and anticipated outcomes.

The five cognitive-affective units proposed in CAT provide a framework for understanding the elements that influence an individual’s behavioral decision-making process across varying disciplines, such as sport behavior (e.g., Hatfield & Kerick, 2007; Smith, 2006), social behaviors (e.g., Chen et al., 2021; Li et al., 2024; Zhang et al., 2024), and pro-environmental behaviors (e.g., Farrukh et al., 2023; Zheng et al., 2023;). This model broadens the understanding of personality and behavioral actions by emphasizing the interaction between situational contexts and internal cognitive-affective processes.

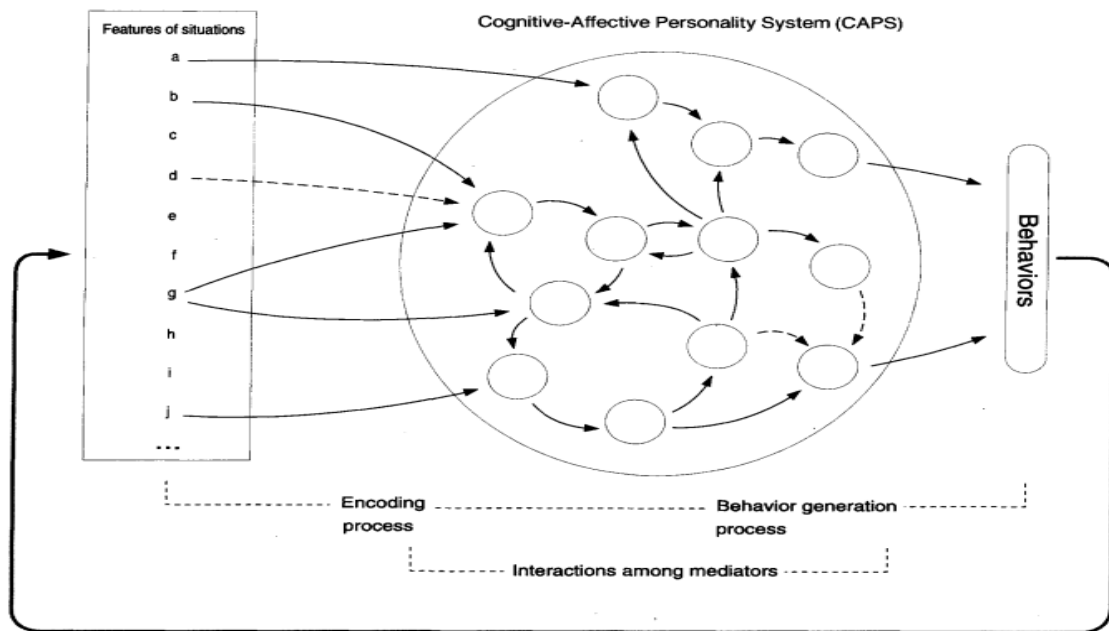


Figure 1. Cognitive-Affective Personality System, Mischel & Shoda, 1995, p. 254

In the context of TPDFD platforms and sustainable choices, CAT helps to explain how consumers process persuasive stimulus promoting sustainable restaurant options. Besides, by integrating CAT with persuasion theories, studies can comprehensively understand how the cognitive and affective processes influence an individual's responses

to persuasion stimulus. Specifically, in the fields of hospitality management and individuals' pro-environmental behavior, scholars have also validated the application of the CAT. For example, several researchers have analyzed the working performance and pro-environmental behaviors of employees within the hospitality industry using CAT. Zheng et al. (2023) found that CAT effectively explains employees' pro-environmental behaviors, particularly through the behavioral generation process influenced by various leadership styles. It explained that leadership can shape environmental actions by framing employees' cognitive and affective responses. Moreover, previous studies have demonstrated CAT's foundational role in analyzing innovative technologies as well as under the hospitality-related contexts. For instance, Lee and Pee (2015) explored consumers' attitudes, trust levels, and intentions regarding online shopping, using CAT to understand the cognitive-affective factors influencing purchasing behaviors in digital settings. Similarly, Wang et al. (2024) examined tourists' flow experiences and satisfaction levels in a metaverse transformed festival tourism setting, providing insights into how immersive technologies enhance travelers' engagement and satisfaction. Additionally, Kowalczyk et al. (2021) investigated consumers' reuse and purchase intentions when shopping with augmented reality technology, revealing how CAT principles can explain cognitive and emotional responses to augmented reality features.

These studies underscore CAT's role as a cornerstone for examining and understanding consumers' perceived persuasiveness, intentions, and decision-making processes, particularly in relation to innovative technologies. Together, they confirm that CAT offers a bedrock framework for analyzing behavior within digital and

technologically advanced environments, making it especially valuable for the current study.

## **2.5. Persuasion theories and dichotomy theory**

### **2.5.1. Persuasion theories**

O’Keefe (2006) defines persuasion as “a successful intentional effort at influencing another’s mental state through communication in a circumstance in which the persuadee has some measure of freedom” (p. 4). Persuasion, as discussed by Ferreira & Teles (2019), reshapes opinions, beliefs, values, and attitudes through communication. In other words, persuasion is a communicative method by which the persuader employs various strategies, such as message delivery methods, the use of credible sources, and presenting potential benefits, to influence and guide the persuadee’s attitudes and intentions, leading them to freely act in line with the persuader’s desired outcomes. Persuasion has been widely studied and applied in areas such as political science (e.g., Ahmad, 2020; Druckman, 2022), mass media (e.g., Seo, 2020; White, 2020), and market advertising (e.g., Jayawardena et al., 2023; Lou, 2022).

To fully understand persuasion strategies’ influence on individuals’ perceived persuasiveness and behavioral intentions, scholars have developed several theories over the past decades. O’Keefe (2009) categorizes these persuasion theories into three major groups: attitude-based theories, theories of voluntary action, and process-focused theories of persuasion. The attitude-based theories (e.g., belief-based attitude models, functional models of attitude, and cognitive dissonance theory) and voluntary action theories (e.g., the theory of reasoned action, theory of planned behavior, and protection motivation theory) focus on influencing behavior by shaping beliefs and attitudes. In contrast,

process-focused theories of persuasion, such as social judgment theory, the elaboration likelihood model (ELM), and the heuristic-systematic model (HSM), explore how persuasion strategies affect the information processing and decision-making process. Both ELM and HSM suggest that individuals use two modes to process persuasive information: a critical analysis mode and a shortcut mode.

The ELM proposes a dual-processing model for persuasive information: if an individual is motivated and able to engage critically, they will process the information through the central route (similar to systematic processing in HSM). However, if the individual lacks motivation and relies on external cues rather than argument quality, they will use the peripheral route (comparable to heuristic processing in HSM) (Ryu & Kim, 2015). Additionally, Lavine (1995) emphasizes that the success of persuasion depends more on the quality of information than the mode of processing. In other words, when an individual possesses high motivation and cognitive ability, complex information can enhance persuasive outcomes, while in low-motivation or low-ability cases, easily processed information is more effective, regardless of processing mode or argument type (Lavine, 1995).

Cialdini (1984, 2007) further outlines six key practical principles of persuasion: authority, reciprocity, commitment and consistency, social proof, liking, and scarcity. which have been shown to influence the persuasion process across various fields, including digital and social marketing (e.g., Naruoei et al., 2024; Spasova, 2022), cybersecurity and phishing detection (e.g., Ahmad et al., 2023; Black & Sarno, 2023), and social media influence (e.g., Goss et al., 2021; Ureno, 2021). As mentioned above, one major reason consumers prefer food delivery services is the convenience they offer in

terms of time and effort saved (Dirsehan & Cankat, 2021), allowing consumers to select food with minimal effort. This reliance on convenience aligns with the peripheral route of ELM, suggesting that peripheral cues are likely to influence persuasive outcomes.

Additionally, in today’s fast-paced, industrialized societies, time is perceived as a scarce resource (Jabs & Devine, 2006), which leads individuals to prioritize convenience over labor-intensive activities like home-cooked meals and to make quick decisions when ordering food delivery. Moreover, Xu and Huang (2019) indicate that consumers are more likely to rely on peripheral cues when evaluating messages TPFD applications, which includes factors such as food image appeal, social presence, and navigational design (Pillai et al., 2022). Consequently, this study constructs its research framework based on these theories to examine the impact of persuasive strategies within the context of consumers’ sustainable food purchasing intention via TPFD services.

Theory Name	Strengths	Weaknesses	Limitations of Applying	Overlaps with other theories
<b>Heuristic-Systematic Mode (HSM)</b>	<ul style="list-style-type: none"> <li>• Flexible, with emphasis on systematic (deep) and heuristic (shortcut) processing.</li> <li>• Considers cognitive shortcuts in decision-making process.</li> </ul>	<ul style="list-style-type: none"> <li>• Limited emphasis on the role of emotional responses.</li> <li>• Complexity of interactions between the two modes is underexplored.</li> </ul>	<ul style="list-style-type: none"> <li>• Complexity may lead to challenges in practical application</li> </ul>	<ul style="list-style-type: none"> <li>• Overlaps with ELM in dual-processing mode concepts.</li> <li>• Both consider motivation and ability as influencing factors.</li> </ul>
<b>Elaboration Likelihood Model (ELM)</b>	<ul style="list-style-type: none"> <li>• Explains dual processing of information (central and peripheral routes).</li> <li>• Highlights the role of motivation and ability in information processing</li> </ul>	<ul style="list-style-type: none"> <li>• Relies heavily on motivation and cognitive capacity.</li> <li>• Does not consider emotional aspects adequately.</li> </ul>	<ul style="list-style-type: none"> <li>• May oversimplify information processing.</li> <li>• Peripheral route outcomes might lack long-term influence.</li> </ul>	<ul style="list-style-type: none"> <li>• Shares with HSM the idea of two processing modes: critical analysis (systematic) and shortcuts (heuristic).</li> </ul>

<b>Theory of Planned Behavior (TPB)</b>	<ul style="list-style-type: none"> <li>• Explains behavioral intentions through attitudes, subjective norms, and perceived behavioral control.</li> <li>• Predictive across multiple domains.</li> </ul>	<ul style="list-style-type: none"> <li>• Assume rational behaviors.</li> <li>• Does not address emotional or spontaneous behaviors effectively.</li> </ul>	<ul style="list-style-type: none"> <li>• Does not account for other external environmental factors.</li> </ul>	<ul style="list-style-type: none"> <li>• Aligns with attitude-based theories in shaping beliefs and intentions.</li> <li>• Overlaps conceptually decision-making contexts.</li> </ul>
<b>Cialdini's Six Principles of Persuasion</b>	<ul style="list-style-type: none"> <li>• Offers practical, actionable strategies for influence.</li> <li>• Highly acceptable to various domains, such as marketing, social media, and cybersecurity.</li> </ul>	<ul style="list-style-type: none"> <li>• Lacks a structured framework for understanding decision-making processes.</li> <li>• May not consider individual differences deeply.</li> </ul>	<ul style="list-style-type: none"> <li>• Principles may not work universally.</li> <li>• Does not address deep processing or individual motivation comprehensively.</li> </ul>	<ul style="list-style-type: none"> <li>• Aligns with peripheral route in ELM by utilizing cues rather than in-depth argument processing.</li> </ul>

Table 1. Comparison of Persuasive Theories.

### 2.5.2. Dichotomy theory

The word “dichotomy” originates from the Greek words “dicha” and “tomos,” meaning to logically divide one class into two distinct subclasses based on a specific and unique attribute or characteristic (Encyclopædia Britannica, 2024). In 19<sup>th</sup> century, Wilson (1887) summarized the previous comments and provided the dichotomy theory systematically on understanding politics and administration in public management area. Beyond that, scholars can apply this method to categorize any group or class objectively or subjectively, ensuring no repetition, overlap, or omission of members in adherence to the principle of contradiction. Dichotomy theory aids scholars in simplifying the understanding process across various disciplines, including philosophy (e.g., Dascal,

2008; Franklin, 2011), psychology (e.g., Garcia-Marques & Ferreira, 2011; Lewis et al., 2020), social studies (e.g., Jay, 1981; Salas et al., 2010), political administration (e.g., Demir & Nyhan, 2008; Overeem, 2005), management (e.g., Caputo et al., 2024; Kativhu et al., 2018), and hospitality management (e.g., Mooney, 2020; Udunuwara et al., 2019).

In relation to the psychology of decision-making, factors influencing behavioral intentions can be categorized into two sub-categories: internal and external factors, based on dichotomy theory. Previous studies suggest that an individual's internal influencers are self-domain factors related to intrinsic motivations, while external influencers are linked to the broader environment. For instance, when analyzing participants' intentions to use social networking sites, Pornsakulvanich and Dumrongsiri (2013) categorized influencers into internal and external groups to gain a comprehensive understanding. In their study, internal influencers included an individual's motivations, whereas external influencers related to media and social factors. Similarly, another study examined the factors influencing consumers' purchasing intentions for organic foods by dividing them into internal and external categories (Chu, 2018). In this study, internal influencers encompassed self-benefit-related factors, such as personal knowledge and awareness, health and safety concerns, and financial price perception, while external influencers included broader factors like surrounding subjective norms, attitudes, and marketing communications.

In the context of TPFDF platforms and the promotion of sustainable food choices, dichotomy theory offers an effective framework for categorizing and analyzing persuasive strategies. By dividing these strategies into internal motivations and external influences, the theory provides a structured approach to understand how they shape

consumer behaviors, particularly within the foodservice sector. This framework allows this study to figure out the self-driven factors that motivate individual decisions from the broader environmental or social cues that increase the influence, creating a comprehensive perspective on consumer decision-making in digital food delivery platforms. In this study, guided by persuasion theories and dichotomy theory, we categorized persuasion strategies into themes of internal individual motivations and external social influence. Specifically, the internal individual motivations category includes three strategies: reciprocity, commitment and consistency, and scarcity. The external social influence category encompasses strategies such as social proof, authority, and liking.

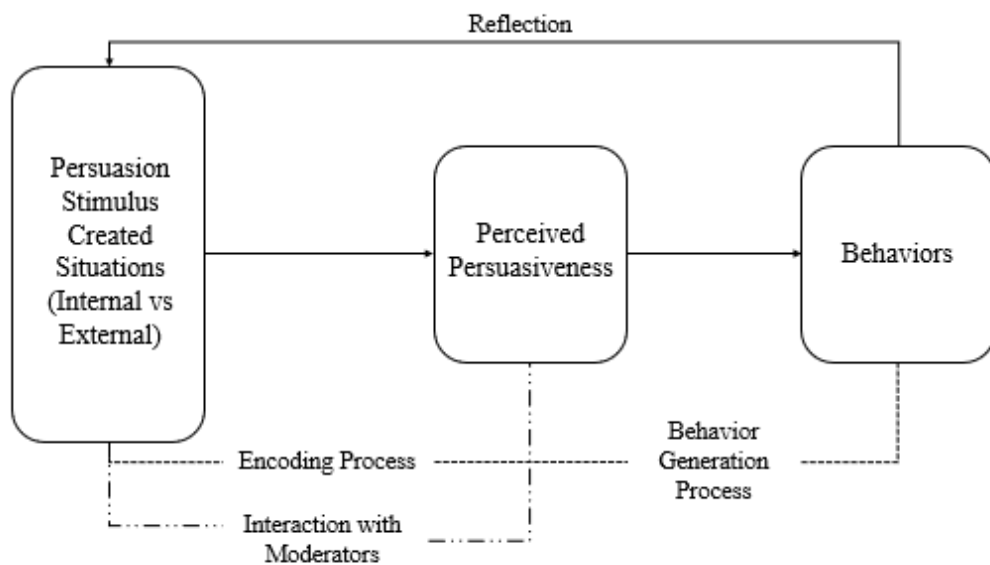


Figure 2. Research framework.

## **2.6. Study 1**

To comprehensively address the research questions, this study will be divided into three sub-studies. The first study focuses on evaluating the effectiveness of internal individual motivation strategies on perceived persuasiveness and pro-environmental behavioral intentions. Additionally, it will examine the moderating role of green self-identity in shaping these outcomes.

### **2.6.1. Effect of internal individual motivations strategies on perceived persuasiveness, and pro-environmental behavioral intentions**

In this study, internal individual motivation strategies, including reciprocity principles, automatic commitment and consistency, and resource scarcity are grounded in the persuasion strategies discussed above. Motivation, as described by Kleinginna Jr. and Kleinginna (1981), is defined as the reactivation of an emotional shift triggered by a specific cue. Perceived persuasiveness is defined as individuals' awareness of, and perceived strength of, a message's persuasive appeal concerning specific behaviors, as well as their understanding of and self-efficacy in engaging with the targeted activity (Guo et al., 2021; Zhang et al., 2014). Referring to the definition, perceived persuasiveness refers to how strongly individual feel that a message or communication is convincing or influential in shaping their behaviors, as well as their confidence in understanding the message and in their own ability to act on what the message suggests. In this study, perceived persuasiveness specifically refer to consumers' subjective evaluation of how convincing the TPFD persuasion messages was in encouraging them to choose sustainable restaurants and their confidence in acting on that message. Furthermore, pro-environmental behavioral intentions refer to actional intentions that

cause minimal environmental harm or even provide beneficial effects to the environment (Liu et al., 2020) and contribute to environmental sustainability (Tian & Liu, 2022). Consumers' personal motivations are closely linked to how persuasive they perceive sustainability-focused messages on TPFD platforms to be, which in turn influences their intention to choose sustainable restaurants. More specifically, pro-environmental behavioral intentions in this study refers to consumers' purchasing intentions from sustainable restaurants through TPFD applications.

These definitions suggest that an individual's internal motivations can shape both their perceived persuasiveness of sustainability messages and their behavioral intentions toward choosing sustainable restaurants via TPFD platforms. For example, Shimul et al. (2021) found that consumers' environment-related attitudes mediate the relationship between their motivations and intentions to purchase green cosmetics in South Africa. Similarly, Silvi and Padilla (2021) observed that citizens' pro-environmental behavior is directly influenced by intrinsic motivations, such as environmental awareness and perceived responsibility. In a related digital consumption context, Zebardast and Radaei (2022) also found that internal factors, such as knowledge, attitudes, and perceived behavioral control within the context of the COVID-19 pandemic, significantly influence individuals' pro-environmental intentions and behaviors.

Therefore, in Study 1, we propose the following hypotheses:

H<sub>1</sub>: Internal individual motivation strategies (e.g. reciprocity, commitment and consistency, and scarcity) are positively related to perceived persuasiveness.

H<sub>2</sub>: Internal individual motivation strategies (e.g. reciprocity, commitment and consistency, and scarcity) are positively related to consumers' behavioral intention towards persuasive strategy.

H<sub>3</sub>: An individual's perceived persuasiveness is positively related to their behavioral intention towards persuasive strategy, and serves as a mediator between internal individual motivation strategies (e.g. reciprocity, commitment and consistency, and scarcity) and consumers' behavioral intention towards persuasive strategy.

H<sub>4</sub>: Internal individual motivation strategies (e.g. reciprocity, commitment and consistency, and scarcity) are positively related to consumers' behavioral intention towards sustainable restaurants.

H<sub>5</sub>: An individual's perceived persuasiveness is positively related to their behavioral intention towards sustainable restaurants, and serves as a mediator between internal individual motivation strategies (e.g. reciprocity, commitment and consistency, and scarcity) and consumers' behavioral intention towards sustainable restaurants.

Furthermore, within the category of internal motivation strategies, three distinct methods exist, yet the literature does not identify which method is the most effective.

Thus, we pose our first research question:

RQ<sub>1</sub>: Which method among the internal individual motivation strategies (e.g. reciprocity, commitment and consistency, and scarcity) is the most effective?

### **2.6.2. Moderating effect of green self-identity**

Self-identity describes how an individual perceives themselves, differentiates themselves from others, identifies with particular groups, and shares common beliefs and values with those group members (Whitmarsh & O'Neill, 2010). The concept of self-identity has been widely used to understand individual psychology and behavioral intentions across various fields, including public and personal health (e.g., Pierro et al., 2003; Quaye et al., 2021), behavior prediction (e.g., Dean et al., 2012; Fekadu & Kraft, 2001), and green practices (e.g., Cao et al., 2023; Mancha & Yoder, 2015). In the context of environmental issues and sustainability, the concept of green self-identity emerged from self-identity but with a specific focus on environmental concerns. Chen and Chang (2012) define green self-identity as “a consumer’s overall appraisal of the net benefit of a product or service between what is received and what is given based on the consumer’s environmental desires, sustainable expectations, and green needs” (p.505). Green self-identity significantly shapes consumer attitudes and green purchasing intentions (Patel et al., 2020).

Previous research on sustainable restaurant choices and environmentally responsible consumption via digital platforms has shown that an individual’s green self-identity plays an essential role in shaping consumers’ evaluation of persuasive messages and behavioral intentions when interacting with TPFD services. For example, Mahasuweerachai and Suttikun, (2022) confirmed that consumers’ green self-identity is highly related to their social consumption motivations and perceived persuasiveness of sustainability message in eco-friendly restaurants. Lalot et al. (2019) also reported a strong influence of green self-identity on consumers’ final behavioral decisions.

Moreover, Mehmood and Khan (2023) found that consumers' self-image indirectly influences their motivations and potential purchasing behaviors in the adoption of autonomous vehicles.

Thus, we propose the following hypothesis:

H<sub>6</sub>: Green self-identity moderates the relationship between individual internal motivation persuasion strategies (e.g. reciprocity, commitment and consistency, and scarcity) and perceived persuasiveness, with a stronger effect observed among those with a higher level of green self-identity.

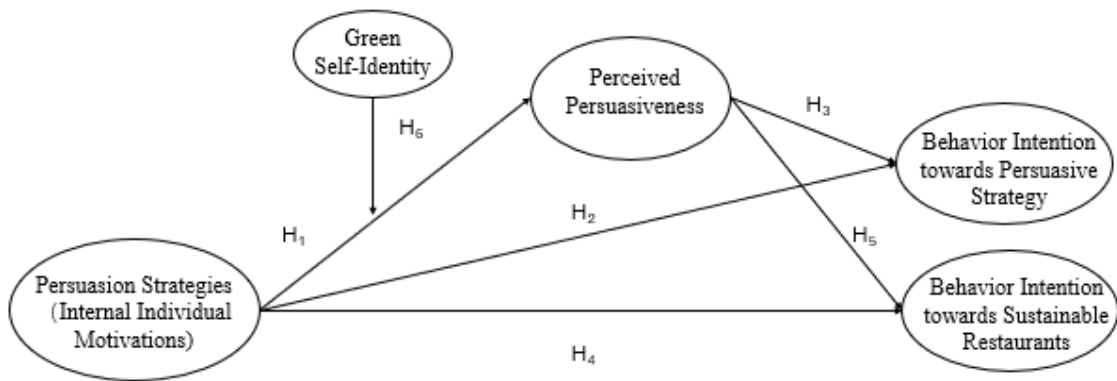


Figure 3. Research model for Study 1.

## 2.7. Study 2

### 2.7.1. Effect of social influence strategies on perceived persuasiveness, and pro-environmental behavioral intentions

In this study, the external social influence category of persuasion strategies includes social proof, authority, and liking, as mentioned previously. Vries et al. (1995)

described social influence as the process by which an individual's thoughts, feelings, and actions are directly or indirectly shaped by others, serving as a significant factor in altering or guiding behavior. The persuasion strategies used in this study align with this definition of social influence. For instance, social proof is identified as a psychological phenomenon where individuals mirror others' behaviors, assuming those behaviors are socially acceptable (Fong et al., 2020). Authority is defined as "the ability of an individual or group to influence the actions of others by what they say" (Mailath et al., 2017, p.37). In other words, an individual may change their behavior based on information perceived as coming from an authoritative source. Additionally, liking refers to an affective attachment where one person feels emotionally connected to another who is viewed favorably, potentially resulting in behavioral change (Nicholson et al., 2001). Analyzing these definitions reveals that these three strategies represent forms of social influence.

Knoll et al. (2015) suggested that social influence can shape individuals' opinions, judgments, attitudes, and behaviors. Experimental studies have provided evidence that social influences significantly impact judgments and behaviors. For example, Vries et al. (1995) found that social influences were critical in shaping citizens' attitudes and evaluation toward smoking and in predicting the initiation of smoking behaviors. Muangmee et al. (2021) observed that social influence positively affected consumers' behavioral intentions toward using food delivery applications during the pandemic. Similarly, Thomas et al. (2019) noted that social influence, when used as a persuasive strategy in sustainability messaging, can significantly shape individuals' perceived persuasiveness.

Therefore, in Study 2, we propose the following hypotheses:

H<sub>7</sub>: External social influence strategies (e.g. social proof, authority, and liking) are positively related to perceived persuasiveness.

H<sub>8</sub>: External social influence strategies (e.g. social proof, authority, and liking) are positively related to consumers' behavioral intention towards persuasive strategy.

H<sub>9</sub>: An individual's perceived persuasiveness is positively related to their behavioral intention towards persuasive strategy, and serves as a mediator between external social influence strategies (e.g. social proof, authority, and liking) and consumers' behavioral intention towards persuasive strategy.

H<sub>10</sub>: External social influence strategies (e.g. social proof, authority, and liking) are positively related to consumers' behavioral intention towards sustainable restaurants.

H<sub>11</sub>: An individual's perceived persuasiveness is positively related to their behavioral intention towards sustainable restaurants, and serves as a mediator between external social influence strategies (e.g. social proof, authority, and liking) and consumers' behavioral intention towards sustainable restaurants.

Moreover, while three distinct methods of external social influence strategies are recognized, the literature has yet to determine which is the most effective. Thus, we pose our second research question:

RQ<sub>2</sub>: Which method among the external social influence strategies (e.g. social proof, authority, and liking) is the most effective?

### **2.7.2. Moderating effect of social norm**

Social norms are defined as a collective set of perceptions regarding what individuals believe others do and what they think they should do in a given context (White et al., 2020). These norms are often described as a combination of descriptive and injunctive (or subjective) norms. Cialdini and Jacobson (2021) explain that descriptive norms are related to a group member's general perceptions or common beliefs about a particular behavior, while injunctive norms, similar to subjective norms as described by Ajzen (1991), are associated with approval for certain behaviors within specific reference groups. In this study, social norms primarily refer to injunctive/subjective norms, as the focus is on understanding how surrounding opinions influence behaviors rather than general perceptions about ordering sustainable food via TPFD applications.

As demonstrated by Cialdini and Jacobson (2021), social norms often serve as a moderator across various fields, helping scholars better understand human attitudes and behaviors. For instance, Jung and Kellaris (2006) found that social culture and norms significantly moderate the effect of authority messaging on purchasing attitudes and intentions among younger generations. Similarly, Telzer et al. (2018) observed that social norms can subtly impact individuals' judgement and subsequent behaviors. Dempsey et al. (2018) reported comparable findings, noting that social norms are associated with consumers' health-related evaluations and behavioral intentions. Accordingly, we propose:

H<sub>12</sub>: Social norm moderates the relationship between external social influence persuasion strategies (e.g. social proof, authority, and liking) and perceived

persuasiveness, with a stronger effect observed among those with a high level of social norm.

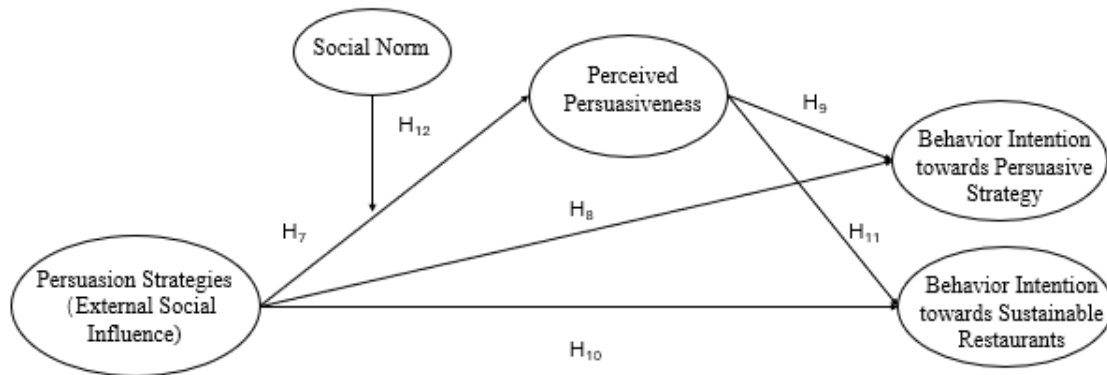


Figure 4. Research model for Study 2.

## 2.8. Study 3

### 2.8.1. Modified extended theory of Value-Attitude-Behavior

Understanding consumers' pro-environmental behaviors requires examining how values, attitudes, and norms influence actions. The value-attitude-behavior (VAB) model, proposed by Homer and Kahle (1988), seeks to explain the mediating role of attitudes on the relationship between individuals' values and their final behaviors. Values are defined as internal guiding principles that shape behavior, rooted in individuals' perceptions of the social environment and their moral preferences (Homer & Kahle, 1988; Liu et al., 2021; Rokeach, 1973). Although the traditional VAB model posits that attitudes mediate the relationship between individuals' value orientations and their behavioral intentions, the current study adopts a modified version of this framework by substituting perceived

persuasiveness in place of attitude. This adaptation is grounded in the context-specific nature of the study, which focuses on how persuasive message strategies delivered through TPDF platforms influence sustainable consumer behavior.

In such persuasion-driven environments, perceived persuasiveness functions as a more proximal, message-level cognitive response that captures how convincingly the persuasive appeal is processed (Guo et al., 2021; Zhang et al., 2014). While attitude represents a relatively stable evaluative orientation toward an object or behavior, perceived persuasiveness reflects the immediate, situational evaluation of the message's effectiveness, which subsequently informs behavioral intention (Fazio, 2007; Fazio, 2014; Wallace et al., 2021). This substitution aligns with prior literature in communication and advertising research that treats perceived persuasiveness as a precursor to attitude or behavioral intention, especially in experimental message exposure contexts (e.g., Dillard & Shen, 2005; Nan & Heo, 2007). Therefore, incorporating perceived persuasiveness as a central mediating mechanism offers a more contextually appropriate lens for examining how persuasive strategies influence consumer choice in digital environments.

Besides, although previous studies have confirmed the usefulness of the VAB model for understanding consumers' purchasing intentions (e.g., Chang et al., 2020; Lee et al., 2021; Wang et al., 2022) and their intentions to engage in green behaviors (e.g., Jung et al., 2020; Kim et al., 2020; Kim & Hall, 2011), there is still a gap in comprehensively examining consumers' purchasing intentions for sustainable foods through TPDF applications. Furthermore, as discussed earlier, empirical evidence highlights the significant influence of surrounding norms on consumers' behavioral

intentions. Thus, we have applied an extended VAB model to develop a comprehensive framework for Study 3.

### **2.8.2. Effects of value on perceived persuasiveness, and pro-environmental behavioral intention**

De Groot and Steg (2007) identify two primary value orientations, bio-altruistic values (BV) and egoistic values (EV), which significantly impact individuals' evaluation and judgement, particularly in the context of environmental and sustainability issues. According to Ayay-Arista et al. (2024), BV represents individuals' willingness to adopt environmentally friendly behaviors that benefit all forms of life, including human and non-human species, while also protecting biodiversity. Since BV closely aligns with individuals' receptiveness to persuasive sustainability message and intentions to support sustainable restaurant practices, consumers with higher levels of BV are more likely to exhibit stronger perceived persuasiveness toward sustainability appeals and a greater willingness to engage in green practices, especially when exposed to persuasive content on TPFD platforms.

In contrast, EV is characterized by a focus on maximizing personal benefits, emphasizing elements such as social power, personal wealth, authority, and influence (De Groot & Steg, 2008). Unlike BV, EV are more self-centered and prioritize individual gains over collective well-being. Individuals with higher levels of EV are more inclined to pursue personal resources and welfare, often showing less concern for the living benefits of others, including non-human species. As Kim and Seock (2019) noted, EV are typically negatively associated with environmental attitudes and behaviors, as individuals with a strong EV orientation prioritize personal gains over environmental benefits.

However, this study takes a different approach by employing persuasion strategies that highlight the personal benefits consumers can gain from practicing sustainable behaviors, such as choosing sustainable restaurant options via TPDF applications. This approach seeks to transform the perceived conflict between personal and environmental benefits into an aligned purpose. Thus, this study hypothesizes that EV will also positively influence consumers' pro-environmental attitudes when the messaging emphasizes personal gains.

On the empirical side, Meng and Si (2022) discuss how pro-environmental attitudes mediate the relationship between personal values and environmental actions. Additionally, Kim and Seock (2019) found significant direct relationships between both BV and EV and personal norms when examining consumers' sustainable purchasing behaviors. Based on these findings, we propose:

H<sub>13</sub>: Bio-altruistic values positively affect perceived persuasiveness.

H<sub>15</sub>: Egoistic values positively affect perceived persuasiveness.

H<sub>17</sub>: Perceived persuasiveness positively affects pro-environmental behavioral intention.

### **2.8.3. Effects of value on personal norm, and pro-environmental behavioral intention**

Personal norms are defined as a “moral obligation to perform or refrain from specific actions” (Schwartz & Howard, 1981, p.191). This concept emphasizes that an individual's sense of moral duty compels them to engage in behaviors that reflect their deeply held beliefs and values (Guan & Zhang, 2023). As a powerful internal motivator, personal norms influence decision-making processes, particularly in scenarios involving

ethical or environmental considerations. They represent a form of internalized social normativity, where individuals feel an intrinsic obligation to act in alignment with their values, even in the absence of external enforcement or social pressures.

In the domain of sustainability, personal norms have been extensively studied for their role in promoting pro-environmental behaviors. De Groot and Steg (2009) introduced the Norm Activation Model (NAM) to explain citizens' pro-environmental behaviors. Within this model, they established that personal norms are mediated by individuals' awareness of environmental consequences and their perceived responsibility for those consequences. These mediators, representing internal values, strongly influence behavioral intentions to engage in sustainable actions. This framework highlights the interplay between awareness, responsibility, and personal norms in shaping sustainable practices.

For example, Nordlund and Garvill (2003) demonstrated that environmental values significantly shape consumers' personal norms, which in turn influence a critical pro-environmental behavior of willingness to reduce personal car usage. Similarly, Lind et al. (2015) found that values and beliefs explain 58% of the variance in personal norms when assessing travelers' intentions to use public transportation during their journeys. These findings underscore the pivotal role of personal norms as mediators between core values and behavioral intentions, particularly in sustainable practices. Thus, building on this theoretical foundation and supported by empirical evidence, we propose the following hypotheses:

H<sub>14</sub>: Bio-altruistic values positively affect personal norm.

H<sub>16</sub>: Egoistic values positively affect personal norm.

H<sub>18</sub>: Personal norms positively affect pro-environmental behavioral intention.

#### **2.8.4. Effect of social norm on personal norm, and pro-environmental behavioral intention**

Social norms are explained as “shared rules of conduct that indicate approval and disapproval by various parties in society” (Elster, 2020). Young (2015) describes social norms as silent codes and informal understandings that dictate what behaviors individuals are expected to exhibit and what they expect from others. Because these norms are unwritten and situational, people may choose to accept or reject them depending on the context. As Farrow et al. (2017) noted, individuals adhere to social norms only when the observability and normative expectations align with their personal interests or ego.

Based on these definitions, social norms can be understood as a form of external social enforcement that shapes and motivates an individual’s thoughts, attitudes, and decision-making processes. In contrast, personal norms are tied to an individual’s internal beliefs and values, reflecting their understanding of the "self" (Hynes & Wilson, 2016). Schwartz (1977) proposed that personal norms are internalized from social norms, suggesting that an individual’s perception of social norms may influence the development of their personal norms.

The relationship between social norms, personal norms, and pro-environmental behaviors has been extensively confirmed by empirical studies, particularly in sustainability-related contexts. For example, Hynes and Wilson (2016) demonstrated the mediating role of personal norms between social norms and environmentally friendly behaviors in the context of food purchasing. Similarly, De Groot et al. (2021) found both direct and indirect influences of social norms and personal norms on pro-environmental

behaviors, particularly in reducing meat consumption. Additionally, Pearce et al. (2022) explored the effects of social and personal norms on visitors' green practices in Western Australia. Thus, building on these theoretical and empirical findings, we propose the following hypotheses:

H<sub>19</sub>: Social norms positively affect personal norms.

H<sub>20</sub>: Social norms positively affect pro-environmental behavioral intention.

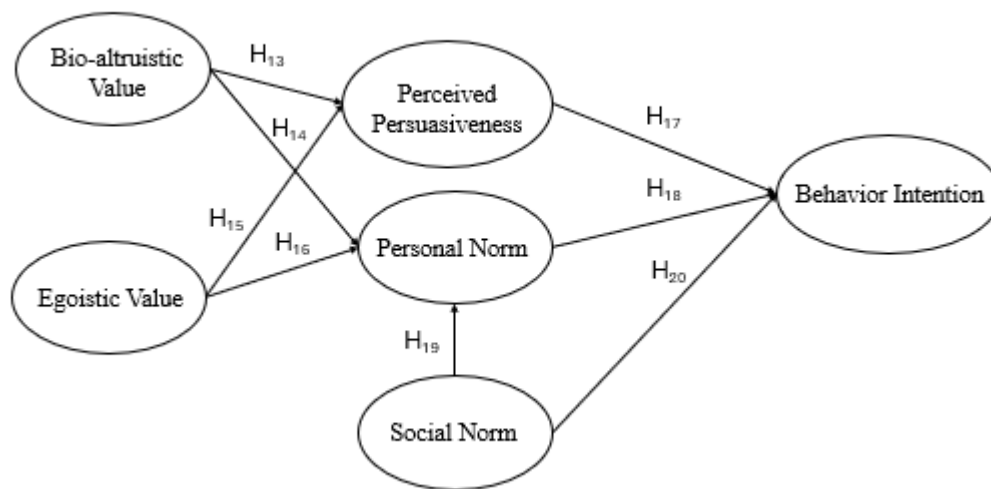


Figure 5. Research model for Study 3.

## 2.9. Summary

In summary, Chapter 2 provides a comprehensive review of the theoretical and empirical foundations underpinning this dissertation. It begins by situating the study within two key theoretical frameworks: the Cognitive-Affective Theory and persuasion theories, both of which inform the construction of the study's conceptual models. CAT emphasizes the interaction between internal cognitive-affective processes and external situational cues, offering a foundation for understanding consumer responses to persuasive messages in digital environments. Persuasion theories, including the

Elaboration Likelihood Model, Heuristic-Systematic Model, and Cialdini's six principles, are reviewed to classify strategies into internal motivations and external social influence, aligned through the lens of Dichotomy Theory.

The chapter then contextualizes the research within the sustainable restaurant sector and the growing relevance of TPFs. It highlights an important research gap: despite increased consumer interest in sustainable dining and the proliferation of TPFs, little is known about how persuasive strategies within these platforms shape sustainable consumption behavior.

The literature review supports the development of three sub-studies. Study 1 investigates how internal motivation-based persuasive strategies (reciprocity, commitment, scarcity) influence perceived persuasiveness and pro-environmental behavioral intentions, with green self-identity as a moderator. Study 2 examines external social influence strategies (social proof, authority, liking) and the moderating role of social norms. Study 3 introduces a modified Value-Attitude-Behavior model, replacing "attitude" with "perceived persuasiveness" to better reflect message-specific effects in a digital context. The model integrates how values (bio-altruism and egoistic) and norms, both personal and social, influence consumers' pro-environmental behavioral intentions.

Altogether, Chapter 2 lays the theoretical groundwork for understanding how persuasive communication via TPFs can foster sustainable consumer behavior, justifying the study's design and hypothesis development.

# CHAPTER 3

## METHODOLOGY

### 3.1. Overview of Research Design

Firstly, this study obtained approval from the Institutional Review Board (IRB) at the University of Missouri-Columbia. For the three sub-studies, Study 1 examined the effectiveness of individual motivation persuasion strategies in influencing consumers' sustainable restaurant choices, as well as the moderating role of green self-identity; Study 2 evaluated the impact of social influence persuasion strategies and the moderating role of social norms; while Study 3 developed a comprehensive model that integrates cognitive, affective, and contextual factors influencing pro-environmental behavioral intentions on TPFD platforms. In Study 1, four persuasion strategies within the internal individual motivation category were developed, including a control treatment. In Study 2, four persuasion strategies within the external social influence category were designed, also incorporating the same control treatment. For Study 3, a survey-based questionnaire was created based on insights from previous literature.

A pilot study was conducted with a total of 182 participants to ensure the validity and reliability for Study 1 and Study 2. For Study 3, 50 participants were recruited to conduct a pilot study. Based on feedback from the pilot studies, adjustments were made to the treatments and survey questions. Once refined, the finalized experimental treatments and survey instruments were used for formal data collection. Data for Study 1 and Study 2 were analyzed by SPSS 26 and Hayes' PROCESS statistical method, while data for Study 3 were performed using SPSS 26 and SPSS AMOS.

## **3.2. Participants**

The targeted participants for these three studies are U.S. residents aged 18 years and older who have prior experience using TPDFD applications in the past three months (e.g., Uber Eats, DoorDash, Grubhub, Zomato, FoodPanda, etc.). After agreeing with the consent form, the participants accessed the study instruments. Data collection was designed using *Qualtrics* and conducted via the online platform *Prolific*. Qualified participants received a small monetary incentive ranging from \$0.7 to \$1.00, depending on their completion time, for both the pilot and formal studies. The compensation amount aligns with the minimum payment requirements set by *Prolific*.

## **3.3. Pilot Study**

### **3.3.1. Study 1 and Study 2**

For the pilot study, an initial round of 70 invitations was distributed using a between-subjects experimental design, resulting in 55 qualified responses. Each participant was randomly assigned to receive either a treatment message or a control message. Based on the analysis of these preliminary results and feedback from participants, adjustments were made to the wording of both the study treatments and constructs. To refine the manipulation check and further validate the pilot framework, a second round of data collection was conducted. Prior to this second round, a G\*Power analysis was performed to determine the appropriate sample size. An F-test was selected with linear multiple regression as the statistical test, specifying an effect size of  $f^2 = 0.15$ ,  $\alpha = 0.05$ , power = 0.95, and seven predictors. The analysis indicated a required total sample size of 153 participants for the pilot study. In total, 292 responses were collected. After removing incomplete responses and those that failed the screening questions or

attention checks, 182 qualified cases were retained for the manipulation check. To ensure data quality, participants were pre-screened based on the following criteria: residency in the United States, fluency or native proficiency in English, completion of at least 30 previous tasks, and a minimum survey approval rate of 90%. The manipulation check consisted of two sections. First, two to four questions were used to assess the effectiveness and clarity of the treatments. Results indicated that the revised wording was clear and easily understandable, facilitating accurate participant interpretation and engagement (see Table 2). A detailed description of the treatments and manipulation check items is provided in the Appendix. The high t-values and significant p-values indicate successful treatment differentiation. Participants reliably recognized the intended persuasive strategies, supporting the validity of the experimental manipulations.

Treatment		t	df	p	Mean
Treatment 1 (Reciprocity)	M1 1	26.775	26	.000	6.444
	M1 2	28.778	26	.000	6.333
	M2	24.005	26	.000	5.778
Treatment 2 (Commitment)	M1 1	17.590	26	.000	4.852
	M1 2	23.278	26	.000	5.593
	M2	23.708	26	.000	5.407
Treatment 3 (Scarcity)	M1 1	32.093	24	.000	6.440
	M1 2	30.502	24	.000	6.080
	M2	18.051	24	.000	5.240
Treatment 4 (Social Proof)	M1 1	20.820	21	.000	6.045
	M1 2	22.517	21	.000	5.909
	M2	14.835	21	.000	5.273
Treatment 5 (Authority)	M1 1	17.776	25	.000	5.269
	M1 2	21.509	25	.000	5.500
	M2	23.361	25	.000	5.731
Treatment 6 (Liking)	M1 1	26.638	27	.000	5.821

	M1 2	21.916	27	.000	5.571
	M1 3	21.911	27	.000	5.786
	M2	19.906	27	.000	5.464
Control					
	M1	13.194	26	.000	4.926
	M2	27.747	26	.000	5.593

Table 2. Manipulation Check 1 Results for Pilot Study 1 and 2

Secondly, following the approach of Parsons et al. (2019), this study further examined whether the intended influence principles effectively impacted participants as anticipated. To ensure a clear understanding, participants were first provided with definitions of persuasive strategies. They were then asked to rank up to three strategies they perceived as most prominent within each treatment message. To account for the possibility that no particular strategy stood out, a "no-strategy" option was included, allowing participants to indicate if they did not recognize any specific persuasive strategy in the message. The results, presented in Table 3, show that at least over half of the participants in each treatment group correctly matched the intended persuasive strategies with the corresponding treatment stimuli, supporting the effectiveness of the treatment design.

Correct counting within top 3 ranking					
Type		Count	Didn't count in	Counted in	Total
	Reciprocity	Count	12	15	27
		% within Type	44.4%	55.6%	100.0%
	Commitment	Count	3	24	27
		% within Type	11.1%	88.9%	100.0%
	Scarcity	Count	5	20	25
		% within Type	20.0%	80.0%	100.0%
	Social Proof	Count	5	17	22
		% within Type	22.7%	77.3%	100.0%
	Authority	Count	13	13	26
		% within Type	50.0%	50.0%	100.0%

	Liking	Count	13	15	28
		% within Type	46.4%	53.6%	100.0%
	Control	Count	17	10	27
		% within Type	63.0%	37.0%	100.0%
Total		Count	68	114	182
		% within Type	37.4%	62.6%	100.0%

$\chi^2(6, N = 182) = 24.08, p = .001.$

Table 3. Manipulation Check 2 Results Using Top-Three Strategy Rankings

Subsequently, a pilot study was conducted for Study 1 and Study 2 to test the base model without the inclusion of any moderators. The results were promising, providing strong initial support for the proposed research framework. In addition, reliability analyses demonstrated acceptable internal consistency across all key constructs (Cronbach's  $\alpha > 0.698$ ) (Table 4). To preserve the unidimensionality of the constructs, several items that contributed to the emergence of secondary factors were removed. Following the guidelines of Hair et al. (2019), items with factor loadings below 0.70 or extracted communalities below 0.40 were also excluded to improve the theoretical alignment and measurement precision of the scale.

	Mean (SD)	Factor Loading	Extracted Factor	Total Variance (%)	KMO and Bartlett's Test
<b>Perceived Persuasiveness (Cronbach's <math>\alpha = 0.907</math>)</b>	<b>4.92 (1.333)</b>			<b>78.626</b>	<b>0.820 (<math>p = 0.000</math>)</b>
The information presented in the advertisement picture is convincing.	4.95 (1.506)	0.906	0.821		
The information provided in the advertisement picture is persuasive.	4.81 (1.567)	0.918	0.842		
The information provided in the	5.10 (1.338)	0.885	0.783		

advertisement picture is good.						
The information provided in the advertisement picture can change/reinforce my impression toward the food recommended.	4.84 (1.610)	0.836		0.699		
<b>Green Self-identity (Cronbach's <math>\alpha</math> = 0.698)</b>	<b>5.23 (1.059)</b>	<b>Component 1</b>	<b>Component 2</b>		<b>Component 1 = 49.114 Component 2 = 35.704</b>	<b>0.638 (<math>p</math> = 0.000)</b>
I think of myself as an environmentally friendly consumer.	5.04 (1.456)	0.913	-0.151	0.856		
Each consumer's behaviour can have a positive effect on society by ordering sustainable food via mobile food delivery applications.	5.07 (1.451)	0.856	0.100	0.758		
I think of myself as someone who is very concerned with environmental issues.	4.93 (1.649)	0.890	-0.153	0.815		
I would be embarrassed to be seen as having an environmentally friendly lifestyle. <i>(reversed)</i>	5.57 (1.653)	0.134	0.943	0.906		
I would not want my family or friends to think of me as someone who is concerned about environmental issues. <i>(reversed)</i>	5.56 (1.643)	0.256	0.917	0.906		
<b>Social Norm (Cronbach's <math>\alpha</math> = 0.746)</b>	<b>3.69 (1.372)</b>				<b>67.974</b>	<b>0.887 (<math>p</math> = 0.000)</b>
Most people who are important to me	3.54 (1.751)	0.869		0.755		

believe that I order sustainable food via a mobile delivery application.					
Other people expect me not to order sustainable food via a mobile delivery application. <i>(reversed)</i>	4.82 (1.753)	- 0.549	0.301		
Most people whose opinion is important to me approve I order sustainable food via a mobile delivery application.	4.32 (1.607)	0.694	0.482		
Most people close to me order sustainable food via a mobile delivery application.	3.78 (1.664)	0.924	0.853		
My friends tend to order sustainable food via a mobile delivery application.	3.73 (1.668)	0.915	0.838		
In general, I think most people who are important to me order sustainable food via a mobile delivery application.	3.60 (1.678)	0.922	0.849		
<b>Behavioral Intention towards persuasive strategy</b>	<b>4.87 (1.462)</b>				
I would like to order foods from sustainable restaurants after reading the advertisement.	4.87 (1.462)				
<b>Behavioral Intention towards sustainable</b>	<b>4.18 (1.450)</b>			<b>85.977</b>	<b>0.745 (p = 0.000)</b>

<b>restaurants (Cronbach's <math>\alpha = 0.917</math>)</b>					
In general, I try to order sustainable food through a mobile delivery application.	4.03 (1.564)	0.936	0.876		
I strive to order sustainable food.	3.88 (1.610)	0.942	0.888		
The next time I order through a mobile delivery application, I will try to order sustainable food.	4.62 (1.680)	0.903	0.815		

Table 4. Constructs reliability test for Study 3

### 3.3.2. Study 3

After completing the main data collection and analysis for Studies 1 and 2, a pilot study was conducted for Study 3 to assess the feasibility of the basic model prior to running multi-group analysis. A total of 50 qualified responses were collected. Based on the pilot results and participant feedback, minor wording adjustments were made to improve item clarity. Reliability analyses indicated strong internal consistency for all key constructs (Cronbach's  $\alpha > 0.90$ ) (Table 5). Additionally, one item that caused the construct to split into two factors was removed to maintain unidimensionality. Items that did not adequately represent the intended construct, specifically those with factor loadings below 0.70 or extracted communalities below 0.40, were also excluded to enhance the conceptual clarity and measurement quality of the scale (Hair et al., 2019).

	Mean (SD)	Factor Loading	Extracted Factor	Total Variance (%)	KMO and Bartlett's Test
<b>Bio-altruistic Value</b>	<b>5.701 (1.075)</b>			<b>62.413</b>	<b>0.842 (<math>p = 0.000</math>)</b>

<b>(Cronbach's <math>\alpha</math> = 0.908)</b>					
Equality	5.88 (1.365)	0.834	0.695		
A world at peace	6.08 (1.226)	0.701	0.492		
Social justice	5.48 (1.669)	0.797	0.636		
Helpful	5.80 (1.553)	0.678	0.460		
Preventing pollution	5.42 (1.553)	0.748	0.559		
Respecting the earth	5.76 (1.287)	0.841	0.708		
Unity with nature	5.40 (1.591)	0.781	0.610		
Protecting the environment	5.80 (1.262)	0.912	0.833		
<b>Egoistic Value (Cronbach's <math>\alpha</math> = 0.922 )</b>	<b>4.128 (1.638)</b>			<b>77.021</b>	<b>0.850 (p = 0.000)</b>
Social power	4.08 (1.861)	0.816	0.666		
Wealth	4.24 (1.869)	0.891	0.794		
Authority	3.78 (2.013)	0.937	0.878		
Influential	3.92 (1.724)	0.953	0.908		
Ambitious	4.62 (1.894)	0.777	0.604		
<b>Perceived Persuasiveness (Cronbach's <math>\alpha</math> = 0.945)</b>	<b>4.910 (1.456)</b>			<b>85.800</b>	<b>0.845 (p = 0.000)</b>
The information presented in the advertisement picture is convincing.	4.84 (1.608)	0.935	0.873		
The information provided in the advertisement picture is persuasive.	4.80 (1.552)	0.916	0.839		
The information provided in the advertisement picture is good.	5.16 (1.517)	0.901	0.813		
The information provided in the advertisement picture can change/reinforce my impression toward the food recommended.	4.84 (1.608)	0.953	0.907		

<b>Personal Norm (Cronbach's <math>\alpha</math> = 0.918)</b>	<b>4.02 (1.318)</b>	<b>Component 1</b>	<b>Component 2</b>		<b>Component 1 = 62.458 Component 2 =11.352</b>	<b>0.891 (<math>p</math> = 0.000)</b>
I feel personally obliged to order as much sustainable food as possible.	4.18 (1.722)	0.905	-0.057	0.822		
I feel morally obliged to order sustainable food, regardless of what others do.	3.88 (1.686)	0.840	0.199	0.746		
I feel guilty when I order non-sustainable food.	3.44 (1.918)	0.784	-0.021	0.615		
I feel morally obliged to order sustainable food instead of non-sustainable food.	3.70 (1.776)	0.893	0.025	0.797		
People like me should do everything they can to order sustainable food.	4.46 (1.541)	0.815	-0.117	0.679		
If I would order food through mobile delivery apps, I would feel morally obliged to order sustainable food.	4.00 (1.796)	0.836	0.053	0.702		
I do not feel guilty at all when I order foods which vegetables and fruit from distant countries <i>(reversed)</i>	3.36 (1.535)	0.282	.924	0.934		
I feel obliged to bear the environment and nature in mind in my daily behaviour.	4.56 (1.567)	0.765	-0.103	0.596		
I would be a better person if I	4.60 (1.690)	0.810	-0.311	0.753		

ordered sustainable foods.						
<b>Social Norm (Cronbach's <math>\alpha</math> = 0.806)</b>	<b>3.61 (1.521)</b>				<b>77.880</b>	<b>0.902 (<math>p = 0.000</math>)</b>
Most people who are important to me believe that I order sustainable food via a mobile delivery application.	3.66 (1.722)	0.948		0.898		
Other people expect me not to order sustainable food via a mobile delivery application. ( <i>reversed</i> )	4.88 (1.637)	- 0.628		0.395		
Most people whose opinion is important to me approve I order sustainable food via a mobile delivery application.	4.24 (1.623)	0.857		0.735		
Most people close to me order sustainable food via a mobile delivery application.	3.56 (1.775)	0.956		0.913		
My friends tend to order sustainable food via a mobile delivery application.	3.50 (1.843)	0.915		0.838		
In general, I think most people who are important to me order sustainable food via a mobile delivery application.	3.60 (1.784)	0.946		0.895		

<b>Pro-environmental Behavioral intention (Cronbach's <math>\alpha</math> = 0.909)</b>	<b>4.58 (1.419)</b>			<b>84.671</b>	<b>0.713 (<math>p</math> = 0.000)</b>
In general, I try to order sustainable food through a mobile delivery application.	4.24 (1.623)	0.951	0.904		
I strive to order sustainable food.	4.40 (1.498)	0.925	0.855		
The next time I order through a mobile delivery application, I will try to order sustainable food.	5.10 (1.502)	0.883	0.780		

Table 5. Constructs reliability test for Study 3

### 3.4. Procedure and Materials

Out of the 611 surveys collected, a total of 414 valid responses were received after removing incomplete submissions and responses that failed the screening or attention check questions for study 1 and 2. This resulted in an overall valid completion rate of 68%. The descriptive information was shown in Table 6.

<b>Characteristic</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Gender</b>		
M	191	46.1%
F	220	53.1%
Prefer not to say	3	.7%
<b>Age</b>		
18-20	11	2.7%
21-30	134	32.4%
31-40	118	28.5%
41-50	72	17.4%
50 and over	79	19.1%
<b>Ethnicity</b>		
Caucasian	240	58.0%
Black or African American	97	23.4%

American Indian or Alaska Native	2	.5%
Asian	27	6.5%
Hispanic/Spanish American	38	9.2%
Other	10	2.4%
<b>Education</b>		
High school diploma or less	77	18.6%
Two-year college degree (Associate)	38	9.2%
Four-year college degree (Bachelor)	185	44.7%
Postgraduate studies	59	14.3%
Professional degree	51	12.3%
Other	4	1.0%
<b>Annual income level</b>		
Less than \$10,000	23	5.6%
\$10,000 - \$20,000	31	7.5%
\$20,001 - \$40,000	68	16.4%
\$40,001 - \$60,000	74	17.9%
\$60,001 - \$80,000	91	22.0%
\$80,001 - \$100,000	61	14.7%
\$100,001 or over	66	15.9%
<b>Ordering frequency from TPFD</b>		
More than 5 times a week	10	2.4%
3-5 times a week	68	16.4%
1-2 times a week	147	35.5%
2-3 times a month	101	24.4%
Once a month or less	86	20.8%
Other	2	.5%
<b>Confident in navigating TPFD apps</b>		
Not confident at all	2	.5%
Slightly confident	9	2.2%
Somewhat confident	60	14.5%
Very confident	197	47.6%
Extremely confident	146	35.3%
<b>Familiarity with TPFD apps</b>		
Novice	6	1.4%
Beginner	20	4.8%
Familiar	115	27.8%
Experienced	189	45.7%
Expert	84	20.3%

Table 6. Descriptive Characteristics of Participants in Study 1 and 2 (n=414).

### 3.4.1. Study 1: Reciprocity, Commitment, Scarcity

Participants interacted with a simulated food ordering scenario on a TPFD platform. After viewing the scenario related to mobile food ordering (see Appendix) as

well as the definition (Joshua et al., 2023) of sustainable restaurants (see Appendix for details), they were randomly assigned to one of four groups: reciprocity, commitment and consistency, scarcity or a control group. The treatment messages (see Appendix), derived from previous literature utilizing similar strategies, were tested for effectiveness (de Vries et al., 2017; Meents et al., 2020; Roethke et al., 2020). Following the experiment, participants have to complete a survey that includes major constructs with a 7-point Likert scale (e.g., perceived persuasiveness (Gao et al., 2021), green self-identity (Dermody, et al., 2015) and behavioral intentions (Meng & Si, 2022)) (Table 7) and demographic questions. This study was analyzed for 235 participants in four groups, and all data was analyzed via SPSS 26 and Hayes' PROCESS function with Model 4 and Model 7.

<b>Construct</b>	<b>Items</b>	<b>Scales</b>
<b>Perceived Persuasiveness</b>	The information presented in the advertisement picture is convincing.	1 = extremely disagree 7 = extremely agree
	The information provided in the advertisement picture is persuasive.	
	The information provided in the advertisement picture is good.	
	The information provided in the advertisement picture can change/reinforce my impression toward the food recommended.	
<b>Green Self-identity</b>	I think of myself as an environmentally friendly consumer.	1 = extremely disagree 7 = extremely agree
	Each consumer's behaviour can have a positive effect on society by ordering sustainable food via mobile food delivery applications.	
	I think of myself as someone who is very concerned with environmental issues.	
<b>Behavioral Intention towards persuasive strategy</b>	I would like to order foods from sustainable restaurants after reading the advertisement.	1 = extremely disagree 7 = extremely agree
<b>Behavioral Intention towards sustainable restaurants</b>	In general, I try to order sustainable food through a mobile delivery application.	1 = extremely disagree 7 = extremely agree
	I strive to order sustainable food.	
	The next time I order through a mobile delivery application, I will try to order sustainable food.	

Table 7. Constructs of Study 1.

### 3.4.2. Study 2: Social Proof, Authority, Liking

Similar to Study 1, in Study 2, participants interacted with a simulated food ordering scenario on a TPFD platform as well as the definition of sustainable restaurant. After viewing the same scenario related to mobile food ordering, they were randomly assigned to one of four groups: social proof, authority, liking, or a control group. The treatment messages (See Appendix), derived from previous literature utilizing similar strategies (Ferreira & Teles, 2019; Roethke et al., 2020; Winter et al., 2021), were tested for effectiveness. Following the experiment, participants have to complete a survey that includes major constructs with a 7-point Likert scale (e.g., perceived persuasiveness, social norms (Park & Smith, 2007), and behavioral intentions) (Table 8) and demographic questions. This study was analyzed for 241 participants in four groups, and all data was analyzed via SPSS 26 and Hayes' PROCESS function with Model 4 and Model 7.

Construct	Items	Scales
<b>Perceived Persuasiveness</b>	The information presented in the advertisement picture is convincing.	1 = extremely disagree 7 = extremely agree
	The information provided in the advertisement picture is persuasive.	
	The information provided in the advertisement picture is good.	
	The information provided in the advertisement picture can change/reinforce my impression toward the food recommended.	
<b>Social Norm</b>	Most people who are important to me believe that I order sustainable food via a mobile delivery application.	1 = extremely disagree 7 = extremely agree
	Most people whose opinion is important to me approve I order sustainable food via a mobile delivery application.	
	Most people close to me order sustainable food via a mobile delivery application.	
	My friends tend to order sustainable food via a mobile delivery application.	

	In general, I think most people who are important to me order sustainable food via a mobile delivery application.	
<b>Behavioral Intention towards persuasive strategy</b>	I would like to order foods from sustainable restaurants after reading the advertisement.	1 = extremely disagree 7 = extremely agree
<b>Behavioral Intention towards sustainable restaurants</b>	In general, I try to order sustainable food through a mobile delivery application.	1 = extremely disagree 7 = extremely agree
	I strive to order sustainable food.	
	The next time I order through a mobile delivery application, I will try to order sustainable food.	

Table 8. Constructs of Study 2.

### 3.4.3. Study 3: Structural Equation Modeling Framework

Building on the findings from Studies 1 and 2, Study 3 was employed Structural Equation Modeling (SEM) to analyze the relationships among participants' values, perceived persuasiveness, norms, and pro-environmental behaviors. After a set of screening questions, participants have to take a survey capturing constructs including bio-altruistic value (De Groot and Steg, 2007), egoistic value (De Groot and Steg, 2007), perceived persuasiveness (Gao et al, 2021), personal norms (Steg et al., 2005), social norms (Park & Smith, 2007), and pro-environmental behavioral intentions (Meng & Si, 2022) after reading the persuasive messages (reciprocity from Study 1 and social proof from Study 2). For each construct item, a 7-point Likert scale was used on examining all the variables (Table 9). A set of demographic questions also was collected followed by the above constructs. A G\*Power analysis was conducted to identify appropriate sample size. An F-test was selected with linear multiple regression as the statistical test, specifying an effect size of  $f^2 = 0.15$ ,  $\alpha = 0.05$ , power = 0.95, and three predictors. The analysis indicated a required total sample size of 119 participants for the pilot study. Data collection was conducted using the *Prolific* platform, with total of 282 qualified responses out of 386 with a response rate of 73%, after eliminated the incomplete

responses and those didn't pass the screening questions or attention check (descriptive information in Table 10). Data analysis was performed using SPSS 26 and SPSS AMOS.

<b>Construct</b>	<b>Items</b>	<b>Scales</b>
<b>Bio-altruistic Value</b>	Equality	1 = opposed to my values 7 = extremely important
	A world at peace	
	Social justice	
	Preventing pollution	
	Respecting the earth	
	Unity with nature	
	Protecting the environment	
<b>Egoistic Value</b>	Social power	1 = opposed to my values 7 = extremely important
	Wealth	
	Authority	
	Influential	
	Ambitious	
<b>Perceived Persuasiveness</b>	The information presented in the advertisement picture is convincing.	1 = extremely disagree 7 = extremely agree
	The information provided in the advertisement picture is persuasive.	
	The information provided in the advertisement picture is good.	
	The information provided in the advertisement picture can change/reinforce my impression toward the food recommended.	
<b>Personal Norm</b>	I feel personally obliged to order as much sustainable food as possible.	1 = extremely disagree 7 = extremely agree
	I feel morally obliged to order sustainable food, regardless of what others do.	
	I feel guilty when I order non-sustainable food.	
	I feel morally obliged to order sustainable food instead of non-sustainable food.	
	People like me should do everything they can to order sustainable food.	
	If I would order food through mobile delivery apps, I would feel morally obliged to order sustainable food.	
	I feel obliged to bear the environment and nature in mind in my daily behaviour.	
	I would be a better person if I ordered sustainable foods.	
<b>Social Norm</b>	Most people who are important to me believe that I order sustainable food via a mobile delivery application.	1 = extremely disagree 7 = extremely agree
	Most people whose opinion is important to me approve I order sustainable food via a mobile delivery application.	
	Most people close to me order sustainable food via a mobile delivery application.	
	My friends tend to order sustainable food via a mobile delivery application.	

	In general, I think most people who are important to me order sustainable food via a mobile delivery application.	
<b>Pro-environmental Behavioral intention</b>	In general, I try to order sustainable food through a mobile delivery application.	1 = extremely disagree 7 = extremely agree
	I strive to order sustainable food.	
	The next time I order through a mobile delivery application, I will try to order sustainable food.	

Table 9. Constructs of Study 3.

<b>Characteristic</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Gender</b>		
M	135	47.9%
F	146	51.8%
Prefer not to say	1	.4%
<b>Age</b>		
18-20	9	3.2%
21-30	74	26.2%
31-40	70	24.8%
41-50	58	20.6%
50 and over	71	25.2%
<b>Ethnicity</b>		
Caucasian	165	58.5%
Black or African American	79	28.0%
American Indian or Alaska Native	5	1.8%
Asian	10	3.5%
Hispanic/Spanish American	14	5.0%
Other	9	3.2%
<b>Education</b>		
High school diploma or less	48	17.0%
Two-year college degree (Associate)	29	10.3%
Four-year college degree (Bachelor)	116	41.1%
Postgraduate studies	39	13.8%
Professional degree	47	16.7%
Other	3	1.1%
<b>Annual income level</b>		
Less than \$10,000	12	4.3%
\$10,000 - \$20,000	20	7.1%
\$20,001 - \$40,000	51	18.1%
\$40,001 - \$60,000	71	25.2%
\$60,001 - \$80,000	48	17.0%
\$80,001 - \$100,000	38	13.5%
\$100,001 or over	42	14.9%
<b>Ordering frequency from TPFD</b>		
More than 5 times a week	13	4.6%
3-5 times a week	45	16.0%

1-2 times a week	108	38.3%
2-3 times a month	77	27.3%
Once a month or less	39	13.8%
Other	0	0%
<b>Confident in navigating TPFD apps</b>		
Not confident at all	1	.4%
Slightly confident	6	2.1%
Somewhat confident	39	13.8%
Very confident	150	53.2%
Extremely confident	86	30.5%
<b>Familiarity with TPFD apps</b>		
Novice	0	0%
Beginner	16	5.7%
Familiar	91	32.3%
Experienced	124	44.0%
Expert	51	18.1%

Table 10. Descriptive Characteristics of Participants in Study 3 (n=282).

### 3.5. Summary

In this chapter, it outlines the research design, participant recruitment, experimental procedures, and data analysis techniques employed across three interrelated studies aimed at examining how persuasive strategies influence consumers' sustainable restaurant choices through TPFD platforms.

This chapter begins by describing the IRB-approved research design. Study 1 tested internal individual motivation strategies (e.g., reciprocity, commitment, scarcity) and the moderating role of green self-identity. Study 2 examined external social influence strategies (e.g., social proof, authority, liking) and the moderating effect of social norms. Study 3 developed a SEM integrating values, norms, and perceived persuasiveness to explain pro-environmental behavioral intention in the TPFD context.

Participant eligibility required U.S.-based users aged 18 and older with recent TPFD experience. Data collection was conducted via the online platform *Prolific*, using *Qualtrics* for survey deployment. Pilot studies were conducted for all three studies to

refine instruments, improve treatment wording, and assess construct validity and reliability. Study 1 and 2 pilots yielded 182 qualified responses; Study 3's pilot included 50 participants. G\*Power analysis guided sample size estimations.

Manipulation checks confirmed the effectiveness of persuasive message treatments, with significant t-values and high participant recognition of strategy types. Constructs such as perceived persuasiveness, green self-identity, social norms, personal norms, and behavioral intentions demonstrated strong internal consistency (Cronbach's  $\alpha > 0.70$  in all cases), and factor analysis confirmed measurement validity.

In the main data collection phase, Study 1 involved 235 participants exposed to internal motivation treatments, while Study 2 included 241 participants assessing social influence strategies. Both studies utilized Hayes' PROCESS macro (Models 4 and 7) in SPSS for mediation and moderation analyses. Study 3 included 282 participants and applied SEM using SPSS AMOS, guided by a theoretically modified extended VAB model. All constructs were measured using 7-point Likert scales adapted from validated prior studies.

## CHAPTER 4

### RESULTS

#### 4.1. Study 1 and 2

Study 1 investigates the effectiveness of individually oriented motivational persuasion strategies, rooted in internal motivation, in shaping consumers' sustainable restaurant choices, with particular attention to the moderating influence of green self-identity. Study 2, in contrast, focuses on socially driven persuasion strategies, which reflect external motivation, and explores the moderating role of perceived social norms. This theoretical distinction between internal and external motivational drivers, based on persuasion theories and dichotomy theory, provides the rationale for separating the two studies. Based on insights from the manipulation checks and pilot studies, a number of measurement items were removed to enhance construct clarity and model fit.

Specifically, Study 1 tested Hypothesis 1 to Hypothesis 6, and the first research question:

H<sub>1</sub>: Internal individual motivations are positively related to perceived persuasiveness.

H<sub>2</sub>: Internal individual motivations are positively related to consumers' behavioral intention towards persuasive strategy.

H<sub>3</sub>: An individual's perceived persuasiveness is positively related to their behavioral intention towards persuasive strategy.

H<sub>4</sub>: Internal individual motivations are positively related to consumers' behavioral intention towards sustainable restaurants.

H<sub>5</sub>: An individual's perceived persuasiveness is positively related to their behavioral intention towards sustainable restaurants.

H<sub>6</sub>: Green self-identity moderates the relationship between individual internal motivation persuasion and perceived persuasiveness, with a stronger effect observed among those with a higher level of green self-identity.

RQ<sub>1</sub>: Which method among the internal individual motivation strategies is the most effective?

Study 2 tested Hypothesis 7 to Hypothesis 12, and the second research question:

H<sub>7</sub>: External social influence is positively related to perceived persuasiveness.

H<sub>8</sub>: External social influence is positively related to consumers' behavioral intention towards persuasive strategy.

H<sub>9</sub>: An individual's perceived persuasiveness is positively related to their behavioral intention towards persuasive strategy.

H<sub>10</sub>: External social influence is positively related to consumers' behavioral intention towards sustainable restaurants.

H<sub>11</sub>: An individual's perceived persuasiveness is positively related to their behavioral intention towards sustainable restaurants.

H<sub>12</sub>: Social norm moderates the relationship between external social influence persuasion and perceived persuasiveness, with a stronger effect observed among those with a high level of social norm.

RQ<sub>2</sub>: Which method among the external social influence strategies is the most effective?

The results for Study 1 and Study 2 are presented in three sections: measurement model testing, mediation analysis, and moderation analysis, as outlined below.

#### 4.1.1. Study 1 and 2 measurement model testing

The results (Table 11) present the descriptive statistics and results of the exploratory factor analysis for key constructs. All multi-item scales demonstrated strong internal consistency, with Cronbach's alpha values exceeding 0.86. Factor loadings ranged from 0.744 to 0.945, and extracted factor scores exceeded 0.55 for all items, indicating solid convergent validity. The total variance explained by each construct ranged from 79.2% to 86.9%, and the KMO values were above the acceptable threshold, with significant Bartlett's tests ( $p < .001$ ), confirming sampling adequacy and factorability of the data. These results provide robust evidence of construct validity, supporting the reliability of the measurement model and justifying the use of these constructs in subsequent mediation and moderation analyses.

	Mean (SD)	Factor Loading	Extracted Factor	Total Variance (%)	KMO and Bartlett's Test
<b>Perceived Persuasiveness (Cronbach's <math>\alpha = 0.932</math>)</b>	<b>5.05 (1.404)</b>			<b>83.209</b>	<b>0.841 (<math>p = 0.000</math>)</b>
The information presented in the advertisement picture is convincing.	5.07 (1.540)	0.933	0.871		
The information provided in the advertisement picture is persuasive.	4.93 (1.595)	0.933	0.870		
The information provided in the advertisement picture is good.	5.26 (1.401)	0.890	0.792		
The information provided in the advertisement picture can change/reinforce my impression toward the food recommended.	4.95 (1.619)	0.892	0.795		
<b>Green Self-identity (Cronbach's <math>\alpha = 0.868</math>)</b>	<b>5.09 (1.387)</b>			<b>79.214</b>	<b>0.717 (<math>p = 0.000</math>)</b>
I think of myself as an environmentally friendly consumer.	5.07 (1.564)	0.912	0.832		

Each consumer's behaviour can have a positive effect on society by ordering sustainable food via mobile food delivery applications.	5.14 (1.448)	0.848	0.718		
I think of myself as someone who is very concerned with environmental issues.	5.06 (1.658)	0.909	0.826		
<b>Social Norm (Cronbach's <math>\alpha = 0.934</math>)</b>	<b>4.14 (1.562)</b>			<b>79.420</b>	<b>0.893 (<math>p = 0.000</math>)</b>
Most people who are important to me believe that I order sustainable food via a mobile delivery application.	3.98 (1.866)	0.890	0.792		
Most people whose opinion is important to me approve I order sustainable food via a mobile delivery application.	4.59 (1.575)	0.744	0.554		
Most people close to me order sustainable food via a mobile delivery application.	4.09 (1.784)	0.930	0.865		
My friends tend to order sustainable food via a mobile delivery application.	4.06 (1.772)	0.932	0.869		
In general, I think most people who are important to me order sustainable food via a mobile delivery application.	3.98 (1.765)	0.944	0.892		
<b>Behavioral Intention towards persuasive strategy</b>	<b>5.11 (1.469)</b>				
I would like to order foods from sustainable restaurants after reading the advertisement.	5.11 (1.469)				
<b>Behavioral Intention towards sustainable restaurants (Cronbach's <math>\alpha = 0.924</math>)</b>	<b>4.41 (1.585)</b>			<b>86.865</b>	<b>0.748 (<math>p = 0.000</math>)</b>
In general, I try to order sustainable food through a mobile delivery application.	4.22 (1.688)	0.943	0.888		
I strive to order sustainable food.	4.16 (1.728)	0.945	0.893		
The next time I order through a mobile delivery	4.86 (1.687)	0.908	0.825		

application, I will try to order sustainable food.					
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Table 11. Constructs reliability test for main Study 1 and Study 2

### 4.1.2. Study 1

As outlined previously, Study 1 investigated the effectiveness of individually oriented motivational persuasion strategies in shaping consumers’ sustainable restaurant choices, along with the moderating role of green self-identity. More specifically, it examines whether the strategies of reciprocity, commitment and consistency, and scarcity influence consumers’ willingness to select sustainable restaurant options when using TPDF applications. Data analysis was conducted using SPSS version 26, employing PROCESS macro Model 4 to assess mediation effects and Model 7 to explore potential moderation by green self-identity.

#### 4.1.2.1 Mediation test

In line with the proposed research model, Study 1 examined two dependent variables: behavioral intention towards persuasive strategy (BIPS) and behavioral intention towards sustainable restaurants (BISR). To determine whether the persuasive messages effectively influenced consumers’ decision-making regarding sustainable restaurant choices when using TPDF platforms, each treatment group was individually compared to the control group. To enhance the reliability of the findings, several individual-level covariates were statistically controlled, including participants’ current hunger level, personal liking for sustainable restaurant foods, preferences for ordering from sustainable restaurants, and their self-reported knowledge of sustainable food.

The first analysis focused on BIPS, treated as the outcome variable (Y). Each treatment group served as the independent variable (X) in PROCESS Model 4, with perceived persuasiveness (PP) included as the mediator (M). The results indicated that the reciprocity-based persuasive message significantly increased consumers' perceived persuasiveness when engaging with TPDF platforms ( $b_{\text{Reciprocity}} = 1.0033$ ,  $p_{\text{Reciprocity}} < 0.001$ ), and in turn, PP significantly enhanced their BIPS to choose sustainable restaurant options ( $b_{\text{PP}} = 0.5336$ ,  $p_{\text{PP}} < 0.001$ ). However, reciprocity did not exhibit a direct effect on BIPS ( $b_{\text{ReciprocityDirect}} = -0.2052$ ,  $p_{\text{ReciprocityDirect}} = 0.2695$ ). It indicates that Treatment 1, reciprocity persuasion strategy, has the significant indirect effect coupled with non-significant direct effect suggests a full mediation relationship. While the commitment and consistency strategy and the scarcity strategy did not produce a significant mediation effect via PP ( $b_{\text{Commitment}} = 0.3971$ ,  $p_{\text{Commitment}} = 0.0727$ ;  $b_{\text{Scarcity}} = 0.0681$ ,  $p_{\text{Scarcity}} = 0.7581$ ), the scarcity message revealed a strong negative direct relationship with BIPS ( $b_{\text{ScarcityDirect}} = -0.6227$ ,  $p_{\text{ScarcityDirect}} < 0.001$ ), which is an unexpected but noteworthy finding. Table 12 includes the details.

Hypothesis	Path	b	SE	t	p	95% CI (LL, UL)
<b>Treatment 1 (Reciprocity)</b>						
H <sub>1</sub> -Reciprocity	Reciprocity → PP	1.0033	0.2064	4.8614	0 .000	[0.5945, 1.4121]
H <sub>2</sub> -Reciprocity	Reciprocity → BIPS	-0.2052	0.1849	-1.1096	.2695	[-0.5714, 0.1611]
H <sub>3</sub> -Reciprocity	PP → BIPS	0.5336	0.0758	7.0381	0 .000	[0.3834, 0.6838]
	Indirect Effect	0.5354	0.1286	—	—	[0.2919, 0.7947]
<b>Treatment 2 (Commitment and Consistency)</b>						
H <sub>1</sub> -Commitment	Commitment → PP	0.3971	0.2192	1.8112	.0727	[-0.0372, 0.8314]
H <sub>2</sub> - Commitment	Commitment → BIPS	-0.2013	0.1573	-1.2800	.2032	[-0.5130, 0.1103]
H <sub>3</sub> - Commitment	PP → BIPS	0.5798	0.0663	8.7517	0 .000	[0.4486, 0.7111]

	Indirect Effect	0.2302	0.1263	—	—	[-0.0219, 0.4790]
<b>Treatment 3 (Scarcity)</b>						
H <sub>1</sub> -Scarcity	Scarcity → PP	0.0681	0.2207	0.3087	.7581	[-0.3692, 0.5055]
H <sub>2</sub> - Scarcity	Scarcity → BIPS	-0.6227	0.1565	-3.9792	0 .000	[-0.9328, -0.3126]
H <sub>3</sub> - Scarcity	PP → BIPS	0.4977	0.0673	7.3995	0 .000	[0.3644, 0.6310]
	Indirect Effect	0.0339	0.1094	—	—	[-0.1827, 0.2459]

Table 12. Mediation test for Study 1, behavioral intention towards persuasive strategy, N=235

Secondly, Study 1 examined BISR as the outcome variable (Y). Each treatment group was tested as the independent variable (X) using PROCESS Model 4, with perceived persuasiveness (PP) included as the mediator (M). The results showed that the reciprocity-based persuasive message significantly enhanced participants' perceived persuasiveness when interacting with TPDF platforms ( $b_{\text{Reciprocity}} = 1.0033$ ,  $p_{\text{Reciprocity}} < 0.001$ ). In turn, PP positively influenced BISR ( $b_{\text{PP}} = 0.3162$ ,  $p_{\text{PP}} = 0.001$ ). However, reciprocity did not exert a significant direct effect on BISR ( $b_{\text{ReciprocityDirect}} = -0.2911$ ,  $p_{\text{ReciprocityDirect}} = 0.1197$ ). Although the commitment and consistency and scarcity strategies did not demonstrate significant indirect effects through PP ( $b_{\text{Commitment}} = 0.3971$ ,  $p_{\text{Commitment}} = 0.0727$ ;  $b_{\text{Scarcity}} = 0.0681$ ,  $p_{\text{Scarcity}} = .7581$ ), the commitment and consistency message exhibited a significant negative direct relationship with BISR ( $b_{\text{CommitmentDirect}} = -0.3867$ ,  $p_{\text{CommitmentDirect}} = 0.0261$ ). This unexpected yet meaningful finding offers new insight into the differential impact of persuasion strategies. Additional results are presented in Table 13.

Hypothesis	Path	b	SE	t	p	95% CI (LL, UL)
<b>Treatment 1 (Reciprocity)</b>						
H <sub>1</sub> -Reciprocity	Reciprocity → PP	1.0033	0.2064	4.8614	0 .000	[0.5945, 1.4121]

H4-Reciprocity	Reciprocity → BISR	-0.2911	0.1857	-1.5678	.1197	[-0.6588, 0.0767]
H5-Reciprocity	PP → BISR	0.3162	0.0761	4.1532	.0001	[0.1654, 0.4670]
	Indirect Effect	0.3172	0.1078	—	—	[0.1262, 0.5496]
<b>Treatment 2 (Commitment and Consistency)</b>						
H1-Commitment	Commitment → PP	0.3971	0.2192	1.8112	.0727	[-0.0372, 0.8314]
H4- Commitment	Commitment → BISR	-0.3867	0.1715	-2.2549	.0261	[-0.7265, -0.0469]
H5- Commitment	PP → BISR	0.5063	0.0722	7.0092	0 .000	[0.3632, 0.6494]
	Indirect Effect	0.2011	0.1107	—	—	[-0.0188, 0.4238]
<b>Treatment 3 (Scarcity)</b>						
H1-Scarcity	Scarcity → PP	0.0681	0.2207	0.3087	.7581	[-0.3692, 0.5055]
H4- Scarcity	Scarcity → BISR	-0.2405	0.1710	-1.4068	.1623	[-0.5793, 0.0983]
H5- Scarcity	PP → BISR	0.3891	0.0735	5.2946	0 .000	[0.2435, 0.5347]
	Indirect Effect	0.0265	0.0861	—	—	[-0.1463, 0.1966]

Table 13. Mediation test for Study 1, behavioral intention towards sustainable restaurants, N=235

#### 4.1.2.2 Moderation test

Based on the results from the mediation test for Study 1, a moderating effect of green self-identity (GSI) was conducted to identify the potential moderating influence for treatment 1, reciprocity strategy for both BIPS and BISR.

First, the data analysis was focused on BIPS as the dependent variable. From Table 14, the findings indicate that the reciprocity-based persuasive message significantly increased PP ( $b = 2.0383$ ,  $p = .0101$ ), which in turn positively influenced participants' sustainable restaurant choice intention ( $b = 0.5336$ ,  $p < .001$ ). The index of moderated mediation was not statistically significant, suggesting that the moderation by GSI on the indirect path did not reach conventional levels of significance (Figure 6).

Outcome	Predictor	b	SE	t	p	95% CI (LL, UL)
<b>PP</b>	Reciprocity	2.0383	0.7789	2.6169	.0101	[0.4953, 3.5813]
	GSI	0.2803	0.1387	2.0210	.0456	[0.0056, 0.5550]
	Reciprocity × GSI (Interaction)	-0.2072	0.1518	-1.3645	.1751	[-0.5080, 0.0936]
	C1 1	-0.0130	0.0561	-0.2317	.8172	[-0.1242, 0.0982]
	C2 1	0.2334	0.1375	1.6979	.0923	[-0.0389, 0.5057]
	C3 1	0.0445	0.0883	0.5045	.6149	[-0.1303, 0.2194]
	C4 1	0.2333	0.0825	2.8279	.0055	[0.0699, 0.3967]
<b>BIPS</b>	PP	0.5336	0.0758	7.0381	0.000	[0.3834, 0.6838]
	Reciprocity	-0.2052	0.1849	-1.1096	.2695	[-0.5714, 0.1611]
	C1 1	0.0595	0.0458	1.3007	.1960	[-0.0311, 0.1501]
	C2 1	0.1333	0.1127	1.1830	.2393	[-0.0899, 0.3565]
	C3 1	0.1406	0.0700	2.0077	.0470	[0.0019, 0.2793]
	C4 1	0.0267	0.0682	0.3910	.6965	[-0.1084, 0.1617]
	<b>Conditional Indirect Effects of Reciprocity on BIPS Through PP at Values of GSI</b>					
GSI = 3.67 (Low)		0.6823	0.1993	—	—	[0.3027, 1.0879]
GSI = 5.00 (Medium)		0.5349	0.1278	—	—	[0.2920, 0.7945]
GSI = 6.33 (High)		0.3875	0.1603	—	—	[0.0775, 0.7128]
<b>Index of Moderated Mediation</b>						
	GSI	-0.1106	0.0960	—	—	[-0.3064, 0.0739]

Table 14. Moderating effect test for Study 1, behavioral intention towards persuasive strategy

Next, the same method was used to analysis the data and focus on the BISR as a dependent variable. As Table 15 shows, the reciprocity-based persuasive message significantly increased PP ( $b = 2.0383, p = .0101$ ), and in turn, PP had a significant positive effect on BISR ( $b = 0.3162, p < .001$ ). However, the interaction term between Reciprocity persuasion strategy and GSI was not significant ( $b = -0.2072, p = .1751$ ),

suggesting no evidence of the moderating effects between persuasion strategy and the PP in the model (Figure 6).

Outcome	Predictor	b	SE	t	p	95% CI (LL, UL)
<b>PP</b>						
	Reciprocity	2.0383	0.7789	2.6169	.0101	[0.4953, 3.5813]
	GSI	0.2803	0.1387	2.0210	.0456	[0.0056, 0.5550]
	Reciprocity × GSI (Interaction)	-0.2072	0.1518	-1.3645	.1751	[-0.5080, 0.0936]
	C1 1	-0.0130	0.0561	-0.2317	.8172	[-0.1242, 0.0982]
	C2 1	0.2334	0.1375	1.6979	.0923	[-0.0389, 0.5057]
	C3 1	0.0445	0.0883	0.5045	.6149	[-0.1303, 0.2194]
	C4 1	0.2333	0.0825	2.8279	.0055	[0.0699, 0.3967]
<b>BISR</b>						
	PP	0.3162	0.0761	4.1532	.0001	[0.1654, 0.4670]
	Reciprocity	-0.2911	0.1857	-1.5678	.1197	[-0.6588, 0.0767]
	C1 1	0.0334	0.0459	0.7273	.4685	[-0.0576, 0.1244]
	C2 1	0.1564	0.1131	1.3826	.1695	[-0.0677, 0.3805]
	C3 1	0.2854	0.0703	4.0600	.0001	[0.1462, 0.4247]
		C4 1	0.2375	0.0685	3.4689	.0007
<b>Conditional Indirect Effects of Reciprocity on BISR Through PP at Values of GSI</b>						
	GSI = 3.67 (Low)	0.4043	0.1522	—	—	[0.1426, 0.7293]
	GSI = 5.00 (Medium)	0.3169	0.1058	—	—	[0.1278, 0.5404]
	GSI = 6.33 (High)	0.2296	0.1101	—	—	[0.0335, 0.4594]
<b>Index of Moderated Mediation</b>						
	GSI	-0.0655	0.0602	—	—	[-0.1925, 0.0463]

Table 15. Moderating effect test for Study 1, behavioral intention towards sustainable restaurants

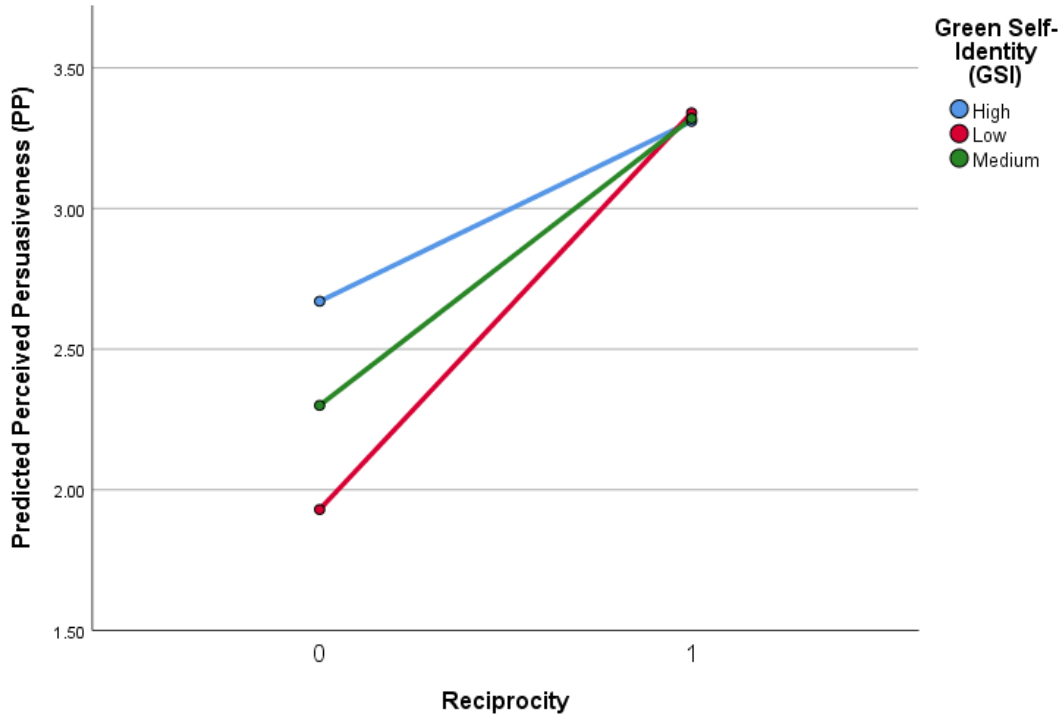


Figure 6. Moderating effect of green self-identity on the relationship between Reciprocity strategy and perceived persuasiveness.

Figure 7, 8, 9 show the model figures in detail for Study 1.

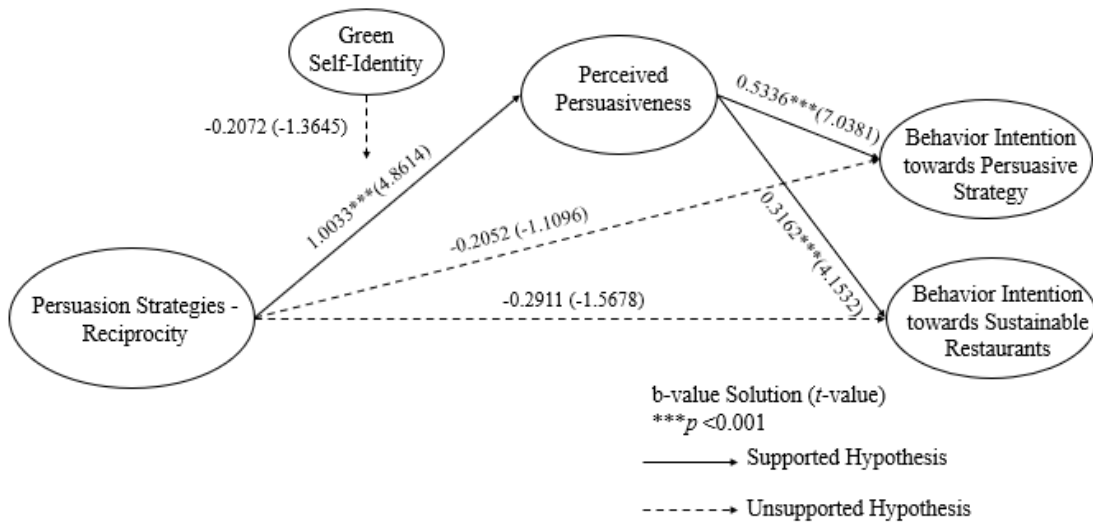


Figure 7. Path coefficient model for Study 1 - Reciprocity

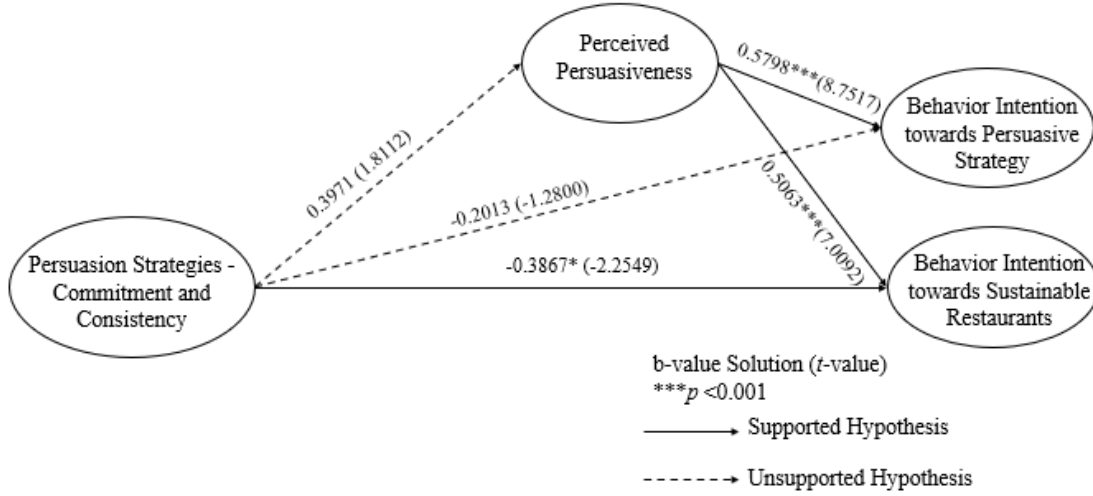


Figure 8. Path coefficient model for Study 1 – Commitment and Consistency

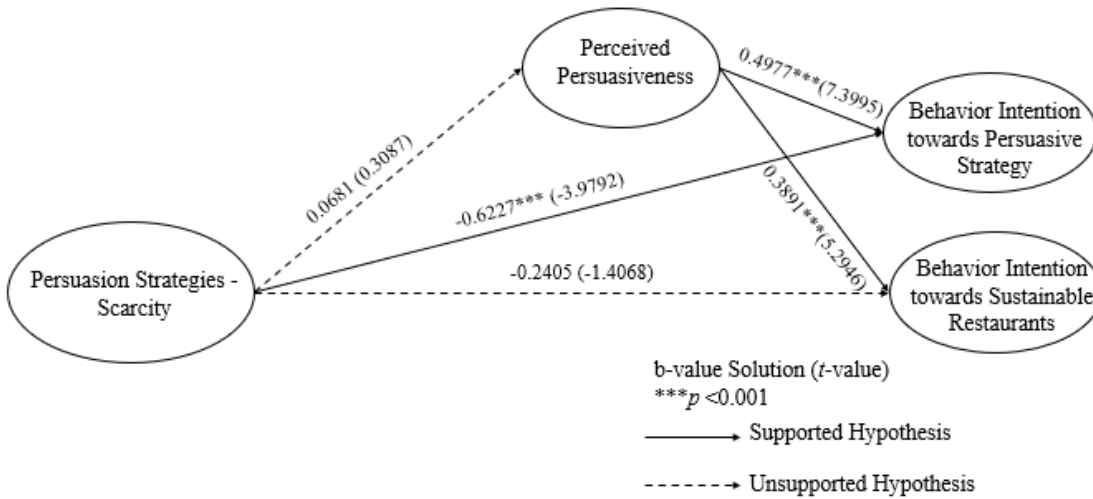


Figure 9. Path coefficient model for Study 1 – Scarcity

### 4.1.3. Study 2

Similar to Study 1, Study 2 explored the effectiveness of socially driven persuasive strategies in influencing consumers' sustainable restaurant choices, with a particular focus on the moderating role of perceived social norms. Specifically, this study examined whether the strategies of social proof, authority, and liking affect consumers' willingness to choose sustainable restaurant options when using TPFD platforms. Data was analyzed using SPSS version 26, applying PROCESS macro Model 4 to test for mediation effects and Model 7 to assess potential moderation by social norms.

#### 4.1.3.1 Mediation test

Consistent with Study 1, Study 2 examined two dependent variables: behavioral intention towards persuasive strategy (BIPS) and behavioral intention towards sustainable restaurants (BISR). To assess whether the persuasive messages effectively influenced consumers' decision-making regarding sustainable restaurant choices on TPFD platforms, each treatment group was independently compared to the control group. To ensure the robustness of the findings, the same set of individual-level covariates used in Study 1 were statistically controlled. These included participants' current hunger level, personal preference for sustainable restaurant foods, ordering habits related to sustainability, and self-reported knowledge of sustainable food practices.

The first analysis focused on BIPS, treated as the outcome variable (Y). Each treatment group served as the independent variable (X) in PROCESS Model 4, with perceived persuasiveness (PP) included as the mediator (M). The results indicated that the social proof-based persuasive message significantly increased consumers' perceived persuasiveness when engaging with TPFD platforms ( $b_{\text{SocialProof}} = 0.6189$ ,  $p_{\text{SocialProofy}} =$

0.0041), and in turn, PP significantly enhanced their immediate behavioral intention to choose sustainable restaurant options ( $b_{PP} = 0.5255, p_{PP} < 0.001$ ). However, Social Proof did not exhibit a direct effect on BIPS ( $b_{\text{SocialProofDirect}} = -0.0565, p_{\text{SocialProofDirect}} = 0.6864$ ), suggesting full mediation through PP. While the authority strategy and the liking strategy did not produce a significant mediation effect via PP ( $b_{\text{Authority}} = 0.3609, p_{\text{Authority}} = 0.0791$ ;  $b_{\text{Liking}} = 0.2829, p_{\text{Liking}} = 0.1664$ ), both of them revealed a strong negative direct relationship with BIPS ( $b_{\text{AuthorityDirect}} = -0.5347, p_{\text{AuthorityDirect}} = 0.0012$ ;  $b_{\text{LikingDirect}} = -0.4704, p_{\text{LikingDirect}} = 0.0031$ ), indicating no mediation but a potential boomerang effect. These results, while contrary to expectations, offer valuable insights into the potential unintended consequences of certain persuasive appeals. Further details are presented in Table 16.

Hypothesis	Path	b	SE	t	p	95% CI (LL, UL)
<b>Treatment 4 (Social Proof)</b>						
H7-SocialProof	SocialProof → PP	0.6189	0.2110	2.9332	.0041	[0.2008, 1.0369]
H8-SocialProof	SocialProof → BIPS	-0.0565	0.1395	-0.4048	.6864	[-0.3329, 0.2199]
H9-SocialProof	PP → BIPS	0.5255	0.0602	8.7289	0.000	[0.4062, 0.6448]
	Indirect Effect	0.3252	0.1143	—	—	[0.1151, 0.5548]
<b>Treatment 5 (Authority)</b>						
H7-Authority	Authority → PP	0.3609	0.2037	1.7717	.0791	[-0.0425, 0.7643]
H8-Authority	Authority → BIPS	-0.5347	0.1605	-3.3312	.0012	[-0.8526, -0.2168]
H9-Authority	PP → BIPS	0.5712	0.0719	7.9450	0.000	[0.4288, 0.7135]
	Indirect Effect	0.2061	0.1174	—	—	[-0.0223, 0.4379]
<b>Treatment 6 (Liking)</b>						
H7-Liking	Liking → PP	0.2829	0.2032	1.3925	.1664	[-0.1194, 0.6852]
H8-Liking	Liking → BIPS	-0.4704	0.1558	-3.0198	.0031	[-0.7789, -0.1619]
H9-Liking	PP → BIPS	0.3876	0.0700	5.5359	0.000	[0.2489, 0.5262]
	Indirect Effect	0.1096	0.0848	—	—	[-0.0392, 0.2915]

Table 16. Mediation test for Study 2, behavioral intention towards persuasive strategy, N= 241

Secondly, Study 2 analyzed BISR as the outcome variable (Y). Each treatment group was tested as the independent variable (X) using PROCESS Model 4, with perceived persuasiveness (PP) included as the mediator (M). The results showed that the social proof-based persuasive message significantly enhanced participants' perceived persuasiveness when interacting with TPDF platforms ( $b_{\text{SocialProof}} = 0.6189$ ,  $p_{\text{SocialProof}} = 0.0041$ ). In turn, PP positively influenced BISR ( $b_{\text{PP}} = 0.4264$ ,  $p_{\text{PP}} < 0.001$ ). However, social proof did not exert a significant direct effect on BISR ( $b_{\text{SocialProofDirect}} = -0.0733$ ,  $p_{\text{SocialProofDirect}} = 0.6253$ ). There is no direct or indirect relationship found for authority and liking strategies to BISR through PP ( $b_{\text{Authority}} = 0.3609$ ,  $p_{\text{Authority}} = 0.0791$ ,  $b_{\text{AuthorityDirect}} = -0.0598$ ,  $p_{\text{AuthorityDirect}} = 0.7179$ ;  $b_{\text{Liking}} = 0.2829$ ,  $p_{\text{Liking}} = .1664$ ,  $b_{\text{LikingDirect}} = -0.0731$ ,  $p_{\text{LikingDirect}} = .6680$ ). Detailed results are presented in Table 17.

Hypothesis	Path	b	SE	t	p	95% CI (LL, UL)
<b>Treatment 4 (Social Proof)</b>						
H <sub>7</sub> -SocialProof	SocialProof → PP	0.6189	0.2110	2.9332	.0041	[0.2008, 1.0369]
H <sub>10</sub> -SocialProof	SocialProof → BISR	-0.0733	0.1497	-0.4897	.6253	[-0.3699, 0.2233]
H <sub>11</sub> -SocialProof	PP → BISR	0.4264	0.0646	6.6007	0.000	[0.2984, 0.5543]
	Indirect Effect	0.2638	0.0999	—	—	[0.0850, 0.4727]
<b>Treatment 5 (Authority)</b>						
H <sub>7</sub> -Authority	Authority → PP	0.3609	0.2037	1.7717	.0791	[-0.0425, 0.7643]
H <sub>10</sub> -Authority	Authority → BISR	-0.0598	0.1652	-0.3621	.7179	[-0.3870, 0.2674]
H <sub>11</sub> -Authority	PP → BISR	0.3490	0.0740	4.7175	0.000	[0.2025, 0.4955]
	Indirect Effect	0.1260	0.0794	—	—	[-0.0116, 0.3002]
<b>Treatment 6 (Liking)</b>						
H <sub>7</sub> -Liking	Liking → PP	0.2829	0.2032	1.3925	.1664	[-0.1194, 0.6852]
H <sub>10</sub> -Liking	Liking → BISR	-0.0731	0.1700	-0.4300	.6680	[-0.4098, 0.2636]
H <sub>11</sub> -Liking	PP → BISR	0.4226	0.0764	5.5299	0.000	[0.2712, 0.5739]

	Indirect Effect	0.1195	0.0882	—	—	[-0.0368, 0.3100]
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Table 17. Mediation test for Study 2, behavioral intention towards sustainable restaurants, N=241

#### 4.1.3.2 Moderation test

Based on the results from the mediation test for Study 2, a moderating effect of social norms (SN) was conducted to identify the potential moderating influence for treatment 4, social proof strategy for both BIPS and BISR.

First, the data analysis was focused on BIPS as the dependent variable. As shown in Table 18, no significant moderating effect was identified between the social proof persuasive strategy and PP ( $b = 0.1734, p = 0.0762$ ). However, SN independently exhibited a significant positive association with PP ( $b = 0.3337, p < 0.001$ ), and PP strongly predicted BIPS ( $b = 0.4264, p < .001$ ) (Figure 7). These findings suggest that SN plays a meaningful role in shaping consumers' perceptions of message persuasiveness and subsequent behavioral intentions. Therefore, SN should be treated as an independent predictor in Study 3 when developing a more comprehensive framework for understanding sustainable restaurant choice behavior.

Outcome	Predictor	b	SE	t	p	95% CI (LL, UL)
<b>PP (Mediator)</b>	Social Proof	-0.4031	0.4406	-0.9148	.3612	[-1.2711, 0.4650]
	SN	0.3337	0.0620	5.3806	.0000	[0.2115, 0.4559]
	Social Proof × SN (Interaction)	0.1734	0.0973	1.7809	.0762	[-0.0184, 0.3651]
	C1 1	0.0304	0.0356	0.8522	.3950	[-0.0399, 0.1006]
	C2 1	0.2313	0.0792	2.9210	.0038	[0.0753, 0.3873]
<b>BIPS</b>	C3 1	0.1198	0.0620	1.9329	.0545	[-0.0023, 0.2418]
	C4 1	0.1177	0.0543	2.1690	.0311	[0.0108, 0.2247]
	PP	0.4264	0.0646	6.6007	0.000	[0.2984, 0.5543]

	Social Proof	0.4918	0.0524	9.3788	.0000	[0.3885, 0.5952]
	C1 1	0.2922	0.1320	2.2129	.0279	[0.0321, 0.5523]
	C2 1	0.0283	0.0309	0.9148	.3612	[-0.0326, 0.0891]
	C3 1	0.2553	0.0697	3.6623	.0003	[0.1180, 0.3927]
	C4 1	0.1722	0.0513	3.3571	.0009	[0.0711, 0.2732]
<b>Conditional Indirect Effects of Social Proof on BIPS Through PP at Values of SN</b>						
	2.20 (Low)	-0.0107	0.1541	—	—	[-0.3081, 0.4691]
	4.40 (Medium)	0.1769	0.0694	—	—	[0.0494, 0.3230]
	6.00 (High)	0.3133	0.0954	—	—	[0.1522, 0.5270]
<b>Index of Moderated Mediation</b>						
	SN	0.0853	0.0545	—	—	[-0.0156, 0.1988]

Table 18. Moderating effect test for Study 2, behavioral intention towards persuasive strategy.

Next, the same analytical procedure was employed, this time examining BISR as the dependent variable. Consistent with previous findings, the results presented in Table 19 show no significant moderating effect between the social proof strategy and PP ( $b = 0.1734, p = 0.0762$ ). However, SN demonstrated a strong and statistically significant independent effect on PP ( $b = 0.3337, p < 0.001$ ), and PP was a significant predictor of BISR ( $b = 0.3911, p < 0.001$ ) (Figure 10). These findings underscore the importance of treating SN as a key influencing factor in the development of a more comprehensive framework for understanding consumers' sustainable restaurant choices.

Outcome	Predictor	b	SE	t	p	95% CI (LL, UL)
<b>PP (Mediator)</b>	Social Proof	-0.4031	0.4406	-0.9148	.3612	[-1.2711, 0.4650]
	SN	0.3337	0.0620	5.3806	.0000	[0.2115, 0.4559]
	Social Proof × SN (Interaction)	0.1734	0.0973	1.7809	.0762	[-0.0184, 0.3651]

	C1 1	0.0304	0.0356	0.8522	.3950	[-0.0399, 0.1006]
	C2 1	0.2313	0.0792	2.9210	.0038	[0.0753, 0.3873]
	C3 1	0.1198	0.0620	1.9329	.0545	[-0.0023, 0.2418]
	C4 1	0.1177	0.0543	2.1690	.0311	[0.0108, 0.2247]
<b>BIPS</b>						
	PP	0.3911	0.0522	7.4932	.0000	[0.2883, 0.4939]
	Social Proof	-0.0039	0.1314	-0.0296	.9764	[-0.2628, 0.2550]
	C1 1	0.0236	0.0307	0.7670	.4439	[-0.0370, 0.0841]
	C2 1	0.2505	0.0694	3.6105	.0004	[0.1138, 0.3872]
	C3 1	0.2200	0.0510	4.3108	.0000	[0.1195, 0.3206]
	C4 1	0.2421	0.0458	5.2845	.0000	[0.1518, 0.3324]
<b>Conditional Indirect Effects of Social Proof on BIPS Through PP at Values of SN</b>						
	2.20 (Low)	-0.0085	0.1225	—	—	[-0.2465, 0.2481]
	4.40 (Medium)	0.1407	0.0559	—	—	[0.0400, 0.2627]
	6.00 (High)	0.2492	0.0745	—	—	[0.1214, 0.4154]
<b>Index of Moderated Mediation</b>						
	SN	0.0678	0.0427	—	—	[-0.0165, 0.1529]

Table 19. Moderating effect test for Study 2, behavioral intention towards sustainable restaurants

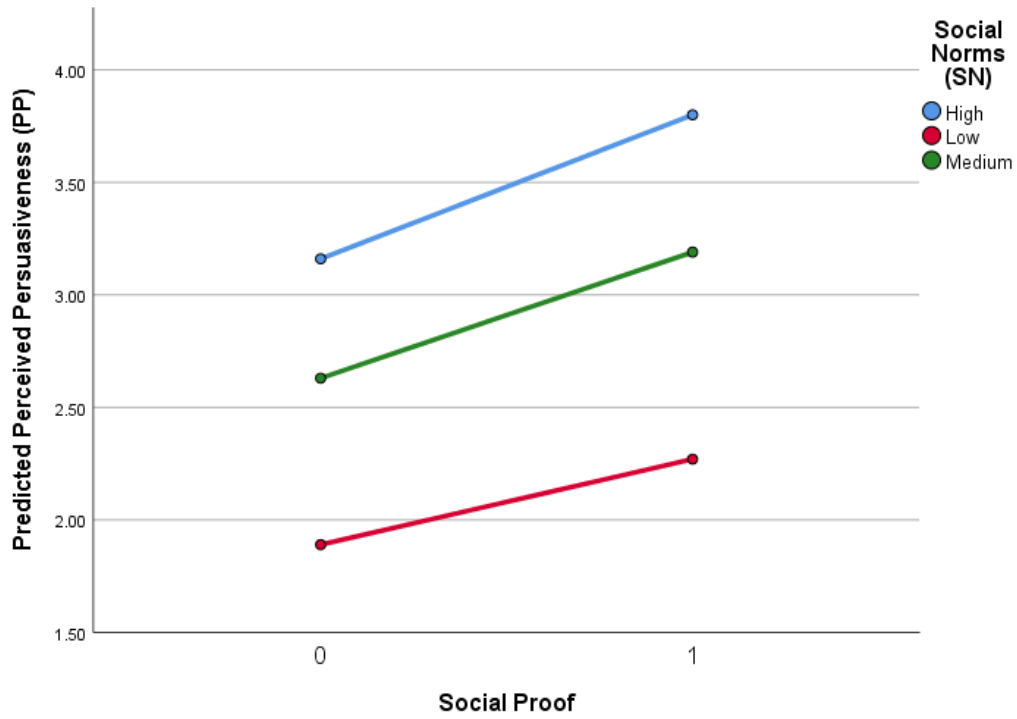


Figure 10. Moderating effect of social norms on the relationship between Social Proof strategy and perceived persuasiveness.

Figure 11, 12, 13 show the model figures in detail for Study 2.

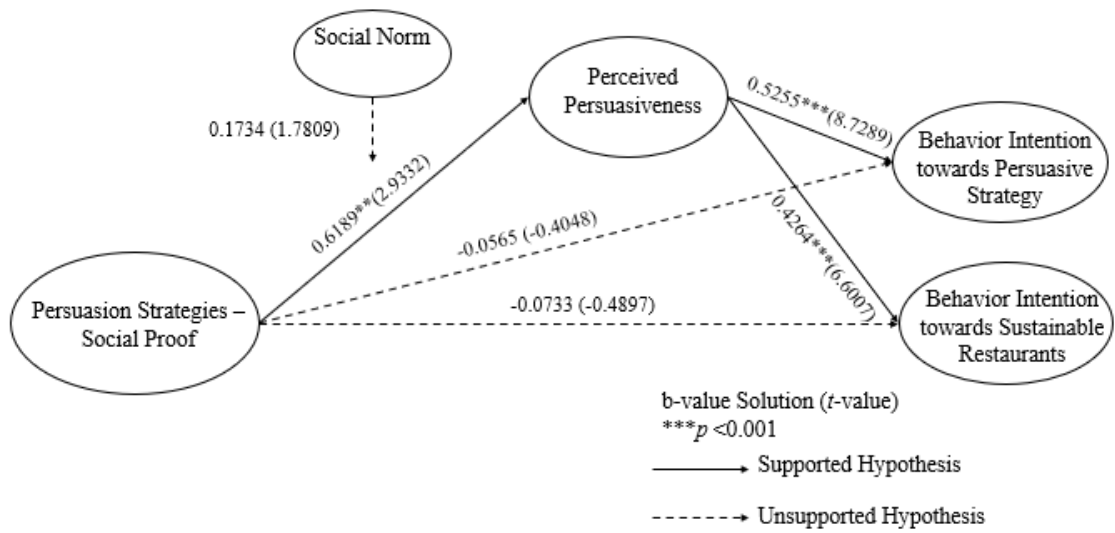


Figure 11. Path coefficient model for Study 2 – Social Proof

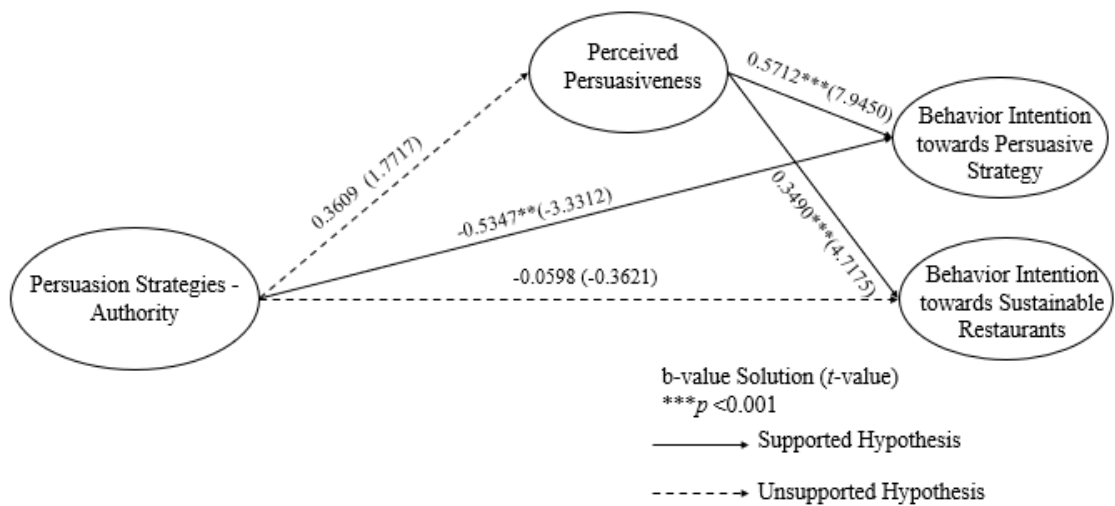


Figure 12. Path coefficient model for Study 2 – Authority

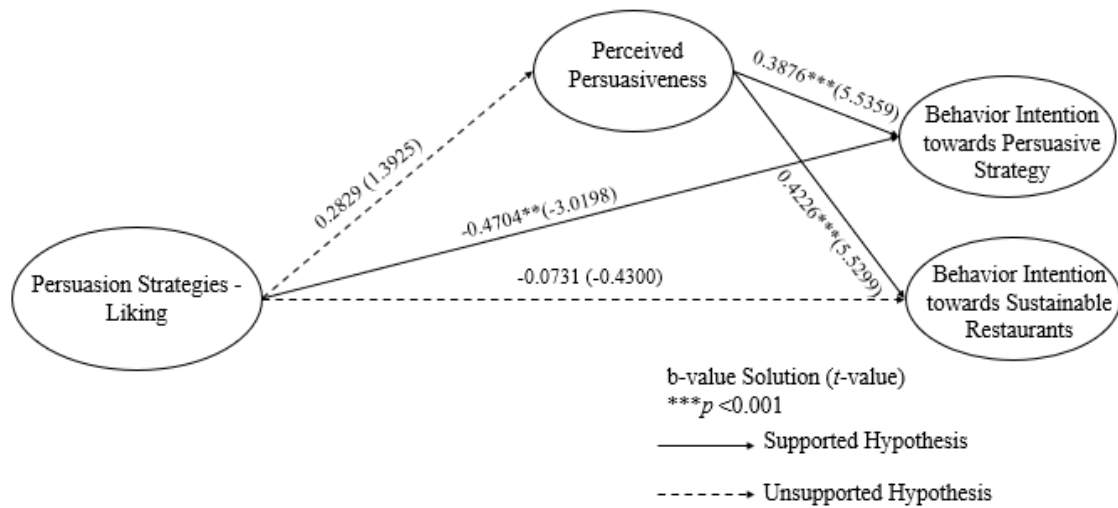


Figure 13. Path coefficient model for Study 2 – Liking

## 4.2. Study 3

Study 3 introduced a comprehensive model that integrates cognitive, affective, and contextual factors to examine pro-environmental behavioral intentions within the context of TPFD platforms. Specifically, the model incorporates bio-altruistic value (BV), egoistic value (EV), perceived persuasiveness (PP), personal norms (PN), social norms (SN), and pro-environmental behavioral intention (BI). Drawing on insights from the pilot studies, several measurement items were removed to improve construct clarity and enhance model fit. Prior to conducting the structural equation modeling (SEM) analysis, both reliability testing and confirmatory factor analysis (CFA) were performed to assess the validity and internal consistency of the measurement model. Detailed results and interpretations are presented in the sections that follow.

### 4.2.1. Study 3 estimation model testing

The results from Table 20 presents the descriptive statistics and results of the exploratory factor analysis for core constructs in Study 3. All scales demonstrated strong internal consistency, with Cronbach's alpha values ranging from 0.885 to 0.955. Factor loadings for all items exceeded the recommended threshold of 0.70, and extracted factors ranged from 0.533 to 0.902, supporting convergent validity. The total variance explained by each construct was substantial, ranging from 64.7% to 84.8%. Kaiser–Meyer–Olkin (KMO) values were above 0.70 and Bartlett's tests were statistically significant ( $p < .001$ ), confirming the adequacy of the sample and the suitability of the data for factor analysis.

	Mean (SD)	Factor Loading	Extracted Factor	Total Variance (%)	KMO and Bartlett's Test
<b>Bio-altruistic Value (Cronbach's <math>\alpha = 0.885</math>)</b>	<b>6.08 (0.866)</b>			<b>64.699</b>	<b>0.828 (<math>p = 0.000</math>)</b>
Equality	6.03 (1.163)	0.786	0.618		
A world at peace	6.30 (0.887)	0.730	0.533		
Social justice	5.96 (1.349)	0.816	0.666		
Respecting the earth	6.05 (0.974)	0.806	0.650		
Unity with nature	5.90 (1.131)	0.787	0.619		
Protecting the environment	6.22 (0.951)	0.893	0.797		
<b>Egoistic Value (Cronbach's <math>\alpha = 0.918</math>)</b>	<b>4.97 (1.460)</b>			<b>75.510</b>	<b>0.872 (<math>p = 0.000</math>)</b>
Social power	4.63 (1.785)	0.843	0.711		
Wealth	5.27 (1.609)	0.854	0.730		
Authority	4.68 (1.791)	0.929	0.863		
Influential	4.72 (1.700)	0.925	0.855		
Ambitious	5.55 (1.507)	0.786	0.617		
<b>Perceived Persuasiveness (Cronbach's <math>\alpha = 0.931</math>)</b>	<b>5.35 (1.278)</b>			<b>83.095</b>	<b>0.863 (<math>p = 0.000</math>)</b>
The information presented in the advertisement picture is convincing.	5.35 (1.452)	0.925	0.856		

The information provided in the advertisement picture is persuasive.	5.26 (1.449)	0.910	0.827		
The information provided in the advertisement picture is good.	5.54 (1.277)	0.900	0.809		
The information provided in the advertisement picture can change/reinforce my impression toward the food recommended.	5.27 (1.427)	0.911	0.831		
<b>Personal Norm (Cronbach's <math>\alpha</math> = 0.955)</b>	<b>4.58 (1.542)</b>			<b>76.393</b>	<b>0.941 (<math>p = 0.000</math>)</b>
I feel personally obliged to order as much sustainable food as possible.	4.61 (1.785)	0.912	0.831		
I feel morally obliged to order sustainable food, regardless of what others do.	4.65 (1.814)	0.926	0.858		
I feel guilty when I order non-sustainable food.	3.69 (1.926)	0.780	0.608		
I feel morally obliged to order sustainable food instead of non-sustainable food.	4.39 (1.89)	0.925	0.855		
People like me should do everything they can to order sustainable food.	4.84 (1.611)	0.881	0.777		
If I would order food through mobile delivery apps, I would feel morally obliged to order sustainable food.	4.56 (1.840)	0.918	0.843		
I feel obliged to bear the environment and nature in mind in my daily behaviour.	5.03 (1.572)	0.800	0.640		
I would be a better person if I ordered sustainable foods.	4.89 (1.707)	0.836	0.698		
<b>Social Norm (Cronbach's <math>\alpha</math> = 0.952)</b>	<b>4.34 (1.653)</b>			<b>83.837</b>	<b>0.888 (<math>p = 0.000</math>)</b>

Most people who are important to me believe that I order sustainable food via a mobile delivery application.	4.24 (1.890)	0.927	0.859		
Most people whose opinion is important to me approve I order sustainable food via a mobile delivery application.	4.71 (1.666)	0.803	0.644		
Most people close to me order sustainable food via a mobile delivery application.	4.24 (1.821)	0.950	0.902		
My friends tend to order sustainable food via a mobile delivery application.	4.28 (1.826)	0.942	0.887		
In general, I think most people who are important to me order sustainable food via a mobile delivery application.	4.24 (1.819)	0.948	0.899		
<b>Pro-environmental Behavioral intention (Cronbach's <math>\alpha = 0.909</math>)</b>	<b>4.89 (1.442)</b>			<b>84.778</b>	<b>0.719 (<math>p = 0.000</math>)</b>
In general, I try to order sustainable food through a mobile delivery application.	4.68 (1.638)	0.950	0.902		
I strive to order sustainable food.	4.66 (1.637)	0.920	0.846		
The next time I order through a mobile delivery application, I will try to order sustainable food.	5.34 (1.419)	0.892	0.795		

Table 20. Constructs reliability test for main Study 3

Following the initial reliability assessment, a confirmatory factor analysis (CFA) was conducted to evaluate the measurement model. The results indicated that the model

demonstrated a good fit with the observed data. The chi-square value ( $\chi^2$ ) was 798.298 (df = 412,  $p < .001$ ), and the CMIN/DF ratio was 1.938, which falls within the acceptable range (less than 5), as recommended by Wheaton et al. (1977). Additionally, all other fit indices supported a well-fitting model (RMSEA = 0.058, CFI = 0.957, NFI = 0.916, IFI = 0.957, TLI = 0.952). These results confirm the measurement model's adequacy in terms of both reliability and validity, offering a solid foundation for subsequent structural analysis.

As presented in Table 21, all constructs achieved composite reliability (CR) values above 0.80 and average variance extracted (AVE) values exceeding the recommended threshold of 0.50 (Haji-Othman & Yusuff, 2022; Purwanto & Sudargini, 2021). Furthermore, discriminant validity was assessed using the heterotrait–monotrait ratio (HTMT), in line with the guidelines proposed by Henseler et al. (2015). Table 22 displays the HTMT values, all of which remained below 0.90, satisfying the criteria suggested by Gold et al. (2001) and Teo et al. (2008), and suggests good discriminant validity. Collectively, these findings provide strong evidence of the measurement model's reliability and validity, supporting its use in the forthcoming structural equation modeling.

	<b>CR</b>	<b>AVE</b>	<b>PP</b>	<b>BV</b>	<b>PN</b>	<b>SN</b>	<b>BI</b>	<b>EV</b>
<b>PP</b>	0.932	0.775	0.880					
<b>BV</b>	0.887	0.571	0.656***	0.756				
<b>PN</b>	0.956	0.733	0.701***	0.531***	0.856			
<b>SN</b>	0.953	0.804	0.603***	0.411***	0.824***	0.897		
<b>BI</b>	0.915	0.782	0.745***	0.563***	0.822***	0.843***	0.884	
<b>EV</b>	0.919	0.698	0.388***	0.217**	0.489***	0.615***	0.499***	0.835

Note: \*\*\*  $p < 0.001$

Table 21. Validity analysis for Study 3

	PP	BV	PN	SN	BI	EV
PP						
BV	0.649					
PN	0.711	0.522				
SN	0.630	0.405	0.858			
BI	0.777	0.577	0.845	0.853		
EV	0.407	0.228	0.508	0.628	0.503	

Table 22. Discriminant validity analysis for Study 3

#### 4.2.2. SEM test

In Study 3, hypotheses 13 through 20 were evaluated using structural equation modeling. The model demonstrated a satisfactory fit to the data, as indicated by the following fit indices:  $\chi^2 = 875.538$  ( $df = 417, p < .001$ ), RMSEA = 0.062, CFI = 0.950, NFI = 0.908, IFI = 0.950, and TLI = 0.944. These values suggest that the proposed structural model adequately represents the observed data. The path relationships and standardized estimates are illustrated in Figure 14, with full statistical details reported in Table 23.

The SEM findings indicate that consumers' bio-altruistic value significantly enhanced both their perceived persuasiveness ( $\beta = 0.632, p < .001$ ) in response to the persuasive advertisement and their personal norms ( $\beta = 0.261, p < .001$ ). Egoistic value also showed a significant positive effect on PP ( $\beta = 0.207, p < .001$ ), but it did not significantly influence PN ( $\beta = 0.004, p = .935$ ). Furthermore, social norms were found to substantially increase PN ( $\beta = 0.715, p < .001$ ). In addition, PP, PN, and SN all had significant positive effects on consumers' pro-environmental behavioral intention when choosing sustainable restaurants through TPFD services.

Additionally, Study 3 explored the indirect effects among these variables. The results showed that bio-altruistic value had a significant indirect effect on behavioral intention through both PP ( $\beta_{BV \rightarrow PP \rightarrow BI} = 0.1997, p < .001$ ) and PN ( $\beta_{BV \rightarrow PN \rightarrow BI} = 0.0653, p < .001$ ). Egoistic value also exerted a significant indirect effect on behavioral intention through PP ( $\beta_{EV \rightarrow PP \rightarrow BI} = 0.0654, p < .001$ ). These results confirm the mediating role of PP and PN in the relationships between BV and EV and BI. Furthermore, SN had a significant indirect effect on behavioral intention via PN ( $\beta_{SN \rightarrow PN \rightarrow BI} = 0.1788, p < .001$ ), supporting the hypothesized mediation pathway proposed in Study 3.

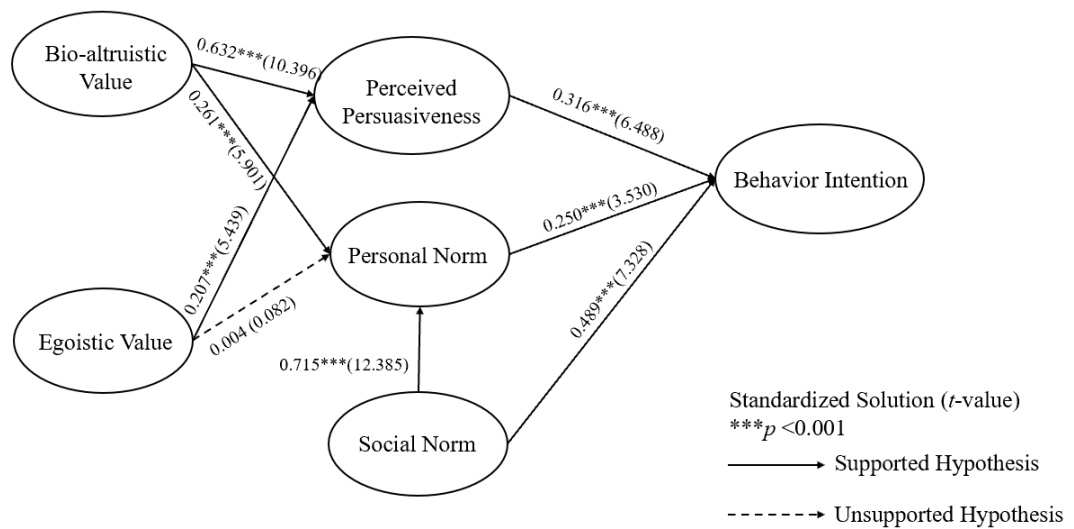


Figure 14. Standardized path coefficient model for Study 3

	Hypothesized Path	$\beta$	SE	<i>t</i> -Value	<i>p</i>	Supported
H <sub>13</sub>	BV → PP	0.632	0.083	10.396	0	Yes
H <sub>14</sub>	BV → PN	0.261	0.076	5.901	0	Yes
H <sub>15</sub>	EV → PP	0.277	0.037	5.439	0	Yes
H <sub>16</sub>	EV → PN	0.004	0.044	0.082	0.935	No
H <sub>17</sub>	PP → BI	0.316	0.057	6.488	0	Yes
H <sub>18</sub>	PN → BI	0.250	0.066	3.530	0	Yes
H <sub>19</sub>	SN → PN	0.715	0.055	12.385	0	Yes

<b>H<sub>20</sub></b>	SN → BI	0.489	0.059	7.328	0	Yes
Indirect impact:						
$\beta_{BV-PP-BI} = 0.1997^{***}$						
$\beta_{BV-PN-BI} = 0.0653^{***}$						
Total indirect impact of BV on BI = 0.265						
$\beta_{EV-PP-BI} = 0.0654^{***}$						
$\beta_{SN-PN-BI} = 0.1788^{***}$						

Table 23. Results of structural model for Study 3

### 4.2.3. Multi-group analysis

Additionally, Study 3 conducted a multi-group analysis comparing the effects of reciprocity and social proof persuasion strategies using the built-in functionality in SPSS AMOS. A significant difference was observed between the baseline (configural) model and the fully constrained model ( $\Delta\chi^2 = 132.433$ ,  $\Delta df = 85$ ,  $p < .001$ ), indicating that some structural relationships may vary across groups. To explore these potential differences, individual path comparisons were examined across all key variables. Contrary to expectations, no statistically significant differences were identified between the two persuasive strategy groups (see Table 24). This suggests that both internally driven motivation (e.g., reciprocity) and externally driven social influence (e.g., social proof) are similarly effective in shaping consumers' perceived persuasiveness and subsequent behavioral intentions toward choosing sustainable restaurants on TPFD platforms. However, the findings indicate that these two strategies do not differ significantly in their relative impact.

Path	Group	$\beta$	p	$\Delta\chi^2$	$\Delta df$	p	Difference
<b>BV → PP</b>	Reciprocity	0.605	0.000***	1.114	1	0.291	NO
	Social Proof	0.668	0.000***				
<b>BV → PN</b>	Reciprocity	0.253	0.000***	0.008	1	0.930	NO
	Social Proof	0.247	0.000***				
<b>EV → PP</b>	Reciprocity	0.213	0.005**	2.004	1	0.157	NO
	Social Proof	0.352	0.000***				

<b>EV → PN</b>	Reciprocity	0.086	0.232	—	—	—	—
	Social Proof	-0.097	0.146				
<b>PP → BI</b>	Reciprocity	0.252	0.000***	1.247	1	0.264	NO
	Social Proof	0.391	0.000***				
<b>PN → BI</b>	Reciprocity	0.245	0.004**	0.153	1	0.695	NO
	Social Proof	0.299	0.012*				
<b>SN → PN</b>	Reciprocity	0.630	0.000***	1.408	1	0.235	NO
	Social Proof	0.828	0.000***				
<b>SN → BI</b>	Reciprocity	0.566	0.000***	3.057	1	0.080	NO
	Social Proof	0.3357	0.001**				

\*\*\*  $p < 0.001$

\*\*  $p < 0.01$

\*  $p < 0.05$

Table 24. Model Comparison for Study 3

Moreover, several multigroup analyses based on demographic characteristics were conducted to identify potential differences. The grouping variables included gender (male and female), age (18–30, 31–40, 41–50, and 50 and over), income (less than \$40,000, \$40,001–80,000, and \$80,001 and over), and visiting frequency (high vs. low). The results revealed no significant differences across gender and income groups. However, significant differences emerged among age groups for the path from EV to PP ( $p = .041$ ). In particular, individuals aged 41–50 were most influenced by egoistic values ( $\beta_{\text{Age 41-50}} = 0.386, p < .001$ ) compared to other age groups ( $\beta_{\text{Age 18-30}} = 0.116, p = .246$ ;  $\beta_{\text{Age 31-40}} = 0.200, p = .044$ ;  $\beta_{\text{Age 50+}} = 0.365, p < .001$ ). Visiting frequency also significantly moderated the relationship between BV to PP. Specifically, individuals with high visiting frequency were more strongly influenced by bio-altruistic values ( $\beta_{\text{High}} = 0.704, p < .001$ ) than those with low visiting frequency ( $\beta_{\text{Low}} = 0.591, p < .001$ ).

### 4.3. Summary of key findings

Study 1 aimed to explore the role of internal motivators in shaping consumers' behavioral intentions within the digital food delivery context. The findings indicate that the reciprocity-based persuasive strategy significantly enhances consumers' intentions to

choose sustainable restaurants when using TPFD services. This effect was mediated by perceived persuasiveness, regardless of whether the intention was measured immediately after message exposure or more generally. In contrast, the commitment strategy did not have a significant effect on immediate behavioral intentions, but it did exhibit a strong negative direct effect on general behavioral intentions toward sustainable restaurant choices. Similarly, the scarcity strategy demonstrated a significant negative direct effect on immediate intentions but failed to influence general behavioral intentions. Notably, the moderating effect of green self-identity was not supported in this study (Figure 7, 8, 9 above).

Study 2 shifted focus to examine the impact of social influence strategies on consumers' behavioral intentions in the same context. Results show that the social proof strategy significantly increased sustainable restaurant choices through the mediating role of perceived persuasiveness, both immediately and more generally. However, both the authority and liking strategies produced significant negative direct effects on immediate behavioral intentions, but did not significantly affect general intentions. The moderating role of subjective norms was also not supported (Figure 11, 12, 13 above).

Study 3 introduced an integrative model combining cognitive, affective, and contextual factors to better understand pro-environmental behavioral intentions in the TPFD environment. Statistical analysis revealed that Hypotheses 13 to 15 and 17 to 20 were supported, with the exception of Hypothesis 16 (see Table 23 above). Interestingly, no significant differences were found between the reciprocity and social proof treatment groups across most demographic characteristics, with the exception of age and visiting frequency.

A more detailed interpretation of these results, including theoretical implications and potential explanations, will be presented in the following chapter.

## **CHAPTER 5**

### **DISCUSSION**

#### **5.1. Conclusion**

To better understand how persuasive strategies influence consumers' choices of sustainable restaurants when using TPDF services, this study first identified two overarching categories of strategies: internal individual motivation and external social influence. These categories were grounded in persuasion theories (Cialdini, 2007; O'Keefe, 2009; Ryu & Kim, 2015) and Wilson's (1887) dichotomy theory. Building on the findings from the first two studies, and informed by the value–attitude–behavior framework (Homer & Kahle, 1988), a comprehensive conceptual model was developed. A multi-group analysis was then conducted to explore potential differences between two persuasive strategies of reciprocity and social proof, which were previously found to significantly influence consumers' behavioral intentions. This chapter interprets the results of each study, along with interpretations of the findings. In addition, it discusses theoretical and practical implications, and concludes with limitations of the current research and directions for future studies.

#### **5.2. Discussion for Study 1**

Study 1 explores how internally driven persuasive strategies influence consumers' decisions to choose sustainable restaurants, with a specific focus on the moderating role of green self-identity. The strategies examined, reciprocity, commitment and consistency, and scarcity, reflect core forms of individual motivation-based persuasion rooted in internal drivers.

As discussed in the previous chapter, Study 1 revealed that the reciprocity strategy significantly influences consumers' behavioral intentions to choose sustainable restaurants via third-party food delivery platforms, with perceived persuasiveness (PP) serving as a key mediating mechanism. This finding aligns with Huang et al. (2024), who emphasized the pivotal role of PP in mediating the relationship between received tokens (e.g., coupons or incentives) and sustainable consumer behavior. Furthermore, Langener et al. (2023) incorporated reciprocity as a core design element in a virtual reality-based alcohol refusal training program, demonstrating that such reciprocity cues can meaningfully enhance the persuasive appeal and increase participants' intentions to engage in positive behavioral change.

Unexpectedly, the commitment and consistency strategy as well as the scarcity strategy demonstrated significant negative direct effects on consumers' intentions to select sustainable dining options after exposure to persuasive messages. While surprising, these outcomes serve as important cautionary signals for practitioners, suggesting that the strategic use of these tactics in sustainability-focused marketing may require reconsideration. Supporting this perspective, Tang et al. (2022) found that a scarcity mindset can have adverse consequences, diminishing consumers' likelihood of engaging in sustainable behaviors, which is a phenomenon indicative of persuasive message backfire.

Despite theoretical expectations, this study did not find evidence supporting the moderating effect of GSI on the relationship between internal motivation-related persuasive strategies and perceived persuasiveness. In this study, GSI was operationalized as individuals' internal assessment of the value exchanged in a product or service,

influenced by their environmental values, sustainability expectations, and ecological needs (Chen & Chang, 2012). It was measured using a multi-item scale adapted from prior research (Dermody et al., 2015), capturing the extent to which participants perceived themselves as environmentally responsible and aligned their everyday decisions with pro-environmental values. One plausible explanation lies in the nature of the decision context. Selecting a sustainable restaurant via a digital food delivery platform may represent a low-involvement, routine decision for many consumers, in which habitual or convenience-based factors take precedence over deeply held personal values. In such low-effort contexts, even individuals with a strong green self-identity may not engage in identity-consistent cognitive processing (Nivornusit et al., 2024). Instead, they may prioritize time efficiency, user experience, or cost, which may diminish the likelihood that their environmental self-concept will meaningfully influence how they evaluate persuasive strategies.

### **5.3. Discussion for Study 2**

Study 2 focuses on the influence of persuasion strategies rooted in external social dynamics on consumers' intentions to engage in sustainable dining behavior through TPDF platforms. Emphasizing the moderating role of perceived social norms, this study examines how externally derived cues, social proof, authority, and liking, affect consumers' decision-making processes. These strategies reflect core principles of social influence, suggesting that individuals may be guided not only by personal values but also by their perceptions of others' behaviors and approvals when making sustainability-related choices.

As discussed in the previous chapter, Study 2 demonstrated that the social proof strategy significantly enhances consumers' behavioral intentions to choose sustainable restaurants through TPDF platforms, with PP functioning as a critical mediating mechanism. This finding aligns with prior research (Chen et al., 2023; Chang et al., 2023; Phoa et al., 2025), which similarly confirmed that social proof can effectively strengthen message persuasiveness and, in turn, increase sustainable consumer decision-making.

Unexpectedly, the authority and liking strategies exhibited significant negative direct effects on consumers' intentions to choose sustainable dining options after immediate exposure to persuasive messages. However, these effects were not observed in relation to more general pro-environmental behavioral intentions toward sustainable restaurants. These counterintuitive results raise important considerations for marketers and platform designers, suggesting that such strategies may be less effective or even detrimental. When applied to prompt, low-effort behavioral decisions in digital environments. One potential explanation lies in consumers' resistance to perceived manipulation (Amazeen, 2021; Appel, 2022), especially when the message source lacks credibility or when the persuasive tactic is seen as overly controlling or inauthentic (Shoenberger et al., 2021; Sui & Zhang, 2021). As such, practitioners should exercise caution when employing authority- or likability-based appeals in sustainability campaigns targeting short-term, reactive behaviors.

Despite theoretical expectations, this study did not find empirical support for the moderating role of SN in the relationship between external social influence-based persuasive strategies and PP. Based on the findings presented in Chapter 4, one plausible explanation is that social norms may operate more effectively as a direct predictor of

consumers' perceived persuasiveness and subsequently their behavioral intentions rather than as a conditional moderator shaping the influence of persuasive strategies (Kim et al., 2023).

#### **5.4. Discussion for Study 3**

Study 3 aimed to advance the understanding of pro-environmental behavioral intentions by proposing an integrative model that captures the cognitive, affective, and contextual dimensions influencing sustainable choices on TPFD platforms. By incorporating bio-altruistic and egoistic values, perceived persuasiveness, personal norms, social norms, and pro-environmental behavioral intention, the model offers a comprehensive perspective on the underlying mechanisms that drive consumers' environmentally conscious decision-making.

As discussed earlier, this study adopted perceived persuasiveness in place of attitude within the traditional Value–Attitude–Behavior framework. This adjustment was theoretically justified, as PP functions as a more proximal, message-level cognitive response, capturing individuals' immediate and context-bound evaluation of a persuasive message's effectiveness, particularly in digitally mediated, persuasion-driven environments (Baig et al., 2019). Guided by the foundational principles of the VAB model (Homer & Kahle, 1988), the results demonstrated that both bio-altruistic and egoistic values positively influenced consumers' perceived persuasiveness. In turn, PP significantly increased their behavioral intentions to choose sustainable restaurants via TPFD platforms. These findings align with previous research that employed VAB-based frameworks to explain pro-environmental behavior in various consumption contexts (Habib et al., 2023; Issock et al., 2023; Kim & Hall, 2021).

In addition to the role of PP, the results further confirmed that bio-altruistic values positively influenced PN, which in turn significantly predicted behavioral intention. This finding is consistent with the previous studies which identified moral obligations serve as powerful motivators for pro-environmental behavior (Kim & Seock, 2019). However, the hypothesized relationship between egoistic values and personal norms was not supported. This is likely because personal norms are rooted in moral obligation and social responsibility, which are theoretically inconsistent with self-centered motivations. As Stern (2000) notes, egoistic values are often incompatible with the formation of internalized pro-social norms, particularly in the context of environmental behaviors.

The dual influence of both altruistic and egoistic value orientations underscores the importance of value-congruent message framing. While bio-altruistic individuals are naturally receptive to sustainability messaging that reflects care for the environment and others, egoistic individuals may also be persuaded when messages highlight self-benefits, such as health, convenience, or cost savings. This suggests that sustainability campaigns delivered via digital platforms can strategically tailor message content to appeal to both motivational orientations.

Moreover, social norms emerged as a significant predictor of both personal norms and behavioral intention. These findings emphasize the strong role of external social influence in shaping sustainability-related decisions within the TPDF context. The impact of social norms suggests that perceptions of what others do or approve of can effectively guide individuals toward more sustainable behaviors, even when those decisions are made in low-effort digital environments. This aligns with and extends previous work highlighting the interplay between social influence and personal norm development (Kim

& Seock, 2019; Al Mamun et al., 2024; Zhu & Liu, 2025). Notably, it reinforces the importance of embedding descriptive or injunctive norm cues in persuasive messages to enhance both personal moral commitment and action.

Lastly, the results from multi-group analysis revealed no significant group differences, indicating that the overall pattern and strength of relationships among values, perceived persuasiveness, personal norms, social norms, and behavioral intention were statistically comparable across both conditions, using internal motivation-based strategy and external social influence-based strategy. This suggests that the underlying mechanisms driving sustainable behavioral intentions operate similarly, regardless of whether consumers are exposed to internally motivated (reciprocity-based) or externally social influenced (social proof-based) persuasive strategies. In addition, multigroup analyses based on demographic characteristics (i.e., gender, age, income, and visiting frequency) showed no significant differences across gender and income groups. However, significant group differences were found for age and visiting frequency. These findings indicate that while the general model holds across experimental conditions, certain value-path relationships may vary depending on specific demographic factors.

## **5.5. Implications**

### **5.5.1. Theoretical implications**

This dissertation offers several important theoretical contributions by integrating insights from Cognitive-Affective theory (Mischel & Shoda, 1995), Persuasion theories (Cialdini, 2007; Lavine, 1995; O’Keefe, 2009), and Dichotomy theory (Wilson, 1887) to better understand how consumers process persuasive sustainability messages within digital environments. Across three interrelated studies, this research systematically

explored the mechanisms through which different persuasive strategies shape consumers' sustainable restaurant choices when using third-party food delivery (TPFD) platforms. Currently, there is no prior research that has jointly applied these three theoretical lenses to the TPFD context, making this an original contribution to both sustainability and persuasive communication literatures.

First of all, guided by the theoretical perspectives of persuasion and dichotomy, this dissertation first categorizes persuasive strategies into two broad types: internally individual motivated strategies (e.g., reciprocity, commitment and consistency, and scarcity) and externally social influenced strategies (e.g., social proof, authority, and liking). The first two experimental studies examined how each category influences PP and subsequent behavioral intentions. Findings revealed that both reciprocity and social proof significantly enhanced PP, which in turn positively influenced consumers' intentions to select sustainable restaurant options. These results lend empirical support to Persuasion theories, particularly the principle that persuasive appeals are more effective when they are aligned with normative or motivational cues that resonate with the target audience (Cialdini, 2007). The significant mediating role of offers provides strong empirical support for Cognitive-Affective Theory, which emphasizes the dynamic interplay between cognitive evaluations and emotional responses in shaping behavioral outcomes. In this context, persuasive messages about sustainable restaurant choices via TPFD platforms likely engage consumers' evaluative processes, such as how relevant, credible, or meaningful they perceive the information to be. These messages simultaneously evoke affective responses that align with consumers' personal values and environmental concerns. Within this process, PP functions as a mediating mechanism, reflecting

consumers' overall evaluation of how compelling or convincing the message appears. This dynamic supports the premise of Cognitive-Affective Theory, which posits that decision-making emerges from an integrated processing of both cognitive appraisals and emotional reactions, rather than from a purely rational or affective response alone. The findings of this study align with the framework's assertion that external stimuli, such as persuasive messages, are interpreted through a fusion of cognitive and affective channels, which collectively shape behavioral intentions. (Dillard & Seo, 2013; Forgas & Eich, 2012; Mischel & Shoda, 1995). This study is the first to identify and empirically test and compare the effects of both internal individual motivated-based and external social influence-based persuasive strategies within a sustainable consumption context on TPDF platforms, addressing a gap in prior message-effectiveness research.

Unexpectedly, four traditionally effective persuasive strategies from the persuasion theory (Cialdini, 2007): commitment and consistency, scarcity, authority, and liking, exhibited direct negative effects on behavioral intention. This challenges foundational assumptions in the persuasion literature and underscores the importance of contextual sensitivity in message effectiveness. In low-effort, goal-oriented environments such as food delivery apps, these strategies may be perceived as coercive, disingenuous, or intrusive, thereby reducing their persuasive impact (Amazeen, 2021; Appel, 2022). These findings suggest that persuasion models may not universally apply across all media and call for deeper investigation into psychological reactance, user resistance, and message-context congruence in digital environments. Besides, this study contributes to the literature by revealing the boundary conditions under which canonical persuasive

strategies may backfire, a topic that has received limited empirical attention in digital food service contexts.

Secondly, Study 3 extended and modified the traditional VAB framework by substituting attitude with perceived persuasiveness, resulting in a more context-appropriate model for explaining sustainable consumer behavior in digital service environments. Although both PP and attitude involve evaluative judgments, they are conceptually distinct. Attitude typically refers to an individual's stable orientation toward an object or behavior, while PP reflects a participant's evaluation of how convincing or effective a message appears. As demonstrated by Rosaen et al. (2019), PP and attitude can operate as separate constructs. Further empirical support for this distinction is provided by Thomas et al. (2019), who developed and validated a multidimensional scale specifically for perceived persuasiveness. Their findings affirm that PP is a unique, multi-faceted construct that warrants separate theoretical and empirical treatment from attitude. This substitution enhances the explanatory power of the VAB model in contexts where message appraisal occurs in real time and may influence intention even before stable attitudes are formed or changed. The traditional VAB models conceptualize attitude as a relatively stable evaluative disposition (Homer & Kahle, 1988). However, in short-term, message-driven contexts like TPDF platforms, PP captures a more immediate and dynamic response to persuasive stimuli. This theoretical extension provides a more nuanced and temporally relevant framework for modeling behavior in fast-paced, situationally reactive settings. Additionally, there is no previous studies proposed substituting attitude with PP in a VAB framework to model digital consumer decision-making, marking a novel theoretical extension.

Finally, this study offers a novel perspective for understanding the comparative effects of different persuasive strategies and demographic characteristics. Although reciprocity and social proof are grounded in different motivational sources, internal versus external, the multi-group analysis in Study 3 revealed no significant differences in how these strategies influence the overall framework, as well as most demographic groups. This suggests that, despite their conceptual distinctions, both strategies operate through a common underlying mechanism and produce comparable outcomes in terms of influencing sustainable behavior. Consequently, theoretical models of persuasion might benefit from placing less emphasis on the motivational source and instead focusing on how effectively a message aligns with the user's cognitive state, situational expectations, and platform context. This multi-group comparison between two theoretically distinct strategies within a structural model represents a first attempt to empirically assess convergence in persuasive mechanisms under a unified framework.

### **5.5.2. Practical implications**

The findings across the three studies yield clear and actionable implications for practitioners seeking to encourage sustainable consumer behavior on digital platforms, particularly within third-party food delivery (TPFD) services.

First and foremost, the results consistently support the effectiveness of reciprocity and social proof as persuasive strategies. These approaches not only enhance PP but also lead to stronger behavioral intentions, offering valuable tools for sustainability-oriented campaigns. For instance, highlighting eco-reward incentives, displaying the number of users who have selected eco-friendly options, or showcasing positive reviews that emphasize sustainability can encourage consumers to make more environmentally

responsible choices without resorting to moral pressure or overtly didactic messaging (Huang et al., 2023; Stokkink & Pouwelse, 2024). However, these findings should be interpreted with caution given the specific sample (U.S.-based, non-vegan consumers with recent TPFD experience) and platform-focused context.

Second, the findings caution against uncritical reliance on traditional persuasive techniques such as commitment, scarcity, authority, and liking within the TPFD context. While these strategies have demonstrated success in other domains (Cremer & Loebbecke, 2021; Halttu & Oinas-Kukkonen, 2022; Isenberg & Brauer, 2022; Spasova, 2022), they were found in this study to exert direct negative effects on behavioral intention. In fast-paced, convenience-driven environments, such appeals may be perceived as manipulative, excessive, or mismatched with user expectations, ultimately undermining their persuasive impact. It is therefore critical for practitioners to assess the fit between message tone and platform context and to apply such strategies with discretion, especially when there is a risk of triggering consumer resistance or skepticism. For example, overemphasizing scarcity with messages like *“Hurry! Only 3 sustainable restaurants are available for ordering dinner today. Get it before it’s gone!”* may come across as pressure-driven and reduce user trust. Similarly, authority-based appeals that highlight endorsements from unnamed “experts” or excessive emphasis on commitment-based language like *“Stay committed to your health and the planet!”* may feel intrusive in a setting where consumers are seeking quick, low-effort decisions. To mitigate this, practitioners should prioritize transparency and specificity in authority claims, for example, practitioners should reference named organizations or certifications to enhance the credibility of sourcing. Even liking-based strategies, such as *“Four people in your*

*area ordered from sustainable restaurants today. Join them!*” may feel disingenuous if not clearly tied to authentic sustainability experiences. To enhance credibility and impact, such appeals should be grounded in user-generated content or verified customer feedback, showcasing authentic sustainable choices made by local users. For instance, platforms could introduce an interactive feature (pending users' permission) that enables consumers to view recent sustainable restaurant orders placed by their neighbors or friends, and to share their own experiences with these establishments.

Third, the structural model in Study 3 emphasizes the importance of value-congruent messaging. Notably, both bio-altruistic values and egoistic values were shown to significantly enhance PP, and EV further contributed to the formation of PN. While traditionally framed as contrasting motivational drivers, this study demonstrates that both BV and EV can effectively lead to sustainable behavioral intentions when messages are framed appropriately, whether emphasizing collective environmental benefits or personal advantages. Sustainability communication efforts should, therefore, aim to engage a range of value orientations rather than relying solely on altruistic appeals. For example, messages might highlight environmental outcomes such as reduced carbon emissions or improved social equity (Allen, 2016; Davari & Strutton, 2014), while also incorporating self-interest messaging such as cost savings, convenience, or health benefits. Specifically, for altruistically oriented consumers, messages can emphasize collective environmental and social benefits, using appeals tap into moral responsibility, empathy, and social justice, such as *“support restaurants that protect our planet”* or *“every sustainable order helps cut carbon emissions”*. For egoistically oriented consumers, messages should

highlight personal benefits, which align sustainability with self-interest and individual rewards, such as “*Get a \$5 off your first order from sustainable restaurants!*”.

Additionally, because PN was found to strongly predict behavioral intention, TPDF application designers could consider integrating personalized sustainability dashboards that visualize users’ cumulative environmental contributions, reinforcing internalized moral norms through feedback loops (Jang & Kim, 2023). These features may help consumers see themselves as consistent moral actors, which in turn encourages sustained pro-environmental choices. Lastly, given the strong positive influence of SN on both PN and behavioral intention, platforms are encouraged to leverage social proof mechanisms, such as sustainability-focused reviews, or interactive features that allow users to publicly signal their eco-friendly decisions, such as badges, leaderboards, or shareable achievements (Hynes & Wilson, 2016). These tools can foster a sense of social participation and normative alignment, further amplifying the behavioral impact of persuasive sustainability messaging.

Moreover, the multigroup analysis offers valuable insights into tailoring persuasive strategies in the promotion of sustainable restaurants. While most demographic groups did not exhibit significant differences, age and visiting frequency emerged as key factors influencing how consumers respond to value-based persuasion. Thus, application platforms were suggested to incorporate personalization features based on age segments within user profiles (Anisimova & Vrontis, 2024). Sustainable restaurant options could be promoted through framed messages that emphasize personal benefits, such as health advantages and cost savings. For example, a message of “*heart-healthy foods made with local ingredients*” could promote to consumers aged over 40 to

emphasize personal health benefits. Additionally, platforms should consider targeting high-frequency users with altruistic appeals (Shin et al., 2017), such as messages centered on social and environmental responsibility, and enhance the visibility and accessibility of sustainability-related information and knowledge. For instance, platforms can use messages such as *“Thank you for your contribution! You have already helped save [a certain number] lbs of CO<sub>2</sub>”*.

Finally, at present, there is not a universally recognized standard for identifying a sustainable restaurant, especially within TPFD platforms. Public agencies could close this gap by formulating clear, transparent criteria that spell out the environmental, social, and governance practices a restaurant must meet to earn sustainable status. Once these criteria are in place, third party platforms should embed an easy-to-see badge or create a score system, and consumers can recognize certified sustainable restaurants at a glance. As mentioned by Erdem (2022), useful food labeling in restaurants nudged consumers’ food choices. Prominent labelling not only streamlines consumer choice but also creates a competitive incentive for restaurants to improve their practices. Besides, to encourage broad participation, regulators and platforms should jointly promote the scheme and keep the application process straightforward, minimizing administrative burdens for operators who wish to be recognized as sustainable as suggested by previous studies in related fields (Elhoushy et al., 2025; Permatasari & Gunawan, 2023; Zhu et al., 2024).

## **5.6. Limitations and future studies**

Although this study offers meaningful contributions to understanding consumers’ sustainable purchasing intentions and addresses a critical gap concerning the application of innovative technologies in the restaurant sector, it is not without limitations.

First, the sample was limited to individuals who identified as non-vegan and had used food delivery services within the past three months. While this criterion ensured the relevance of participants to the research context, it may also limit the generalizability of the findings to wider consumer populations, including those with alternative dietary preferences or lower levels of engagement with food delivery platforms. Future research could broaden the scope by including more diverse demographic and behavioral profiles, such as vegetarians, vegans, or infrequent users of third-party food delivery services, to determine whether persuasive strategies yield similar effects across consumer subgroups. Besides, the data were collected solely from participants residing in the United States within an English-speaking cultural context. Cultural norms, communication preferences, and values surrounding sustainability can vary significantly across regions. Therefore, future studies should consider cross-cultural comparisons to better understand how cultural contexts shape consumers' responses to different types of persuasive strategies in promoting sustainable food choices.

Second, this study focused exclusively on consumers' behavioral intentions rather than their actual purchasing behaviors. While intentions are valuable predictors, they may not always translate into real-world actions. Future research should adopt longitudinal designs or employ real-time behavioral tracking methods, such as app usage data, purchase history, or real-time tracking, to capture more accurate and ecologically valid insights into sustainable consumer behavior over time.

Third, although the behavioral intention construct was informed by prior literature, it was assessed using a single-item measure consumers' behavioral intentions after reading the persuasive messages immediately. Relying on a single-item measure limits

the ability to evaluate the construct's internal consistency and may compromise both reliability and validity. Future research incorporating this construct should consider developing or adapting multi-item scales to capture a broader range of behavioral intentions. Expanding the measurement scale would allow for more robust psychometric evaluation and enhance the precision and credibility of the findings.

Lastly, although this study proposed a comprehensive framework for understanding consumers' sustainable restaurant selection behaviors within the context of digital food delivery services, several potentially influential variables were not incorporated. Factors such as perceived time pressure, decision fatigue, and the ease of interaction with mobile applications may also play a critical role in shaping consumer behavior. Future research should consider integrating these contextual and technological dimensions to further enhance the explanatory power of the model and capture the complexity of real-world decision-making processes in digital environments.

## **5.7. Summary**

In summary, Chapter 5 discusses the implications of three studies examining how persuasive strategies influence consumers' sustainable restaurant choices through TPDF platforms. Drawing from persuasion theory, CAT, and the VAB framework, this research explored both internal motivation-based and external social influence-based strategies.

While the findings confirmed the effectiveness of reciprocity and social proof, they also revealed unexpected negative effects from traditionally effective strategies such as commitment, scarcity, authority, and liking. These outcomes underscore the importance of contextual sensitivity, particularly in low-effort digital environments, where certain appeals may be perceived as manipulative or mismatched with user expectations.

Theoretical models of persuasion must therefore consider message-platform congruence and the potential for psychological reactance.

A key theoretical contribution is the substitution of PP for attitude in the VAB model. This adjustment captures more immediate, message-level evaluations and better reflects user responses in fast-paced, digitally mediated contexts. Additionally, the study provides novel insights into the converging effects of distinct persuasive strategies, suggesting that message alignment with users' cognitive and contextual states may matter more than the motivational source.

Practically, this research advises digital marketers and TPFD platforms to emphasize transparent, user-centered messaging, grounded in value congruence. Platforms should tailor messages to appeal to both altruistic and egoistic values, and highlight environmental benefits for socially driven users and personal gains for self-focused consumers. Features such as eco-reward incentives, verified user reviews, and interactive sustainability dashboards can further enhance persuasive impact by reinforcing social norms and internalized moral commitments.

Lastly, the chapter identifies several directions for future research, including expanding to diverse populations, measuring actual behaviors, improving construct reliability, and integrating real-world decision-making factors such as time pressure and digital interface design.

# APPENDIX

## A. IRB approval



**Institutional Review Board**  
**University of Missouri-Columbia**  
FWA Number: 00002876  
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January 11, 2022

Principal Investigator: Qianni Zhu  
Department: Applied Soc Sci

Your Exempt Amendment Form v.2 to project entitled UNDERSTANDING CHALLENGES FACED BY FEMALE EMPLOYEES IN U.S. FOODSERVICE OPERATIONS was reviewed and approved by the MU Institutional Review Board according to the terms and conditions described below:

IRB Project Number	2060022
IRB Review Number	337824
Initial Application Approval Date	July 22, 2021
Approval Date of this Review	January 11, 2022
IRB Expiration Date	July 22, 2022
Level of Review	Exempt
Project Status	Active - Exempt
Risk Level	Minimal Risk
HIPAA Category	No HIPAA
Approved Documents	Adjusted 1/7 Adjusted the gift card amount interview questions

The principal investigator (PI) is responsible for all aspects and conduct of this study. The PI must comply with the following conditions of the approval:

- No subjects may be involved in any study procedure prior to the IRB approval date or after the expiration date.
  - All changes must be IRB approved prior to implementation utilizing the Exempt Amendment Form.
  - Major noncompliance deviations must be reported to the MU IRB on the Event Report within 5 business days of the research team becoming aware of the deviation. Major deviations result when research activities may affect the research subject's rights, safety, and/or welfare, or may have had the potential to impact even if no actual harm occurred. Please refer to the MU IRB Noncompliance policy for additional details.
  - The Annual Exempt Form must be submitted to the IRB for review and approval at least 30 days prior to the project expiration date to keep the study active or to close it.
  - Maintain all research records for a period of seven years from the project completion date.
- If you are offering subject payments and would like more information about research participant payments, please click here to view the MU Business Policy and Procedure: [http://bppm.missouri.edu/chapter2/2\\_250.html](http://bppm.missouri.edu/chapter2/2_250.html)

If you have any questions or concerns, please contact the MU IRB Office at 573-882-3181 or email to [muresearchirb@missouri.edu](mailto:muresearchirb@missouri.edu).

Thank you,  
MU Institutional Review Board

## B. Study Instrument

### Section 1. Screening Questions.

1. Are you over 19 years old?
2. Do you live in the U.S.?
3. Have you ordered food products through a third-party delivery application in the past three months? (e.g., Uber Eats, DoorDash, Grubhub, Zomato, FoodPanda, etc.)
4. Not Vegetarian?

### Section 2. Definition of sustainable restaurants

Sustainable restaurants are those that take actions to minimize their negative impact on the environment by implementing green practices such as recycling, utilizing renewable energy, responsibly disposing of waste, reducing food waste, and serving organic foods.

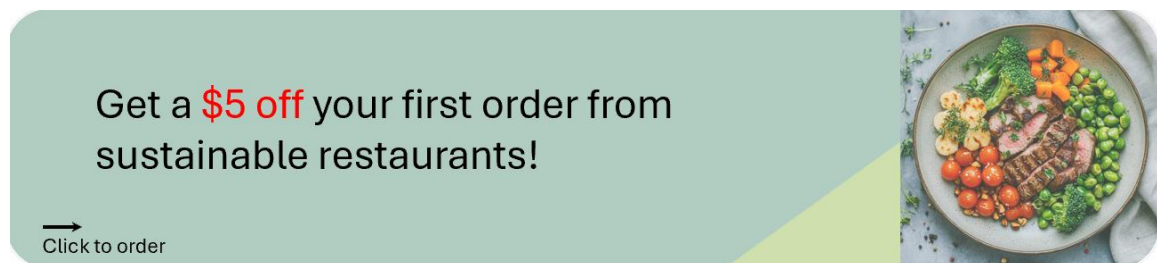
### Section 3. Experiment Scenario for Study 1 and Study 2.

Imagine you are about to order food for dinner through a third-party delivery app that you frequently use (e.g., Uber Eats, DoorDash, Grubhub, Zomato, FoodPanda, etc.). When you open the app, you are presented with the information below from your favorite restaurant. Please read it carefully and answer the following questions.

### Section 4. Experiment Stimuli Example.

#### *Internal Individual Motivation Category:*

##### A. Reciprocity



##### B. Commitment and consistency



##### C. Scarcity

Hurry! **Only 3** sustainable restaurants are available for ordering dinner today. Get it before it's gone!

→  
Click to order

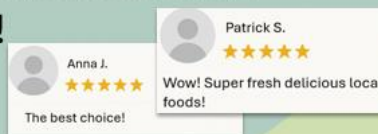


**External Social Influence Category:**

A. Social proof

Based on recent orders, **97.2%** of our customers have chosen sustainable restaurants for dinner!

→  
Click to order



B. Authority

**Expert-recommended:** Dietitians agree foods from sustainable restaurants are the best choice for your health and the planet.

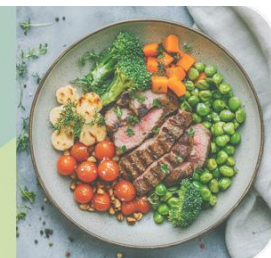
→  
Click to order



C. Liking

**Four people in your area** ordered from sustainable restaurants today. Join them!

→  
Click to order



**Control Group:**

View available restaurants.

→  
Click to order





- C. 31-40
  - D. 41-50
  - E. 50 and more
3. What is your ethnicity?
- A. Caucasian
  - B. American Indian/Native American
  - C. Black/African American
  - D. Hispanic/Spanish American
  - E. Asian/Pacific Islander
  - F. Other: \_\_\_\_\_
4. What is the highest level of your education?
- A. High school diploma or less
  - B. Two-year college degree (Associate)
  - C. Four-year college degree (Bachelor)
  - D. Postgraduate studies
  - E. Professional degree
  - F. Other (please specify) \_\_\_\_\_
5. Attention check: Please select 'Strongly disagree'
- A. Strongly agree
  - B. Agree
  - C. Neutral
  - D. Disagree
  - E. Strongly disagree
6. What is your annual income level?
- A. Less than \$10,000
  - B. \$10,000 – \$20,000
  - C. \$20,001 – \$40,000
  - D. \$40,001 – \$60,000
  - E. \$60,001 – \$80,000
  - F. \$80,001 – \$100,000

G. \$100,001 or over

7. How frequently do you order food products via third-party food delivery applications on average (e.g., Uber Eats, DoorDash, Grubhub, Zomato, FoodPanda, etc.)?

A. More than 5 times a **week**

B. 3-5 times a **week**

C. 1-2 times a **week**

D. 2-3 times a **month**

E. Once a **month** or less

F. Other (please specify) \_\_\_\_\_

8. Which food delivery apps have you used before? (Select all that apply):

A. Uber Eats

B. DoorDash

C. Grubhub

D. Zomato

E. FoodPanda

F. Other (please specify) \_\_\_\_\_

9. How confident are you in navigating food delivery apps?

A. Not confident at all

B. Slightly confident

C. Somewhat confident

D. Very confident

E. Extremely confident

10. How would you describe your familiarity with using food delivery applications (e.g., Uber Eats, DoorDash, Grubhub, Zomato, FoodPanda, etc.)?

A. **Novice**: I am new to food delivery applications and have little to no experience using them.

B. **Beginner**: I have used food delivery applications occasionally but am not very familiar with all their features.

C. **Familiar**: I use food delivery applications somewhat regularly and feel comfortable navigating them.

D. **Experienced**: I use food delivery applications frequently and am confident in using most of their features.

E. *Expert*: I use food delivery applications extensively and am highly knowledgeable about their functionality and features.

## Section 6. Manipulation Checklist

The manipulation check consists of two components and is designed to verify both the validity of the treatment principles and the clarity of the wording. The first component focuses on verifying that the wording of the treatment is clear and easily understandable to participants, ensuring accurate interpretation and engagement. The second component, based on the study by Parsons et al. (2019), aims to ensure that the intended influence principles effectively impact participants as anticipated.

### Sector 1

#### *Internal Individual Motivation Category:*

##### Reciprocity

M1\_1: Please indicate your level of agreement with the statement: In the scenario presented, I understand that I would receive a \$5 off if I ordered foods via the delivery application from sustainable restaurants.

1	2	3	4	5	6	7
Strongly disagree			Neutral	Strongly agree		

M1\_2: Please indicate your level of agreement with the statement: In the scenario presented, I understand that by clicking the arrow button, I will order foods via the delivery application from sustainable restaurants.

1	2	3	4	5	6	7
Strongly disagree			Neutral	Strongly agree		

M2: Please evaluate how realistic the notification message from a delivery application is:

1	2	3	4	5	6	7
Highly unrealistic			Neutral	Highly realistic		

##### Commitment and consistency

M1\_1: Please indicate your level of agreement with the statement: In the scenario presented, I understand that I would like to order foods via the delivery application from sustainable restaurants because it aligns with my health commitment.

1	2	3	4	5	6	7
Strongly disagree			Neutral	Strongly agree		

M1\_2: Please indicate your level of agreement with the statement: In the scenario presented, I understand that by clicking the arrow button, I will order foods via the delivery application from sustainable restaurants.







G. No strategy applied

## REFERENCES

- Ahmad, S. (2020). Political behavior in virtual environment: Role of social media intensity, internet connectivity, and political affiliation in online political persuasion among university students. *Journal of Human Behavior in the Social Environment, 30*(4), 457-473.
- Ahmad, R., Terzis, S., & Renaud, K. (2023, July). Content analysis of persuasion principles in mobile instant message phishing. In *International Symposium on Human Aspects of Information Security and Assurance* (pp. 324-336). Cham: Springer Nature Switzerland.
- Al Mamun, A., Ma, Y., Reza, M. N. H., Ahmad, J., Wan, H. W. M. H., & Lili, Z. (2024). Predicting attitude and intention to reduce food waste using the environmental values-beliefs-norms model and the theory of planned behavior. *Food Quality and Preference, 120*, 105247.
- Alae-Carew, C., Green, R., Stewart, C., Cook, B., Dangour, A. D., & Scheelbeek, P. F. (2022). The role of plant-based alternative foods in sustainable and healthy food systems: Consumption trends in the UK. *Science of the Total Environment, 807*, 151041.
- AlAmmar, W. A., Albeesh, F. H., & Khattab, R. Y. (2020). Food and mood: The corresponsive effect. *Current nutrition reports, 9*(3), 296-308.
- Ali, S., Khalid, N., Javed, H. M. U., & Islam, D. M. Z. (2020). Consumer adoption of online food delivery ordering (OFDO) services in Pakistan: The impact of the COVID-19 pandemic situation. *Journal of Open Innovation: Technology, Market, and Complexity, 7*(1), 10.

- Allen, M. (2016). Understanding pro-environmental behavior: Models and messages. In *Strategic communication for sustainable organizations: Theory and practice* (pp. 105-137). Cham: Springer International Publishing.
- Ajzen, I. (1991). The Theory of planned behavior. *Organizational Behavior and Human Decision Processes*.
- Amazeen, M. A. (2021). Resisting covert persuasion in digital news: Comparing inoculation and reactance in the processing of native advertising disclosures and in article engagement intentions. *Journalism & Mass Communication Quarterly*, 98(4), 1129-1156.
- Anisimova, T., & Vrontis, D. (2024). The food you can trust: the moderating role of age in the relationship between consumer values and organic food trust. *Journal of Business Research*, 182, 114803.
- Appel, M. (2022). Affective resistance to narrative persuasion. *Journal of Business Research*, 149, 850-859.
- Ayay-Arista, G., Estrada-Araoz, E. G., Herrera, M. J. R., Santos, R. C., Florindes, J. A. M., Chugden, J. W. C., ... & Guevara, R. C. (2024). A look at the link between bio-altruistic values and pro-environmental attitude in university students. *Heritage and Sustainable Development*, 6(2), 545-556.
- Azzurra, A., Massimiliano, A., & Angela, M. (2019). Measuring sustainable food consumption: A case study on organic food. *Sustainable production and consumption*, 17, 95-107.

- Baig, S. A., Noar, S. M., Gottfredson, N. C., Boynton, M. H., Ribisl, K. M., & Brewer, N. T. (2019). UNC perceived message effectiveness: validation of a brief scale. *Annals of Behavioral Medicine, 53*(8), 732-742.
- Black, J., & Sarno, D. M. (2023, September). The Influence of Time Pressure and Persuasion Principles on Phishing Detection. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 67, No. 1, pp. 1977-1982). Sage CA: Los Angeles, CA: SAGE Publications.
- Brishti, F. H., Chay, S. Y., Muhammad, K., Ismail-Fitry, M. R., Zarei, M., & Saari, N. (2021). Texturized mung bean protein as a sustainable food source: Effects of extrusion on its physical, textural and protein quality. *Innovative Food Science & Emerging Technologies, 67*, 102591.
- Bryant, C. J. (2022). Plant-based animal product alternatives are healthier and more environmentally sustainable than animal products. *Future Foods, 6*, 100174.
- Cameron, K. A. (2009). A practitioner's guide to persuasion: An overview of 15 selected persuasion theories, models and frameworks. *Patient education and counseling, 74*(3), 309-317.
- Caputo, F., Sepe, F., Di Taranto, E., & Fiano, F. (2024). Human–technology dichotomy in shaping management history. *Journal of Management History, 30*(2), 147-165.
- Cao, J., Qiu, H., & Morrison, A. M. (2023). Self-identity matters: an extended theory of planned behavior to decode tourists' waste sorting intentions. *International Journal of Environmental Research and Public Health, 20*(6), 5099.
- Cialdini, R. B., & Cialdini, R. B. (2007). *Influence: The psychology of persuasion* (Vol. 55, p. 339). New York: Collins.

- Cialdini, R. B., & Jacobson, R. P. (2021). Influences of social norms on climate change-related behaviors. *Current Opinion in Behavioral Sciences*, 42, 1-8.
- Chan, H. L., Cheung, T. T., Choi, T. M., & Sheu, J. B. (2023). Sustainable successes in third-party food delivery operations in the digital platform era. *Annals of operations research*, 1-37.
- Chang, H. P., Ma, C. C., & Chen, H. S. (2020). The impacts of young consumers' health values on functional beverages purchase intentions. *International journal of environmental research and public health*, 17(10), 3479.
- Chang, H. H., Lu, Y. Y., & Li, P. R. (2023). The Yale model of green message sharing and environmental consciousness on social media platforms. *Online Information Review*, 47(2), 333-355.
- Chen, S., Jiang, W., Li, X., & Gao, H. (2021). Effect of employees' perceived green HRM on their workplace green behaviors in oil and mining industries: Based on cognitive-affective system theory. *International Journal of Environmental Research and Public Health*, 18(8), 4056.
- Chen, C., Zhang, D., Zhang, F., & Zhang, F. (2023). The interaction effect of online composite reviews and time pressure on information persuasiveness: A heuristic-systematic perspective. *Electronic Commerce Research and Applications*, 59, 101269.
- Chen, Y. S., & Chang, C. H. (2012). Enhance green purchase intentions: The roles of green perceived value, green perceived risk, and green trust. *Management decision*, 50(3), 502-520.

- Cozzio, C., Volgger, M., Taplin, R., & Woodside, A. G. (2020). Nurturing tourists' ethical food consumption: Testing the persuasive strengths of alternative messages in a natural hotel setting. *Journal of Business Research*, 117, 268-279.
- Cremer, S., & Loebbecke, C. (2021). Selling goods on e-commerce platforms: The impact of scarcity messages. *Electronic Commerce Research and Applications*, 47, 101039.
- Dabiriyani Tehrani, H., & Yamini, S. (2022). Gender differences concerning the horizontal and vertical individualism and collectivism: A meta-analysis. *Psychological Studies*, 67(1), 11-27.
- Dascal, M. (2008). Dichotomies and types of debate. *Controversy and confrontation: Relating controversy analysis with argumentation theory*.
- da Silva, J. M., Rodrigues, M. B., de Paula Matos, J., Mais, L. A., Martins, A. P. B., Claro, R. M., & Horta, P. M. (2021). Use of persuasive strategies in food advertising on television and on social media in Brazil. *Preventive Medicine Reports*, 24, 101520.
- Davari, A., & Strutton, D. (2014). Marketing mix strategies for closing the gap between green consumers' pro-environmental beliefs and behaviors. *Journal of Strategic Marketing*, 22(7), 563-586.
- Dean, L., Churchill, B., & Ruppner, L. (2022). The mental load: Building a deeper theoretical understanding of how cognitive and emotional labor over load women and mothers. *Community, work & family*, 25(1), 13-29.

- Dean, M., Raats, M. M., & Shepherd, R. (2012). The role of self-identity, past behavior, and their interaction in predicting intention to purchase fresh and processed organic food 1. *Journal of applied social psychology, 42*(3), 669-688.
- De Groot, J. I., Bondy, K., & Schuitema, G. (2021). Listen to others or yourself? The role of personal norms on the effectiveness of social norm interventions to change pro-environmental behavior. *Journal of Environmental Psychology, 78*, 101688.
- De Groot, J. I., & Steg, L. (2007). Value orientations and environmental beliefs in five countries: Validity of an instrument to measure egoistic, altruistic and biospheric value orientations. *Journal of cross-cultural psychology, 38*(3), 318-332.
- De Groot, J. I., & Steg, L. (2008). Value orientations to explain beliefs related to environmental significant behavior: How to measure egoistic, altruistic, and biospheric value orientations. *Environment and behavior, 40*(3), 330-354.
- De Groot, J. I., & Steg, L. (2009). Morality and prosocial behavior: The role of awareness, responsibility, and norms in the norm activation model. *The Journal of social psychology, 149*(4), 425-449.
- De Groot, J. I., & Steg, L. (2010). Relationships between value orientations, self-determined motivational types and pro-environmental behavioural intentions. *Journal of Environmental Psychology, 30*(4), 368-378.
- Demir, T., & Nyhan, R. C. (2008). The politics–administration dichotomy: An empirical search for correspondence between theory and practice. *Public Administration Review, 68*(1), 81-96.

- Dempsey, R. C., McAlaney, J., & Bewick, B. M. (2018). A critical appraisal of the social norms approach as an interventional strategy for health-related behavior and attitude change. *Frontiers in psychology, 9*, 2180.
- Dermody, Janine; Hanmer-Lloyd, Stuart; Koenig-Lewis, Nicole; Zhao, Anita Lifan (2015). *Advancing sustainable consumption in the UK and China: the mediating effect of pro-environmental self-identity. Journal of Marketing Management, 31(13-14), 1472–1502.* doi:10.1080/0267257X.2015.1061039
- de Souza, T. S. P., Miyahira, R. F., Matheus, J. R. V., de Brito Nogueira, T. B., Maragoni-Santos, C., Barros, F. F. C., ... & Fai, A. E. C. (2022). Food services in times of uncertainty: Remodeling operations, changing trends, and looking into perspectives after the COVID-19 pandemic. *Trends in Food Science & Technology, 120*, 301-307.
- DeVille, N. V., Tomasso, L. P., Stoddard, O. P., Wilt, G. E., Horton, T. H., Wolf, K. L., ... & James, P. (2021). Time spent in nature is associated with increased pro-environmental attitudes and behaviors. *International journal of environmental research and public health, 18(14)*, 7498.
- De Vries, P. W., Oinas-Kukkonen, H., Siemons, L., Beerlage-de Jong, N., & van Gemert-Pijnen, L. (Eds.). (2017). *Persuasive Technology: Development and Implementation of Personalized Technologies to Change Attitudes and Behaviors: 12th International Conference, PERSUASIVE 2017, Amsterdam, The Netherlands, April 4–6, 2017, Proceedings* (Vol. 10171). Springer.
- Dillard, J. P., & Seo, K. (2013). Affect and persuasion. *The SAGE handbook of persuasion: Developments in theory and practice*, 150-166.

- Dillard, J. P., & Shen, L. (2005). On the nature of reactance and its role in persuasive health communication. *Communication monographs*, 72(2), 144-168.
- Dingess, A., & Wilt, J. (2020). Cognitive-Affective Processing System (CAPS). *The Wiley Encyclopedia of Personality and Individual Differences: Models and Theories*, 129-133.
- Dirsehan, T., & Cankat, E. (2021). Role of mobile food-ordering applications in developing restaurants' brand satisfaction and loyalty in the pandemic period. *Journal of Retailing and Consumer Services*, 62, 102608.
- DoorDash. (2024). 2024 *Restaurant and Alcohol Online Ordering Trends*. Retrieved from: <https://get.doordash.com/en-us/resources/restaurant-online-ordering-trends>
- Dragomir, G. M., Fărcașiu, M. A., & Șimon, S. (2021). Students' perceptions of verbal and non-verbal communication behaviors during and after the COVID-19 pandemic. *Applied Sciences*, 11(18), 8282.
- Druckman, J. N. (2022). A framework for the study of persuasion. *Annual Review of Political Science*, 25(1), 65-88.
- Du, Z., Fan, Z. P., & Chen, Z. (2023). Implications of on-time delivery service with compensation for an online food delivery platform and a restaurant. *International Journal of Production Economics*, 262, 108896.
- Dubov, A. (2015). Ethical persuasion: the rhetoric of communication in critical care. *Journal of evaluation in clinical practice*, 21(3), 496-502.
- Eaton, M., Firth, J., & Sarris, J. (2020). Nutrition and Mental Health—How the Food We Eat Can Affect Our Mood. *Frontiers in Young Minds*, 8, 115.

- Elhoushy, S., Elzek, Y., & Font, X. (2025). Sustainable tourism certification: a systematic literature review and suggested ways forward. *Journal of Sustainable Tourism*, 1-27.
- Elster, J. (2020). Social norms and economic theory. In *Handbook of monetary policy* (pp. 117-133). Routledge.
- Encyclopædia Britannica. (2024). *Dichotomy*, Encyclopædia Britannica. Retrieved November 7, 2024, from <https://www.britannica.com/science/dichotomy>
- Erdem, S. (2022). Investigating the effect of restaurant menu labelling on consumer food choices using a field experiment. *British Food Journal*, 124(11), 3447-3467.
- Farrow, K., Grolleau, G., & Ibanez, L. (2017). Social norms and pro-environmental behavior: A review of the evidence. *Ecological Economics*, 140, 1-13.
- Farrukh, M., Raza, A., & Rafiq, M. (2023). Environmentally specific authentic leadership and team green creative behavior based on cognitive-affective path systems. *International Journal of Contemporary Hospitality Management*, 35(10), 3662-3680.
- Fazio, R. H. (2007). Attitudes as object–evaluation associations of varying strength. *Social cognition*, 25(5), 603-637.
- Fazio, R. H. (2014). Attitudes as object-evaluation associations: Determinants, consequences, and correlates of attitude accessibility. In *Attitude strength* (pp. 247-282). Psychology Press.
- Fekadu, Z., & Kraft, P. (2001). Self-identity in planned behavior perspective: Past behavior and its moderating effects on self-identity-intention relations. *Social Behavior and Personality: an international journal*, 29(7), 671-685.

- Ferreira, A., & Teles, S. (2019). Persuasion: How phishing emails can influence users and bypass security measures. *International Journal of Human-Computer Studies*, 125, 19-31.
- Firth, J., Gangwisch, J. E., Borsini, A., Wootton, R. E., & Mayer, E. A. (2020). Food and mood: how do diet and nutrition affect mental wellbeing?. *bmj*, 369.
- Fong, K. C. H., Au, C. H., Lam, E. T. H., & Chiu, D. K. (2020). Social network services for academic libraries: A study based on social capital and social proof. *The Journal of Academic Librarianship*, 46(1), 102091.
- Forgas, J. P., & Eich, E. (2012). Affective influences on cognition: Mood congruence, mood dependence, and mood effects on processing strategies. *Handbook of Psychology, Second Edition*, 4.
- Franklin, L. (2011). Dichotomy and Platonic diairesis. *History of Philosophy Quarterly*, 28(1), 1-20.
- Fukase, E., & Martin, W. (2020). Economic growth, convergence, and world food demand and supply. *World Development*, 132, 104954.
- Galanakis, C. M., Rizou, M., Aldawoud, T. M., Ucak, I., & Rowan, N. J. (2021). Innovations and technology disruptions in the food sector within the COVID-19 pandemic and post-lockdown era. *Trends in Food Science & Technology*, 110, 193-200.
- Gao, X., Xu, X. Y., Tayyab, S. M. U., & Li, Q. (2021). How the live streaming commerce viewers process the persuasive message: An ELM perspective and the moderating effect of mindfulness. *Electronic Commerce Research and Applications*, 49, 101087.

- Garcia-Marques, L., & Ferreira, M. B. (2011). Friends and foes of theory construction in psychological science: Vague dichotomies, unified theories of cognition, and the new experimentalism. *Perspectives on Psychological Science*, 6(2), 192-201.
- Gold, A. H., Malhotra, A., & Segars, A. H. (2001). Knowledge management: An organizational capabilities perspective. *Journal of management information systems*, 18(1), 185-214.
- Goss, B. D., Rothschild, P. C., & Hutson, M. M. (2021). Applying Persuasion Theory to Sport Properties' Digital Media. *Journal of managerial issues*, 33(3).
- Guan, T., & Zhang, Q. (2023). Value orientations, personal norms, and public attitude toward SDGs. *International Journal of Environmental Research and Public Health*, 20(5), 4031.
- Guo, J. L., Hsu, H. P., Lai, T. M., Lin, M. L., Chung, C. M., & Huang, C. M. (2021). Acceptability evaluation of the use of virtual reality games in smoking-prevention education for high school students: Prospective observational study. *Journal of medical Internet research*, 23(9), e28037.
- Habib, M. D., Kaur, P., Sharma, V., & Talwar, S. (2023). Analyzing the food waste reduction intentions of UK households. A Value-Attitude-Behavior (VAB) theory perspective. *Journal of retailing and consumer services*, 75, 103486.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis*.
- Halttu, K., & Oinas-Kukkonen, H. (2022). Susceptibility to social influence strategies and persuasive system design: exploring the relationship. *Behaviour & Information Technology*, 41(12), 2705-2726.

- Haji-Othman, Y., & Yusuff, M. S. S. (2022). Assessing reliability and validity of attitude construct using partial least squares structural equation modeling. *Int J Acad Res Bus Soc Sci*, 12(5), 378-385.
- Hansmann, R., Baur, I., & Binder, C. R. (2020). Increasing organic food consumption: An integrating model of drivers and barriers. *Journal of Cleaner Production*, 275, 123058.
- Hatfield, B. D., & Kerick, S. E. (2007). The psychology of superior sport performance: A cognitive and affective neuroscience perspective. *Handbook of sport psychology*, 84-109.
- Ha Thu, L. U. O. N. G., Nhi Lan, D. A. O., Trang Thu, N. G. U. Y. E. N., Uyen Thu Thi, L. A., Na Thi Le, T. R. A. N., & Hoa Thi, D. U. O. N. G. (2023). Continuous Behavior of Using Food Delivery Mobile Applications in Vietnam after Covid-19 Pandemic. *Journal of Distribution Science*, 21(3), 47-60.
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the academy of marketing science*, 43, 115-135.
- Hoang, T. D. L., Nguyen, H. K., & Nguyen, H. T. (2021). Towards an economic recovery after the COVID-19 pandemic: empirical study on electronic commerce adoption of small and medium enterprises in Vietnam. *Management & Marketing*, 16(1), 47-68.
- Homer, P.M., & Kahle, L.R. (1988). A structural equation test of the value-attitude-behavior hierarchy. *Journal of Personality and Social Psychology*, 54(4), 638–646.

- Hong, C., Choi, H. H., Choi, E. K. C., & Joung, H. W. D. (2021). Factors affecting customer intention to use online food delivery services before and during the COVID-19 pandemic. *Journal of Hospitality and Tourism Management*, 48, 509-518.
- Huang, L., Yuan, H., Dong, X., Chen, Z., & Zhou, L. (2023). Social norms and socially responsible consumption behavior in the sharing economy: The mediation role of reciprocity motivation. *Journal of Cleaner Production*, 414, 137750.
- Huang, M., Mohamad Saleh, M. S., Zolkepli, I. A., & Wang, L. (2024). The Mediating Effect of Perceived Persuasiveness on the Relationship Between Gamified Reward in Ant Forest and User's Sustainable Behaviour in China. In *An Agenda for Sustainable Development Research* (pp. 247-263). Cham: Springer Nature Switzerland.
- Hynes, N., & Wilson, J. (2016). I do it, but don't tell anyone! Personal values, personal and social norms: Can social media play a role in changing pro-environmental behaviours?. *Technological Forecasting and Social Change*, 111, 349-359.
- Isenberg, N., & Brauer, M. (2022). Commitment and consistency. *The Routledge research encyclopedia of psychology applied to everyday life*. Routledge. <https://doi.org/10.4324/9780367198459-REPRW126-1>.
- Issock, P. B. I., Mpinganjira, M., & Roberts-Lombard, M. (2023). Beyond sustainable consumption practices: Linking organic food consumption to hedonic and eudaimonic well-being. *Appetite*, 188, 106633.
- Jabs, J., & Devine, C. M. (2006). Time scarcity and food choices: an overview. *Appetite*, 47(2), 196-204.

- Janairo, J. I. B. (2021). Unsustainable plastic consumption associated with online food delivery services in the new normal. *Cleaner and Responsible Consumption*, 2, 100014.
- Jang, Y. J., & Kim, E. (2023). Social and Personal Norms in Shaping Customers' Environmentally Sustainable Behavior in Restaurants' Social Media Communities. *Sustainability*, 15(8), 6410.
- Jay, N. (1981). Gender and dichotomy. *Feminist studies*, 7(1), 38-56.
- Jayawardena, N. S., Thaichon, P., Quach, S., Razzaq, A., & Behl, A. (2023). The persuasion effects of virtual reality (VR) and augmented reality (AR) video advertisements: A conceptual review. *Journal of Business Research*, 160, 113739.
- Joshua, J. B., Jin, Y., Ogunmokun, O. A., & Ikhide, J. E. (2023). Hospitality for sustainability: employee eco-anxiety and employee green behaviors in green restaurants. *Journal of Sustainable Tourism*, 31(6), 1356-1372.
- Jung, H. J., Choi, Y. J., & Oh, K. W. (2020). Influencing factors of Chinese consumers' purchase intention to sustainable apparel products: Exploring consumer "attitude-behavioral intention" gap. *Sustainability*, 12(5), 1770.
- Jung, J. M., & Kellaris, J. J. (2006). Responsiveness to authority appeals among young French and American consumers. *Journal of Business Research*, 59(6), 735-744.
- Kativhu, T., Mazvimavi, D., Tevera, D., & Nhapi, I. (2018). Implementation of Community Based Management (CBM) in Zimbabwe: The dichotomy of theory and practice and its influence on sustainability of rural water supply systems. *Physics and Chemistry of the Earth, Parts A/B/C*, 106, 73-82.

- Kim, K. (2024). How the relationship between verbal and nonverbal text signals influences second language expository text comprehension: knowledge structure analysis. *Educational technology research and development*, 1-20.
- Kim, M. J., Hall, C. M., & Kim, D. K. (2020). Predicting environmentally friendly eating out behavior by value-attitude-behavior theory: does being vegetarian reduce food waste?. *Journal of Sustainable Tourism*, 28(6), 797-815.
- Kim, M. J., & Hall, C. M. (2021). Do value-attitude-behavior and personality affect sustainability crowdfunding initiatives?. *Journal of Environmental Management*, 280, 111827.
- Kim, M. J., Hall, C. M., & Kim, M. (2023). What is significant for engagement in cycling and walking in South Korea? Applying value-belief-norm theory. *Travel behaviour and society*, 32, 100571.
- Kim, S. H., & Seock, Y. K. (2019). The roles of values and social norm on personal norms and pro-environmentally friendly apparel product purchasing behavior: The mediating role of personal norms. *Journal of Retailing and Consumer Services*, 51, 83-90.
- Kleinginna Jr, P. R., & Kleinginna, A. M. (1981). A categorized list of motivation definitions, with a suggestion for a consensual definition. *Motivation and emotion*, 5(3), 263-291.
- Knoll, L. J., Magis-Weinberg, L., Speekenbrink, M., & Blakemore, S. J. (2015). Social influence on risk perception during adolescence. *Psychological science*, 26(5), 583-592.

- Lalot, F., Quiamzade, A., Falomir-Pichastor, J. M., & Gollwitzer, P. M. (2019). When does self-identity predict intention to act green? A self-completion account relying on past behaviour and majority-minority support for pro-environmental values. *Journal of Environmental Psychology, 61*, 79-92.
- Lajoie-O'Malley, A., Bronson, K., van der Burg, S., & Klerkx, L. (2020). The future (s) of digital agriculture and sustainable food systems: An analysis of high-level policy documents. *Ecosystem Services, 45*, 101183.
- Langener, S., Kolkmeier, J., VanDerNagel, J., Klaassen, R., van Manen, J., & Heylen, D. (2023). Development of an Alcohol Refusal Training in Immersive virtual reality for patients with mild to Borderline Intellectual disability and Alcohol Use Disorder: Cocreation with experts in Addiction Care. *JMIR Formative Research, 7*(1), e42523.
- Lavine, H. (1999). Types of evidence and routes to persuasion: the unimodel versus dual-process models. *Psychological Inquiry, 10*(2), 141-144.
- Lavuri, R., Roubaud, D., & Grebinevych, O. (2023). Sustainable consumption behaviour: Mediating role of pro-environment self-identity, attitude, and moderation role of environmental protection emotion. *Journal of Environmental Management, 347*, 119106.
- Lee, J., & Pee, L. G. (2015). The relationship between online trust and distrust in business: Testing mutual causality from a cognitive-affective personality system theory. *Asia pacific journal of information systems, 25*(3), 500-518.
- Lee, K. H., Hwang, K. H., Kim, M., & Cho, M. (2021). 3D printed food attributes and their roles within the value-attitude-behavior model: Moderating effects of food

- neophobia and food technology neophobia. *Journal of Hospitality and Tourism Management*, 48, 46-54.
- Lewis, J. A., Fraga, K. J., & Erickson, T. M. (2020). Dichotomous thinking. *Encyclopedia of Personality and Individual Differences*, 1109-1113.
- Li, C., Miroso, M., & Bremer, P. (2020). Review of online food delivery platforms and their impacts on sustainability. *Sustainability*, 12(14), 5528.
- Li, P., Lv, Y., Wang, R., Chen, T., Gao, J., & Huang, Z. (2024). How do illegitimate tasks affect hospitality employees' adaptive performance? An explanation from the perspective of cognitive-affective system theory of personality. *International Journal of Contemporary Hospitality Management*, 36(9), 3032-3051.
- Lind, H. B., Nordfjærn, T., Jørgensen, S. H., & Rundmo, T. (2015). The value-belief-norm theory, personal norms and sustainable travel mode choice in urban areas. *Journal of Environmental Psychology*, 44, 119-125.
- Liu, J., Zhao, Y., & Jang, S. (2021). Understanding beach tourists' environmentally responsible behaviors: An extended value-attitude-behavior model. *Journal of Travel & Tourism Marketing*, 38(7), 696-709.
- Liu, P., Teng, M., & Han, C. (2020). How does environmental knowledge translate into pro-environmental behaviors?: The mediating role of environmental attitudes and behavioral intentions. *Science of the total environment*, 728, 138126.
- Liu, S., Liu, S., Liu, Z., Peng, X., & Yang, Z. (2022). Automated detection of emotional and cognitive engagement in MOOC discussions to predict learning achievement. *Computers & Education*, 181, 104461.

- Lou, C. (2022). Social media influencers and followers: Theorization of a trans-parasocial relation and explication of its implications for influencer advertising. *Journal of advertising*, 51(1), 4-21.
- Mahasuweerachai, P., & Suttikun, C. (2022). The effect of green self-identity on perceived image, warm glow and willingness to purchase: A new generation's perspective towards eco-friendly restaurants. *Sustainability*, 14(17), 10539.
- Mailath, G. J., Morris, S., & Postlewaite, A. (2017). Laws and authority. *Research in Economics*, 71(1), 32-42.
- Mancha, R. M., & Yoder, C. Y. (2015). Cultural antecedents of green behavioral intent: An environmental theory of planned behavior. *Journal of environmental psychology*, 43, 145-154.
- Maslow, A. H. (1954). *Motivation and personality*, 3rd ed. New York: Longman.
- Meents, S., Verhagen, T., Merikivi, J., & Weltevreden, J. (2020). Persuasive location-based messaging to increase store visits: An exploratory study of fashion shoppers. *Journal of Retailing and Consumer Services*, 57, 102174.
- Meng, L., & Si, W. (2022). Pro-environmental behavior: Examining the role of ecological value cognition, environmental attitude, and place attachment among rural farmers in China. *International Journal of Environmental Research and Public Health*, 19(24), 17011.
- Miller, G. R. (2013). On being persuaded: Some basic distinctions. In J. P. Dillard & L. Shen (Eds.), *The SAGE handbook of persuasion: Developments in theory and practice* (2nd ed., pp. 70–82). Sage Publications, Inc.

- Mischel, W., & Shoda, Y. (1995). A cognitive-affective system theory of personality: Reconceptualizing situations, dispositions, dynamics, and invariance in personality structure. *Psychological Review*, *102*(2), 246–268.
- Mischel, W., & Shoda, Y. (2008). Toward a unified theory of personality: Integrating dispositions and processing dynamics within the cognitive-affective processing system. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (3rd ed., pp. 208–241). Guilford Press.
- Molina-Besch, K. (2020). Food delivery packaging and tableware waste. *Nature Food*, *1*(9), 531-532.
- Mooney, S. K. (2020). Gender research in hospitality and tourism management: time to change the guard. *International Journal of Contemporary Hospitality Management*, *32*(5), 1861-1879.
- Muangmee, C., Kot, S., Meekaewkunchorn, N., Kassakorn, N., & Khalid, B. (2021). Factors determining the behavioral intention of using food delivery apps during COVID-19 pandemics. *Journal of theoretical and applied electronic commerce research*, *16*(5), 1297-1310.
- Nair, K., & Gupta, R. (2021). Application of AI technology in modern digital marketing environment. *World Journal of Entrepreneurship, Management and Sustainable Development*, *17*(3), 318-328.
- Nan, X., & Heo, K. (2007). Consumer responses to corporate social responsibility (CSR) initiatives: Examining the role of brand-cause fit in cause-related marketing. *Journal of advertising*, *36*(2), 63-74.

- Naruoeei, B., Hakimpour, H., Mahmoodzadeh Vashshan, M., & Mohammadi, M. (2024). The effectiveness of Cialdini's principles on persuasion in digital marketing (A case study of Iran's furniture industry). *International Journal of Nonlinear Analysis and Applications*, 15(4), 135-148.
- Nicholson, C. Y., Compeau, L. D., & Sethi, R. (2001). The role of interpersonal liking in building trust in long-term channel relationships. *Journal of the Academy of Marketing Science*, 29, 3-15.
- Nivornusit, R., Kraiwanit, T., & Limna, P. (2024). Food delivery competition in the digital economy: Price war strategy in a developing country. *Digital Business*, 4(1), 100076.
- Nordlund, A. M., & Garvill, J. (2003). Effects of values, problem awareness, and personal norm on willingness to reduce personal car use. *Journal of environmental psychology*, 23(4), 339-347.
- O'keefe, D. J. (2006). Persuasion. In *The handbook of communication skills* (pp. 333-352). Routledge.
- O'Keefe, D. J. (2009). Theories of persuasion. *The SAGE handbook of media processes and effects*, 269-282.
- Overeem, P. (2005). The value of the dichotomy: Politics, administration, and the political neutrality of administrators. *Administrative Theory & Praxis*, 27(2), 311-329.
- Patel, J. D., Trivedi, R. H., & Yagnik, A. (2020). Self-identity and internal environmental locus of control: Comparing their influences on green purchase intentions in high-

- context versus low-context cultures. *Journal of Retailing and Consumer Services*, 53, 102003.
- Park, H. S., & Smith, S. W. (2007). Distinctiveness and influence of subjective norms, personal descriptive and injunctive norms, and societal descriptive and injunctive norms on behavioral intent: A case of two behaviors critical to organ donation. *Human Communication Research*, 33(2), 194-218.
- Park, S., Lehto, X., & Lehto, M. (2021). Self-service technology kiosk design for restaurants: An QFD application. *International Journal of Hospitality Management*, 92, 102757.
- Parsons, K., Butavicius, M., Delfabbro, P., & Lillie, M. (2019). Predicting susceptibility to social influence in phishing emails. *International Journal of Human-Computer Studies*, 128, 17-26.
- Permatasari, P., & Gunawan, J. (2023). Sustainability policies for small medium enterprises: WHO are the actors?. *Cleaner and Responsible Consumption*, 9, 100122.
- Pierro, A., Mannetti, L., & Livi, S. (2003). Self-identity and the theory of planned behavior in the prediction of health behavior and leisure activity. *Self and Identity*, 2(1), 47-60.
- Pillai, S. G., Kim, W. G., Haldorai, K., & Kim, H. S. (2022). Online food delivery services and consumers' purchase intention: Integration of theory of planned behavior, theory of perceived risk, and the elaboration likelihood model. *International journal of hospitality management*, 105, 103275.

- Phoa, P. K. A., Marcus, M., Siau, C. S., Wong, Y. H., Naidu, C. S., Dain, C., & Wee, L. H. (2025). Virtual Reality Technology in Electronic Cigarette Prevention and Cessation Intervention: A Systematic Review. *Current Addiction Reports*, 12(1), 1-14.
- Pornsakulvanich, V., & Dumrongsiri, N. (2013). Internal and external influences on social networking site usage in Thailand. *Computers in Human Behavior*, 29(6), 2788-2795.
- Purwanto, A., & Sudargini, Y. (2021). Partial least squares structural equation modeling (PLS-SEM) analysis for social and management research: a literature review. *Journal of Industrial Engineering & Management Research*, 2(4), 114-123.
- Quaye, E. S., Mokgethi, K., & Ameyibor, L. E. K. (2021). Health self-identity-based motivations and behavioral intentions: a predictive model and segmentation analysis. *Social Marketing Quarterly*, 27(4), 347-369.
- Rajkumar, R. P. (2021). The relationship between measures of individualism and collectivism and the impact of COVID-19 across nations. *Public Health in Practice*, 2, 100143.
- Rana, R. L., Tricase, C., & De Cesare, L. (2021). Blockchain technology for a sustainable agri-food supply chain. *British Food Journal*, 123(11), 3471-3485.
- Recuero-Virto, N., & Valilla-Arróspide, C. (2022). Forecasting the next revolution: food technology's impact on consumers' acceptance and satisfaction. *British Food Journal*, 124(12), 4339-4353.

- Reichheld, A., Peto, J., & Ritthaler, C. (2023). Research: Consumers' sustainability demands are rising. *Harvard Business Review*. <https://hbr.org/2023/09/research-consumers-sustainability-demands-are-rising>.
- Research and Markets. (2024, July 30). United States Online Food Delivery Market Forecast Report 2024: A \$66.5+ Billion Industry by 2032, Driven by Aggressive Marketing and Promotional Campaigns, and Strategic Acquisitions & Partnerships, Retrieved from: <https://www.globenewswire.com/news-release/2024/07/30/2920779/28124/en/United-States-Online-Food-Delivery-Market-Forecast-Report-2024-A-66-5-Billion-Industry-by-2032-Driven-by-Aggressive-Marketing-and-Promotional-Campaigns-and-Strategic-Acquisitions-P.html>
- Rustam, A., Wang, Y., & Zameer, H. (2020). Environmental awareness, firm sustainability exposure and green consumption behaviors. *Journal of Cleaner Production*, 268, 122016.
- Rokeach, M. (1973). The nature of human values. *Fre Pre*.
- Roethke, K., Klumpe, J., Adam, M., & Benlian, A. (2020). Social influence tactics in e-commerce onboarding: The role of social proof and reciprocity in affecting user registrations. *Decision Support Systems*, 131, 113268.
- Rosaen, S. F., Dibble, J. L., & Hartmann, T. (2019). Does the experience of parasocial interaction enhance persuasiveness of video public service messages?. *Communication Research Reports*, 36(3), 201-208.

- Ryu, Y., & Kim, S. (2015). Testing the heuristic/systematic information-processing model (HSM) on the perception of risk after the Fukushima nuclear accidents. *Journal of Risk Research*, *18*(7), 840-859.
- Sachani, D. K., Dhameliya, N., Mullangi, K., Anumandla, S. K. R., & Vennapusa, S. C. R. (2021). Enhancing Food Service Sales through AI and Automation in Convenience Store Kitchens. *Global Disclosure of Economics and Business*, *10*(2), 105-116.
- Salas, L. M., Sen, S., & Segal, E. A. (2010). Critical theory: Pathway from dichotomous to integrated social work practice. *Families in Society*, *91*(1), 91-96.
- Saracevic, S., Schlegelmilch, B. B., & Wu, T. (2022). How normative appeals influence pro-environmental behavior: The role of individualism and collectivism. *Journal of Cleaner Production*, *344*, 131086.
- Schwartz, S. H. (1977). Normative influences on altruism. In *Advances in experimental social psychology* (Vol. 10, pp. 221-279). Academic Press.
- Schwartz, S. H., & Howard, J. A. (1981). A normative decision-making model of altruism. *Altruism and helping behavior*, 189-211.
- Seo, K. (2020). Meta-analysis on visual persuasion—does adding images to texts influence persuasion. *Athens Journal of Mass Media and Communications*, *6*(3), 177-190.
- Seo, E. H., Jang, H. W., & Cho, M. (2023). Enabling the foodservice industry to transition consumers toward plant-based meat alternatives: A behavioral reasoning perspective. *International Journal of Hospitality Management*, *114*, 103559.

- Seo, E., Nunkoo, R., & Cho, M. (2024). Employees' sustainability behavior: moderating effects of customer environmental awareness. *Journal of Hospitality Marketing & Management*, 1-30.
- Shankar, A., Jebarajakirthy, C., Nayal, P., Maseeh, H. I., Kumar, A., & Sivapalan, A. (2022). Online food delivery: A systematic synthesis of literature and a framework development. *International Journal of Hospitality Management*, 104, 103240.
- Shimul, A. S., Cheah, I., & Khan, B. B. (2022). Investigating female shoppers' attitude and purchase intention toward green cosmetics in South Africa. *Journal of Global Marketing*, 35(1), 37-56.
- Shin, Y. H., Moon, H., Jung, S. E., & Severt, K. (2017). The effect of environmental values and attitudes on consumer willingness to pay more for organic menus: A value-attitude-behavior approach. *Journal of Hospitality and Tourism Management*, 33, 113-121.
- Shoenberger, H., Kim, E., & Sun, Y. (2021). Advertising during COVID-19: Exploring perceived brand message authenticity and potential psychological reactance. *Journal of Advertising*, 50(3), 253-261.
- Silvi, M., & Padilla, E. (2021). Pro-environmental behavior: Social norms, intrinsic motivation and external conditions. *Environmental Policy and Governance*, 31(6), 619-632.
- Simeone, M., & Scarpato, D. (2020). Sustainable consumption: How does social media affect food choices?. *Journal of Cleaner Production*, 277, 124036.
- Smith, R. E. (2006). Understanding sport behavior: A cognitive-affective processing systems approach. *Journal of Applied Sport Psychology*, 18(1), 1-27.

- Spasova, L. (2022). Impact of gender and age on susceptibility to persuasion principles in advertisement. *Economics and Sociology*, 15(3), 89-107.
- Steg, L., Bolderdijk, J. W., Keizer, K., & Perlaviciute, G. (2014). An integrated framework for encouraging pro-environmental behaviour: The role of values, situational factors and goals. *Journal of Environmental psychology*, 38, 104-115.
- Stokkink, Q., & Pouwelse, J. (2024). A local-first approach for green smart contracts. *Distributed Ledger Technologies: Research and Practice*, 3(2), 1-21.
- Stren, P. C. (2000). Toward a coherent theory of environmentally significant behaviour. *Journal of Social Issues*, 56(3), 407-424.
- Sui, Y., & Zhang, B. (2021). Determinants of the perceived credibility of rebuttals concerning health misinformation. *International Journal of Environmental Research and Public Health*, 18(3), 1345.
- Tai, Y. F., Wang, Y. C., & Luo, C. C. (2021). Technology-or human-related service innovation? Enhancing customer satisfaction, delight, and loyalty in the hospitality industry. *Service Business*, 15, 667-694.
- Tang, H., Li, L., & Su, S. (2022). Experiencing less leads to the use of more: The effect of a scarcity mindset on product usage. *Journal of Business Research*, 149, 139-148.
- Telzer, E. H., Van Hoorn, J., Rogers, C. R., & Do, K. T. (2018). Social influence on positive youth development: A developmental neuroscience perspective. *Advances in child development and behavior*, 54, 215-258.

- Teo, T. S., Srivastava, S. C., & Jiang, L. I. (2008). Trust and electronic government success: An empirical study. *Journal of management information systems*, 25(3), 99-132.
- The Brainy Insights. (2024, July). *Online Food Delivery Market*. Retrieved from: <https://www.thebrainyinsights.com/report/online-food-delivery-market-12992>
- Thomas, R. J., Masthoff, J., & Oren, N. (2019). Can I influence you? Development of a scale to measure perceived persuasiveness and two studies showing the use of the scale. *Frontiers in Artificial Intelligence*, 2, 24.
- Tian, H., & Liu, X. (2022). Pro-environmental behavior research: Theoretical progress and future directions. *International Journal of Environmental Research and Public Health*, 19(11), 6721.
- Tulanbaeva, S. S. (2023). Exploring the role of nonverbal communication in conveying sympathy and support. *American Journal of Philological Sciences*, 3(06), 130-136.
- Uban, A. S., Chulvi, B., & Rosso, P. (2021). An emotion and cognitive based analysis of mental health disorders from social media data. *Future Generation Computer Systems*, 124, 480-494.
- Udunuwara, M., Sanders, D., & Wilkins, H. (2019). The dichotomy of customer relationship management and variety-seeking behaviour in the hotel sector. *Journal of Vacation Marketing*, 25(4), 444-461.

- Ureno, D. M. (2021). Cialdini's Principle of Liking and the 2016 Presidential Election. *Montview Journal of Research & Scholarship*, 8(1), 2.
- Vries, H. D., Backbier, E., Kok, G., & Dijkstra, M. (1995). The Impact of Social Influences in the Context of Attitude, Self-Efficacy, Intention, and Previous Behavior as Predictors of Smoking Onset 1. *Journal of applied social psychology*, 25(3), 237-257.
- Wallace, L. E., Wegener, D. T., Quinn, M. E., & Ross, A. J. (2021). Influences of position justification on perceived bias: Immediate effects and carryover across persuasive messages. *Personality and Social Psychology Bulletin*, 47(7), 1188-1204.
- Wang, L., Zhang, Q., & Wong, P. P. W. (2022). Purchase intention for green cars among Chinese millennials: merging the value–attitude–behavior theory and theory of planned behavior. *Frontiers in psychology*, 13, 786292.
- Wilson, W. (1887). *The Study of Administration*. *Classics of Public Administration (5th ed.)/Thomson*.
- Winter, S., Maslowska, E., & Vos, A. L. (2021). The effects of trait-based personalization in social media advertising. *Computers in Human Behavior*, 114, 106525.
- Wheaton, B., Muthen, B., Alwin, D. F., & Summers, G. F. (1977). Assessing reliability and stability in panel models. *Sociological methodology*, 8, 84-136.
- White, F. A., Borinca, I., Vezzali, L., Reynolds, K. J., Blomster Lyshol, J. K., Verrelli, S., & Falomir-Pichastor, J. M. (2021). Beyond direct contact: The theoretical and societal relevance of indirect contact for improving intergroup relations. *Journal of Social Issues*, 77(1), 132-153.

- White, P. R. (2020). The putative reader in mass media persuasion—stance, argumentation and ideology. *Discourse & Communication*, 14(4), 404-423.
- Whitmarsh, L., & O'Neill, S. (2010). Green identity, green living? The role of pro-environmental self-identity in determining consistency across diverse pro-environmental behaviours. *Journal of environmental psychology*, 30(3), 305-314.
- Wong, I. A., Huang, J., Lin, Z., & Jiao, H. (2022). Smart dining, smart restaurant, and smart service quality (SSQ). *International Journal of Contemporary Hospitality Management*, 34(6), 2272-2297.
- Wu, X., Gursoy, D., & Zhang, M. (2021). Effects of social interaction flow on experiential quality, service quality and satisfaction: moderating effects of self-service technologies to reduce employee interruptions. *Journal of Hospitality Marketing & Management*, 30(5), 571-591.
- Xu, X., & Huang, Y. (2019). Restaurant information cues, Diners' expectations, and need for cognition: Experimental studies of online-to-offline mobile food ordering. *Journal of Retailing and Consumer Services*, 51, 231-241.
- Young, H. P. (2015). The evolution of social norms. *Annual Review of Economics*, 7(1), 359-387.
- Zebardast, L., & Radaei, M. (2022). The influence of global crises on reshaping pro-environmental behavior, case study: the COVID-19 pandemic. *Science of the total environment*, 811, 151436.
- Zhang, B., Ying, L., Khan, M. A., Ali, M., Barykin, S., & Jahanzeb, A. (2023). Sustainable digital marketing: Factors of adoption of m-technologies by older adults in the Chinese market. *Sustainability*, 15(3), 1972.

- Zhang, H. M., Liu, J. Y., & Chen, J. W. (2024). The double-edged sword effect of performance pressure on employee boundary-spanning behavior. *J. Chin. Hum. Resour. Manag.*, *15*, 86-103.
- Zhang, K. Z., Zhao, S. J., Cheung, C. M., & Lee, M. K. (2014). Examining the influence of online reviews on consumers' decision-making: A heuristic–systematic model. *Decision support systems*, *67*, 78-89.
- Zheng, Y., Gao, Y. L., Li, M., & Dang, N. (2023). Leadership styles and employee pro-environmental behavior in the tourism and hospitality industry: A cognitive-affective personality system perspective. *International Journal of Hospitality Management*, *113*, 103509.
- Zhu, J., Han, Y., & Chen, Z. (2024). The effect of administrative burden perception on citizen participation: A barrier or a spur?. *Public Performance & Management Review*, *47*(5), 1138-1165.
- Zhu, Q., & Liu, P. (2025). Exploring factors influencing consumer behavior towards food waste reduction in buffet style restaurants. *British Food Journal*, *127*(3), 839-856.

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