Behavioral Analytics under Risk Contexts

Modeling Consumer Decisions through Cognitive and Emotional Variables

IN A PARK

1. Introduction

COVID-19 had a profound impact on global health, society, and the economy, with a particularly severe negative impact on the restaurant industry. In South Korea, dining-out sales decreased, and the government implemented preventive policies that encouraged people to use delivery services instead of visiting restaurants. Many confirmed cases occurred in restaurants, leading consumers to respond in diverse ways — some avoided dining out altogether, while others continued to do so. These contrasting behaviors reflect differences in consumers' cognitive and emotional responses to risk-related messages about dining out.

This study models consumer behavioral data collected during the COVID-19 pandemic to examine how cognitive dissonance under risk perception predicts emotional responses—fear and psychological reactance—and how these features drive information-seeking and dining-behavioral patterns. The analysis follows a data-driven behavioral modeling framework rather than a purely theoretical exploration, integrating survey-based variables into a predictive path model. This framework demonstrates how behavioral theories can be quantitatively modeled to support predictive consumer analytics under uncertainty.

Compared with prior studies on risk perception and dining behavior, this study offers theoretical and methodological advances. First, by integrating cognitive dissonance theory into the Risk Information Seeking and Processing (RISP) framework, it extends existing models beyond simple risk–behavior linkages to explain the dual emotional pathways—fear and psychological reactance-that arise from conflicting cognitions about dining-out risks.

Second, this study distinguishes between different types of negative emotions, demonstrating that fear encourages information seeking, while psychological reactance leads to avoidance and does not significantly promote information seeking. This refined emotional differentiation enhances the RISP framework by revealing that negative emotions exert heterogeneous effects in risk communication contexts.

Building on these theoretical insights, the findings also provide practical guidance for risk communication and restaurant management during health crises. First, COVID-19 risk messages should adopt emotion-specific communication strategies. Instead of enforcing restrictive or fear-inducing messages that may trigger psychological reactance, emphasizing government efforts and controllability of the situation can enhance consumers' motivation to seek information. Excessive fear appeals, on the other hand, should be avoided to prevent information withdrawal.

Second, restaurants should focus on building consumer trust and a sense of safety. By visibly demonstrating preventive measures—such as distancing, hygiene management, and contactless service—restaurants can reinforce perceptions of safety and encourage continued dining intentions.

2. Theoretical Background

The study applies behavioral theories within a data-analytic framework to examine how cognitive and emotional variables influence consumer decision-making under health-risk conditions. The constructs were translated into quantifiable variables suitable for statistical modeling, following the Risk Information Seeking and Processing (RISP) model.

Cognitive Dissonance refers to the inconsistency among beliefs, attitudes, and behaviors. In this study, it was operationalized as a composite score of five Likert-scale items (1 = strongly disagree, 7 = strongly agree) capturing the discomfort experienced when dining decisions conflicted with COVID-19 safety norms.

Psychological Reactance captures the resistance individuals feel when their freedom of choice appears restricted, particularly in response to government dining restrictions or health advisories. The construct was measured using three items on a 7-point Likert scale, serving as a key emotional variable in the predictive model.

Fear was conceptualized as an emotional response to perceived risk and measured through participants' reported anxiety levels toward infection while dining out. Together, cognitive dissonance, psychological reactance, and fear represent the emotional and cognitive predictors driving information behavior.

The study adopts the RISP Model, which describes how exposure to risk messages triggers cognitive dissonance, generates negative emotions, and shapes information-seeking or avoidance tendencies. These, in turn, influence behavioral intentions. This model was implemented as a structural data model (SEM) to quantify the directional effects among these latent constructs.

Behavioral outcomes were categorized into two forms: Preventive Behavior, referring to safety-oriented dining actions such as mask-wearing and social distancing, and General Dining Behavior, reflecting the maintenance of normal dining patterns despite perceived risks.

Table 1. Theoretical Framework and Core Concepts

Category	Core Concept
Cognitive Dissonance	Inconsistency among beliefs, attitudes, and behaviors
Psychological Reactance	Resistance to perceived restriction of freedom
Fear	Emotional response to perceived risk
RISP Model	Risk message → Cognitive dissonance → Negative emotions → Information seeking/avoidance → Behavioral intention.
Preventive Behavior	Safety-oriented dining actions
General Dining Behavior	Maintenance of normal dining patterns

Table 1. Summarizes the core psychological constructs used in this study. These concepts were integrated into the proposed research model shown below (Figure 1), illustrating the hypothesized relationships among cognitive, emotional, and behavioral variables.
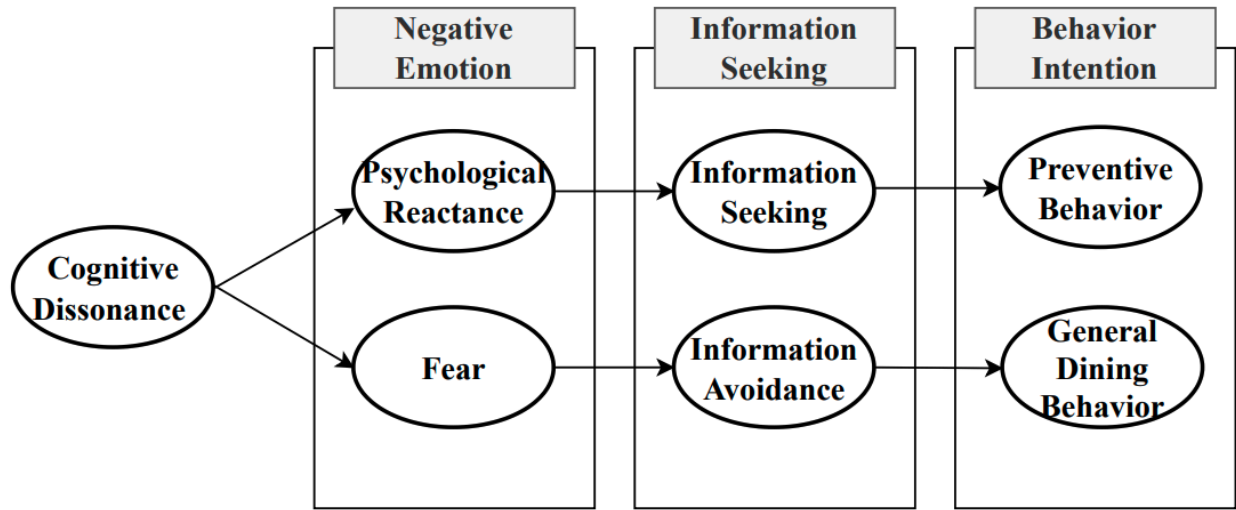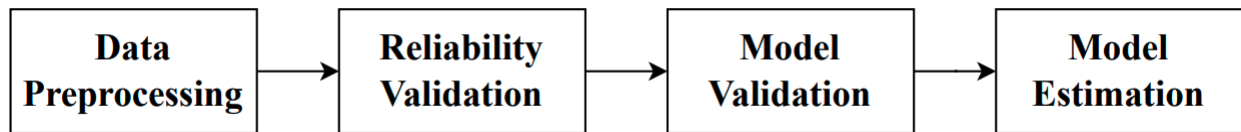
3. Research Model

Figure 1. Conceptual framework illustrating hypothesized pathways among cognitive dissonance, emotional reactions, information behavior, and dining intention.

4. Research Methodology

The research pipeline consisted of four data-analytic stages:
1) Data preprocessing:
    a) Feature Aggregation: Individual variables' scores were aggregated into a mean composite variable for each construct. This step converted qualitative psychological concepts into quantifiable continuous variables, enabling their use in statistical and structural modeling.
    b) Feature Selection: During Confirmatory Factor Analysis (CFA), items with low factor loadings were identified and excluded to enhance construct validity. This process served as a feature selection step, eliminating unreliable measurement signals and improving the model's internal consistency and goodness of fit.
2) Reliability validation: Cronbach's α computed to assess internal consistency across constructs (α > 0.70).
3) Model validation: Confirmatory factor analysis (CFA) performed in SPSS to ensure construct validity (CFI = 0.921, TLI=0.903, RMSEA = 0.056).
4) Model estimation: Structural equation modeling (SEM) used to estimate directional effects among features.

5. Results

The structural equation modeling (SEM) confirmed the hypothesized relationships among cognitive, emotional, and behavioral variables under COVID-19 dining risk contexts. Model fit indices indicated excellent suitability (χ^2/df = 2.070, RMSEA = 0.061, CFI = 0.936, TLI = 0.926). Detailed statistics for all hypotheses are provided in Table 2

Cognitive dissonance significantly increased both psychological reactance (β = 0.286, p < .001) and fear (β = 0.130, p = .021), suggesting that dissonant perceptions trigger dual emotional responses - resistance and anxiety. Fear was associated with higher information seeking (β = 0.229, p < .001) and lower information avoidance (β = –0.140, p < .001), indicating that fear stimulates proactive information behavior. In contrast, reactance predicted only information avoidance (β = 0.277, p < .001), implying that defensive emotion leads to withdrawal from information processing. However, psychological reactance did not significantly predict information seeking (β = 0.091, p = .122), indicating that individuals experiencing reactance were not more inclined to actively search for information. This suggests that while reactance fosters avoidance behaviors, it does not motivate proactive information engagement in the context of perceived dining risks.

Regarding behavioral outcomes, information seeking positively influenced preventive dining intentions (β = 0.314, p < .001) and negatively influenced general dining intentions (β = –0.089, p < .05), while information avoidance showed the opposite pattern (preventive: β = –0.355, p < .001; general: β = 0.188, p < .001).

Collectively, these findings reveal three key patterns:
1) Reactance dominates as the primary avoidance trigger, explaining defensive withdrawal under perceived restriction.
2) Fear drives dual information pathways, increasing active seeking while suppressing avoidance.
3) Information behaviors serve as pivotal mediators linking emotional responses to preventive or habitual dining intentions.

Table 2. Results of Hypothesis Testing.

Hypothesis	Path	Standardized β	p-value	Result
H1-1	Cognitive Dissonance → Psychological Reactance	0.286	***	Supported
H1-2	Cognitive Dissonance → Fear	0.130	0.021	Supported
H2-1	Fear → Information Seeking	0.229	***	Supported
H2-2	Fear → Information Avoidance	–0.140	***	Supported
H2-3	Psychological Reactance → Information Seeking	0.091	0.122	Not Supported
H2-4	Psychological Reactance → Information Avoidance	0.277	***	Supported

H3-1	Information Seeking → Preventive Behavioral Intention	0.314	***	Supported
H3-2	Information Seeking → General Dining Intention	−0.089	0.041	Supported
H3-3	Information Avoidance → Preventive Behavioral Intention	−0.355	***	Supported
H3-4	Information Avoidance → General Dining Intention	0.188	***	Supported

- SEM analysis was performed using SPSS AMOS
- Model fit indices: χ^2/df = 2.070, RMSEA = 0.061, NFI = 0.885, IFI = 0.937, TLI = 0.926, CFI = 0.936.
- Significance levels: $p < .001$, p < .01, $p < .05$.
- Non-significant paths (e.g., Reactance → Information Seeking) were excluded from the final structural interpretation.