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Restaurant diners' self-protective behavior in response to an epidemic crisis

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ABSTRACT

This study is designed to conceptually propose and empirically examine a theoretical model for restaurant diners' self-protective behavior in response to an epidemic crisis. Based on Weinstein's five-stage PAPM, a prospective model and a classification scheme for five corresponding types of self-protective behavior adopters are proposed in this study. By using ten-year longitudinal survey data provided by a timely research sample which was obtained from a multi-store restaurant's diner club members immediately after the peak period of the SARS outbreak in Taiwan, both theoretical and managerial applicability of the proposed stage-based model are empirically verified in this study. The results show that the type of self-protective behavior respondents adopted is significantly associated with their marital status and risk attitude toward the epidemic. Besides, respondents significantly advance their type of self-protective behavior adoption along successive epidemics from the SARS to avian influenza A(H7N9) in decade.

1. Introduction

The self-protective behavior appears to be different among diverse contexts where people play different social roles in various daily activities. Of the diverse social contexts, one of the most popularly discussed contexts is where one plays the role of a worker in the workplace. As results, academic efforts have been largely made in the field of industrial safety to influence or encourage an individual worker's interest in and attitude to adopting greater extent of self-protective behavior against workplace hazards. Different from the passive attitude and reluctant propensity for adopting self-protective behavior (e.g., following standardized operational procedures) in a workplace, people are usually alert to the personal risks or dangers that exist in a marketplace where they are playing the role of a consumer and have no hesitation in adopting self-protective behavior (i.e., to suspend or cease the consumption of particular products) spontaneously. In other words, while operations management attempts to modify workers' self-protective behavior by developing and using innovative incentives or tailor-made occupational safety programs, similarly but more aggressively, marketing managers may have to eliminate or retard consumers' overreacting self-protective behavior by proposing rapid and effective marketing programs. However, in contrast to a number of conceptual models regarding workers' self-protective behavior (see the review in DeJoy, 1996) which have been proposed to help agglomerate research findings and guide the development of practical occupational safety programs and compare with myriads of studies emphasize other facets of the consumer behavior in restaurants (e.g., Guéguen et al., 2009, 2012; Heung and Gu, 2012; Milliman, 1986; Tse et al., 2002; Wei and Miao, 2013; Yang et al., 2009), it is surprising that little research has discussed or explored consumers' self-protective behavior in tourism and hospitality literature.

One of the most well-known cases of consumers' self-protective behavior in decades can be observed during the Severe Acute Respiratory Syndrome (SARS) outbreak in Asia. Lakshmanan (2003, as cited by McKercher and Chon, 2004) aptly describes the feature of the outbreak by observing that 'a panic spread faster than the disease itself.' Some scholars (e.g., Chen et al., 2007; Chuo, 2007; McKercher and Chon, 2004) explain the phenomenon clearly that people were overreacting to the outbreak. As consequences of the consumers' self-protective behavior in response to the epidemic crisis, the costs of canceled travel and decreased investment in Asia might rival the Asian financial crisis of the mid-1990s (De Lisle, 2004) and the tourism and hospitality industries in Asia had almost completely collapsed (McKercher and Chon, 2004). In fact, the industries are still threatened by the possibility of a new epidemic or pandemic crisis (Page et al., 2012). Ten years after the SARS outbreak, human cases of infection with a novel avian influenza A(H7N9) were reported in eastern China on 31 March 2013. Since then, the number of notified cases reported to World Health Organization (WHO) has increased, reaching 137 cases (including 45 deaths) as of October 25 (http://www.who.int/influenza/human_animal_interface/

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influenza_h7n9/Data_Reports/en/index.html). Since the evolution of the H7N9 epidemic in China has been observed, analyzed and reported as a signal indicating a possible risk of a larger outbreak in the very near future (Kelland, 2013; Morens and Fauci, 2013; Schenk et al., 2013; Yoshikura, 2013), the successive crises from the SARS to the H7N9 epidemic in Asia provide an appropriate (if not the best) natural context for studies investigating consumers' self-protective behavior in the field of hospitality management.

This study intends to develop and examine a model for restaurant diners' self-protective behavior in response to an epidemic crisis with longitudinal data consisting of research sample members' responses to both the 2003 SARS and the 2013 avian influenza A(H7N9) epidemics. Accordingly, the remainder of this paper is organized as follows. Research on perceived physical risk and self-protective behavior is first summarized. Candidate models elicited from the above summary are briefly introduced and the applicability of the models for restaurant diners' self-protective behavior in response to an epidemic outbreak is deductively reviewed subsequently. A prospective model is proposed based on the most applicable model elicited from the above review and followed by the hypotheses formulated for this study. Afterward the procedural, measuring, and analytical design of the empirical examination on both theoretical and managerial applicability of the proposed model are described respectively. Finally, the analyzed results are presented and followed by a further discussion of the results and their implications.

2. Literature review and hypothesis construction

Ehrlich and Becker (1972) define a self-protective behavior as an averting behavior used by consumers to reduce the probability of an adverse outcome or as an action taken to reduce personal or group vulnerability to a risk. Taylor (1974) also indicates that a self-protective behavior is a corresponding function of a perceived risk which has been recognized by consumers. Perceived risk has been identified by six specific risk types in the extant literature, Jacoby and Kaplan (1972) depict five (i.e., financial, performance, physical, psychological and social risks) and Roselius (1971) identifies the other (i.e., time risk). Of the six risk types, this current study focuses on restaurant diners' perceived physical risk associated with possible plague infection which happened not only in the dining space but also in the mutual interactions between customers, service staff, and other customers in a restaurant dining service delivery system during an epidemic crisis.

2.1. Research of self-protective behavior

As a corresponding function of an individual's perceived physical risk, individual's self-protective behavior has been explored and discussed in terms of industrial, food, and daily activity safety. One of the most popularly discussed social contexts is where one plays the role of a worker in the workplace. In terms of industrial safety, researchers (Cohen et al., 1979; Peters, 1991) examine and suggest effective strategies or techniques which can influence or encourage individual workers' interest in and attitude toward adopting greater extent of self-protective behavior against workplace hazards. More specifically, Vaughan (1993) examines immigrant workers' self-protective behavior in response to the environmental hazards of pesticide exposure. The other popularly discussed social context is where one plays the role of a consumer in the marketplace. Extant research regarding consumers' behavior resulted from their perceived physical risks has been mostly discussed in terms of 'food safety behavior.' In response to unsafe food such as milk containing the recombinant bovine growth hormone (rbGH) (e.g., Grobe and Douthitt, 1995) or beef contaminated by the bovine spongiform encephalopathy (BSE) (e.g., Pennings et al., 2002), the safety behaviors refer to actions being taken to assure the safety of food, including behaviors of seeking information, food preparation, and food purchase (Schafer et al., 1993). Since the conceptual constructs and performing patterns of a person's self-protective behavior appear to be different among diverse contexts where he/she plays different social roles in various daily activities, Weinstein (1989) extends the application and understanding of the individual's self-protective behavior to various daily situations. He discusses the effect of prior personal experiences of accidents and an individual's post self-protective behavior in response to the risk of the occurrence of future identical accidents occurrence in daily life, such as the attention to the use of seat belts in the event of automobile accidents, individual crime prevention efforts due to previous criminal victimization (except rape), natural hazard preparedness and compliance with evacuation warnings after prior experience of natural hazards, and changes in smoking behavior after the occurrence of myocardial infarction. On the other hand, in contrast to the comparisons between multiple contexts, Tewksbury (2003) specifically explores the effect of college students' lifestyle characteristics on their self-protective behavior of guardianship adoption in response to the risk of criminal victimization.

2.2. Theoretical models of individual's self-protective behavior

Although an individual's self-protective behavior has been explored and discussed in a variety of social contexts, related studies which involve applying or proposing theoretical models for the self-protective behavior can be found primarily in the fields of food and industrial safety.

In the field of consumer food safety, there are two representative studies of individual's self-protective behavior. Schafer et al. (1993) examine the application of the Health Belief Model to food safety and confirm the actions that people usually take to assure the safety of food. They reveal that people's perceived personal susceptibility, self-efficacy (perceived sense of control), motivation to maintain good health, and demographics such as age, gender and household size can be used to predict consumers' self-protective behavior. Grobe et al. (1999) propose an rbGH risk-perception classification scheme based on Weinstein's (1988) five-stage precaution adoption process model and examine differences among research subjects classified by the scheme. In the study, they define 'consumer's self-protective behavior' as the actions such as seeking assurance that purchased milk came from non-treated herds and to reduce or stop milk consumption in response to the health threat caused by rbGH contained in milk. The findings of the above studies show that consumers' risk-attitude, product involvement, gender, age, education attainment, income, and household size are important factors associated with the undertaking of their self-protective behavior. Besides, the above consumer studies also provide a standard analytical design to examine a model's applicability to people's self-protective behavior in particular contexts.

In the field of industrial safety, DeJoy (1986, 1996) proposes models of workers' self-protective behavior in the workplace. DeJoy (1986) proposes a behavioral-diagnostic model for analyzing the determinants of workers' self-protective behavior and developing effective accident prevention strategies based on the PRECEDE framework from models of health behavior. To take this research further, DeJoy (1996) reviews and analyzes the applicability of health behavior models to workers' responses to possible job-related hazards then proposes a four-stage integrative theoretical framework to conceptualize the self-protective behavior. Although no empirical examination is conducted in DeJoy's studies, they indeed set a standard for research design for examining an individual's self-protective behavior and provide a paradigm

of model proposition for the coming self-protective behavior research.

2.3. A prospective model derived from individual's health behavior theories

According to the above review, the general area of health behavior seems to be the most appropriate academic domain offering sufficient amount of sophisticated and applicable theoretical models for diners' self-protective behavior in response to a perceived physical risk of possible plague infection in a restaurant during an epidemic crisis. Based on units of health behavior being undertaken, Glanz et al. (2009) classify selected models into three categories. The three categories of health behavior models are: (1) models of individual health behavior, (2) models of interpersonal health behavior and (3) community and group models of health behavior change, respectively. Consistent with the research scope of the current study, six individual health behavior models (i.e., Health Belief Model, Theory of Reasoned Action, Theory of Planned Behavior, Integrated Behavioral Model, Transtheoretical Model, and Precaution-Adoption Process Model) included in the first category will be deductively reviewed for the specific research interests of this study in the following sections.

Of the six models, Health Belief Model, Theory of Reasoned Action, Theory of Planned Behavior and Integrated Behavioral Model are proposed similarly on the basis of value-expectancy approaches to human decision making. From the perspective of value-expectancy, people's actions in response to a perceived physical risk are logically assumed to be rational and consistent with their goals, expectations and values by pursuing the maximization of expected utility (Cleary, 1987). In other words, value-expectancy models try to explain health behavior by focusing on the rational pursuit of a particular action's utility maximization. However, the rational decision-making process can be conducted only in the context that individuals are able to precisely assess both the likelihood and the severity of physical losses caused by a particular hazard.

Rather than focusing on determinants (e.g., value and utility) of health behavior, Transtheoretical Model (TTM) and Precaution-Adoption Process Model (PAPM) emphasize the stages of changes in an individual's behavior. Weinstein et al. (1998) summarize four principal elements and assumptions underlying stage-based models: (1) a category system to define the stages; (2) an ordering of the stages; (3) common barriers to change faced by people in the same stage, and (4) different barriers to change faced by people in different stages.

TTM consists of five principal stages: precontemplation, contemplation, preparation, action, and maintenance (Prochaska et al., 1992). In the stage of 'precontemplation,' people do not seriously think about changing their behavior. Then, they start to think about changing their behavior in the near future (i.e., about six months) in the 'contemplation' stage. In the subsequent 'preparation' stage, people intend and have plans to make a behavioral change in the very near future. As the fourth stage, 'action' usually denotes a six-month period of time from the day starting the change of behavior. The final stage 'maintenance' refers to the time period from the end of action to the termination of changes in behavior.

Weinstein (1988) proposes a five-stage PAPM to explain how a person comes to decisions to take action and how he or she translates that decision into action (see Table 1). There are two assumptions underlying the model. First, an individual advancing to the next stage needs to accept the idea defining the current stage. Second, the stages are cumulative. Accordingly, the model assumes that one must advance through a series of distinct stages before taking an action to protect oneself. The first stage occurs when an individual learns of the existence of the hazard. In stage two, the individual believes that there is a significant probability that others will experience the hazard. Subsequently, the individual in the third stage believes he/she is personally susceptible to the hazard. In the fourth stage, the individual expresses the intention to engage in self-protective behavior. The individual may persist in the fourth stage by means of using barriers such as financial cost, time cost, or social cost (e.g., embarrassing nature of the protective behavior). Finally, only by adopting the self-protective behavior may the individual advance to the final stage of the process.

The original five-stage PAPM is further stretched to a more detailed seven-stage model in Weinstein et al. (2009). The seven stages are: unawareness of the issues, disengagement of the issues, indecision about acting, decision not to act (deviating from the process of decision making), decision to act (advancing on the process of decision making), action, and maintenance. In fact, the added 'maintenance' had been uniquely proposed in the TTM and the expanded PAPM seems to be much more applicable to people's reluctant health behaviors (e.g., dietary change and smoking cessation). As a result, the expanded seven-stage PAPM does not seem to be appropriate for underlying people's spontaneous self-protective behavior as the original five-stage PAPM does.

The primary similarity between TTM and the five-stage PAPM is on the stage-based framework. However, even some stages with similar names are defined according to quite different criteria. In essence, while TTM emphasizes days or months until intended action, the five-stage PAPM focuses more on the mental state or the action taken in each of the decision making stages. Besides, although both models assume that people go through stages before modifying their behaviors, different time horizons can be simply found between them. Obviously, TTM's proposition of a relatively substantial long lead-time before taking action makes the model not suitable to contexts of urgent hazards or exigent risks.

3. Conceptual framework and research hypothesis

3.1. Derivation of the perspective model

According to the above description and comparison, of the six individual-oriented health behavior models, the five-stage PAPM could be most appropriate and suitable for diners' self-protective behavior in response to the physical risk caused by an outbreak crisis. Therefore, based on the five-stage PAPM, a corresponding perspective model was proposed in this study (Table 2).

There were five sequential stages of restaurant diners' self-protective behavior proposed in the prospective model such as learning the outbreak but perceiving no risk, acknowledging others are at risk, acknowledging personal risk but not intending to act, intending to act, and engaging in self-protective behavior. Based on the prospective model, a classification scheme for the case of SARS outbreak was derived and used to divide sample units into five corresponding types. In order to verify the theoretical and managerial applicability of the perspective model, hypothesis regarding possible differences between sample units classified in the five types of self-protective behavior adopted were respectively proposed in the following sections.

3.2. Research hypothesis

3.2.1. Examination of theoretical applicability

In order to verify the theoretical applicability of the prospective model in this study, according to the empirical findings and analytical design of the consumer self-protective behavior studies reviewed in Section 2.2 (i.e., Grobe et al., 1999; Schafer et al., 1993), differences between sample units classified in different types were examined on their demographics, product-related psychographic characteristics and behavioral intention to dining service patronage

Table 1
Weinstein's theory of stages in the self-protection process.

Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Learning that the hazard exists	Believing in the significant likelihood for others	Acknowledging personal susceptibility	Intention to act	Adopting self-protective behavior

Table 2
A Prospective model of restaurant diners' self-protective behavior in response to an outbreak crisis.

Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Learning the outbreak but perceiving no risk	Acknowledging others are at risk	Acknowledging personal risk but not intending to act	Intention to act	Engaging in self-protective behavior

in a hypothetical epidemic context. In addition, significant difference between types of respondents on their perceived physical risk toward the caused epidemic should reasonably be expected since peoples' self-protective behavior is a corresponding function of a perceived risk (Ehrlich and Becker, 1972; Taylor, 1974). Finally, as the most central essence of the model's theoretical applicability, dynamic nature of the prospective model which is represented by the advancing tendency of the type of respondent's self-protective behavior along the successive epidemic crises should also be examined.

At first, corresponding hypotheses for the verification of the prospective model's theoretical applicability in terms of distinctions between types of self-protective behavior adopters in their demographics, product-related psychographic characteristics and behavioral intention to dining service patronage in a given context of next epidemic were proposed respectively as follows.

H1. There will be significant differences between different types of respondents in their demographics (i.e., gender, age, marital status, education attainment, income, household size) to the SARS outbreak.

H2. There will be significant differences between different types of respondents in their involvement to restaurant dining services to the SARS outbreak.

H3. There will be significant differences between different types of respondents in their willingness to patronize regular restaurant dining services in a given context of next epidemic (W1).

In terms of perceived physical risk, Pennings et al. (2002) propose that the behavior of consumers in a crisis context can be explained by a combination of risk perception and risk attitude. Whereas risk attitude deals with consumers' interpretation of the content of the risk, the seriousness of adverse consequences or the extent of risk aversion toward a particular crisis, risk perception instead deals with consumers' interpretation of the chance of being exposed to the risk. However, a substantial amount of research on biases in risk perception shows that the estimation of risk probability tends to be a complex process (see the review in Van der Pligt, 1998 for details). Although researchers recognize substantial biases arose from quantitative risk estimations, Van der Pligt (1996) indicates that most research on health behavior seems to disregard the substantial biases and assume that people are able to accurately estimate the magnitude of risks they take. Consistent with findings of the studies regarding biases in individual's risk perception, Chuo (2007) even suggests that the magnitude of people's aversion to the plague (risk attitude) rather than the perceived possibility of being infected by the plague (risk perception) tended to be the dominant determinant in the formulation of the SARS-generated panic.

According to the suggestions from the above studies, of the two perceived risk constructs (i.e., risk attitude and risk perception), only respondents' risk-attitude toward the SARS outbreak was investigated in this study. Based on the elicitation from Grobe et al. (1999), Pennings et al. (2002), Schafer et al. (1993), and Van der Pligt (1996), individual's risk attitude toward a crisis consists of four elements—perceived sense of control, perceived personal susceptibility, perceived personal avertibility, and magnitude of aversion. Therefore, a hypothesis for the verification of the prospective model's theoretical applicability regarding individual's risk attitude toward the caused epidemic was formulated as follows.

H4. There will be significant differences between different types of respondents in their risk attitude—in terms of (a) perceived sense of control, (b) perceived personal susceptibility, (c) perceived personal avertibility, and (d) magnitude of aversion—to the SARS outbreak.

Finally, as one of the most underlying assumptions of a stage-based model, dynamic nature of the prospective model represented by individual's tendency of advancing stages (i.e., types of self-protective behavior adopted) over time should certainly be examined. Therefore, a hypothesis for the verification of the prospective model's theoretical applicability regarding individuals' stage-advancing tendency was formulated as follows.

H5. There will be significant difference between respondents' types of self-protective behavior adopted in response to the successive epidemic crises (i.e., the SARS and the avian influenza A(H7N9)).

3.2.2. Examination of managerial applicability

In terms of managerial applicability, the perspective model should be significantly associated with restaurant diners' different intentional responses to possible offerings resulted from restaurant's crisis management and recovery in a crisis context. As one of the few studies regarding restaurant's crisis management and recovery in SARS outbreak, Tse et al. (2006) suggest practical procedures and strategies to restaurant managers for crisis management and recovery. They claim that restaurant managers have to devise tactics to deal with cost reduction and revenue enhancement when facing such a crisis. Change of marketing mix and decrease customers' perceived physical risk are two of the priorities in the crisis circumstance. However, it still lacks empirical supports.

To verify the perspective model's managerial applicability, according to Tse et al.'s (2006) suggestion, the differences between types of respondents on their willingness to patronize a value-enhanced package of restaurant dining services derived from the proposed tactics in a hypothetical outbreak situation was examined in this study. A hypothesis for the verification of the prospective model's managerial applicability was proposed as follows.

H6. There will be significant differences between different types of respondents in their willingness to patronize 30-percent-off dining services in a disinfection certified restaurant in a given context of next epidemic (W2).

4. Methodology

4.1. Research design

In the context of a rapidly spreading epidemic, this study was trying to investigate consumers' self-protective behavior through a survey sample consisting of diners ranging from those who still patronizing to those who no longer patronizing restaurant dining services. Therefore, it seems inevitable that the design and implementation of the initial data collection of this longitudinal research was on the horns of a dilemma. At first, the initial data collection of this study had to be organized promptly and implemented quickly during or soon after the outbreak since Raphael (1987) indicates that a potential recall bias exists in epidemic-related retrospective research. However, the second horn is that a number of consumers ceased their consumption completely during and even shortly after the outbreak period. In addition, to take possible evolution of individual's self-protective behavior over time into consideration, a case study seemed to be an appropriate, if not the best, approach to reach consumers of a wide range of self-protective behaviors during the SARS outbreak and to investigate their subsequent self-protective behaviors to the following avian influenza A(H7N9) epidemic.

4.2. Data collection

The target population for this study was diners at each of the four locations of a well-known multi-store casual restaurant which is located in central Taiwan. A mailing list consisting of 820 customers who had patronized the restaurant and enrolled themselves as members of its Diners' Club in 2002 was obtained for mail surveys. Since the WHO-prompted travel ban against Taiwan was issued on May 8 and lifted on June 17 in 2003, the period of the SARS-outbreak in Taiwan can be defined accordingly. In order to minimize respondents' recall errors, on the third of August in 2003, a cover letter from the researcher and a copy of the first edition of questionnaire were mailed to each individual on the mailing list for the first data collection of this study. The club members were requested to complete and mail the questionnaire back to the researcher by using the stamped addressed envelope.

As the ensuing epidemic after the SARS outbreak since 2003, the first imported H7N9 infected human case from China was confirmed in Taiwan on 3 April 2013 (Lo et al., 2013) and the number of notified cases in China kept increasing, the second data collection of this study was implemented in 2013. On 12 September, a cover letter from the researcher and a copy of the second edition of questionnaire were mailed to each individual on the mailing list consisting of the 294 respondents who participated in the first survey of this study in 2003. They were informed by the cover letter that the researcher will offer a reward of 200 NT dollars (about 7 US dollars) by registered mail for their participation. They were requested to complete and mail the questionnaire back to the researcher also by using the stamped addressed envelope. In order to immerse the respondents in a given scenario of the epidemic crisis currently occurred in China, prior to their question answering, respondents were requested to read a brief introduction to avian influenza A(H7N9) virus and reports of both current international outbreak news on human infection with H7N9 and domestic surveillance which were retrieved from the official website of Center for Disease Control, R.O.C. (Taiwan) as of September 10, 2013 (http://www.cdc.gov.tw/professional/ThemaNet.aspx?treeid=beac9c103df952c4&nowtreeid=E5EA0E1018FF0E91&did=731) and pretended Taiwan has been in the identical situation of the H7N9 outbreak in China.

Table 3
Items for determining respondents' typology of self-protective behavior adoption.

Types	P-types
Did you perceive that people are at risk of infection from the SARS epidemic?	Do you perceive that people are at risk of infection from the H7N9 epidemic?
Did you perceive personal risk of infection from the SARS epidemic	Do you perceive personal risk of infection from the H7N9 epidemic
In comparison with the days before, your intention to dine out in a restaurant during the SARS outbreak period...	In comparison with the days before, your intention to dine out in a restaurant during the H7N9 outbreak period...
In comparison with the days before, the frequency of your actual dining out in restaurants during the SARS outbreak period...	Under the constraint of your real life, in comparison with the days before, the frequency of your actual dining out in restaurants during the H7N9 outbreak period will...

4.3. Instrument development

Two editions of structured-undisguised questionnaire were respectively developed for the first and second (follow-up) data collection. Data regarding respondents' self-protective behaviors in response to the successive epidemic crises (i.e., SARS and H7N9) were respectively collected via the two editions of questionnaire. Based on the content description of the classification scheme proposed in this study, four measurement items were designed to determine the typology of respondents' self-protective behaviors in response to the SARS and H7N9 epidemics in each edition of the questionnaire (see Table 3). The operating process of the typology determination is described in connection with the items' functions in Section 4.4.

In the first edition of questionnaire, respondents' demographics, self-protective behaviors during the outbreak period, risk attitude toward the SARS epidemic, involvement with dining services, and their willingness to patronize normal and value-enhanced restaurant dining services (i.e., W1 and W2) in a given context of next epidemic were requested. On the other hand, to investigate respondents' self-protective behaviors in the given context of H7N9 outbreak was the primary mission of the second edition of questionnaire. In general, it took no more than 15 min for a respondent to finish each edition of the questionnaire.

In the first edition of questionnaire, respondents' personal characteristics such as their demographics, risk-attitude toward the SARS epidemic, and product involvement with restaurant dining services were measured by multi-item scales. Based on the elicitation from Grobe et al. (1999), Pennings et al. (2002), Schafer et al. (1993), and Van der Pligt (1996), respondent's risk attitude toward the SARS epidemic were measured by perceived sense of control, perceived personal susceptibility, perceived personal avertibility, and magnitude of aversion on a Likert 5-point scale ranging from '1 = strongly disagree' to '5 = strongly agree' (see Appendix A). In the specific interests of this study, McQuarrie and Munson's (1992) eight scale items for the measurement of consumers' "enduring involvement" with a product were modified to measure respondents' product involvement with restaurant dining services on a Likert 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree) (see Appendix B).

To examine the Hypothesis 6, respondents' willingness to patronize normal restaurant dining services (W1) and a value-enhanced package of restaurant dining services (W2) in a given context of next epidemic were requested via the first edition of questionnaire. Based on the suggestion of Tse et al. (2006, p. 9), a package of 30-percent-off sales discount plus strong measures of thermal scanning all diners and an official-certified disinfection was proposed to be the value-enhanced package of restaurant dining services. Respondents were first asked to indicate their W1, and

followed by questions regarding their W2 on a 5-point scale (from '1 = definitely will not' to '5 = definitely will').

In the final section of the questionnaire, personal information regarding respondents' gender, age, marital status, income, education attainment and household size were requested. While the 'gender' and 'marital status' items were measured on a dichotomous type of scale, the 'age,' 'income,' and 'education attainment' items were measured on ordinal scales, and the 'household size' item was measured on a ratio scale.

4.4. Data analysis

According to the classification scheme proposed in this study, respondents of the initiate survey were classified into each of the five types based on the standing stages of their self-protection behavior adoption during the days of SARS outbreak. In the same veins, respondents of the second survey were classified into each of the five progressed types (P-types) based on the standing stages of their anticipated self-protection behavior adoption in the given context that Taiwan has been in the identical situation of the H7N9 epidemic as of September 10, 2013 in China. Taking the classification of respondents' self-protective behavior in response to the SARS outbreak as an example, the procedure of typology determination based on respondents' responses to the four items developed for typology classification is described as follows.

In the first two items—"Did you perceive that people are at risk of infection from the SARS epidemic?" and "Did you perceive personal risk of infection from the SARS epidemic?"—a dichotomous (yes vs. no) type of scale was used to distinguish the Type 1 respondents (reported "no" to the first question) and the Type 2 respondents (reported "yes" to the first question and "no" to the second question) from the others in the research sample. The third item—"In comparison with the days before, your intention to dine out in a restaurant during the SARS outbreak period. . ."—was measured on a 4-itemized scale (i.e., increased, did not change, decreased, or ceased completely) to distinguish the Type 3 respondents from the candidates for the other two types. At this point, the non-Type 1 and non-Type 2 respondents who reported increased or unchanged intentions to dine out were classified into Type 3. The fourth item—"In comparison with the days before, the frequency of your actual dining out in restaurants during the SARS outbreak period. . ."—was also measured on the 4-itemized scale to divide the unclassified respondents into the typologies of Types 4 and 5. While the unclassified respondents who reported 'ceased completely' dining out in restaurants during the SARS outbreak period' were classified into Type 5, and all the rest respondents were classified into Type 4. On the other hand, by applying the same procedure, respondents of the second survey were classified into each of the five P-types of self-protective behavior adoption in response to the H7N9 epidemic.

In order to verify the theoretical applicability regarding distinction between stages of the prospective model, differences of respondents' demographics, product involvement, four elements of risk-attitude and their W1 and W2 among the five types were examined by using one-way ANOVA, Kruskal–Wallis, and Chi-square tests, accordingly. On the other hand, to verify the theoretical applicability regarding individuals' advancing tendency among the stages of the prospective model, the progress of respondents' self-protective behavior adoption over time should be confirmed empirically. Accordingly, respondents' P-type of self-protective behavior adoption should be expected to advance their type of self-protective behavior adoption. Therefore, Wilconxon signed rank sum test was used to examine differences between respondents' types and P-types of self-protective behavior adoptions along the two epidemics over time. SPSS 11.5 was utilized for data processing and a level of significance of .05 was accepted for all statistical tests in this study.

5. Results

5.1. The research sample

Of the 820 club members on the mailing list for the original data collection, 39 persons could not be reached due to incorrect addresses. Two hundred and ninety-five out of the 781 club members reached mailed back the questionnaire between August 6 and September 9, 2003 (verified by the mailing date stamp); however, one of the respondents did not complete the questionnaire. As a result, the original research sample (i.e., sample t_1) of this study consisted of 294 respondents who completed and mailed back the first edition of questionnaire and a completion rate of 37.6% was achieved. The demographic profile of the respondents summarized in Table 4 shows that the composition of sample t_1 can represent the population of restaurant diners in Taiwan fairly well.

Ten years later, all members of sample t_1 were approached again, and 88 of them (30% of the sample t_1) were successfully investigated via the second edition of questionnaire between September 12 and October 11, 2013. Although sample mortality is an inevitable problem in longitudinal research (Wimmer and Dominick, 2011), except for income and marital status which are of a reasonable and acceptable transformation during the decade, comparison of demographic data (shown in Table 4) and frequency distributions of self-protective types (shown in Table 8) for the original and follow-up sample (i.e., sample t_2) suggests that sample t_2 was not significantly biased. In other words, in terms of self-protective behavior, the progress of the 294 respondents in sample t_1 during the decade can be well represented by the 88 respondents retained in the sample t_2.

5.2. Estimation of the effect of non-response

In order to estimate possible effects of non-response, respondents of the sample t_1 were split into two equal sized groups in terms of the responding sequence and the later-responding respondents were projected to all non-respondents. No significant differences were found between the data provided by the earlier- and later-responding respondents by using *t*-tests and *Chi*-square tests accordingly. As a result, it is assumed that there was no significant effect of non-response.

5.3. Theoretical applicability of the perspective model

Frequency distribution of the respondents of the sample t_1 classified into the five types is shown in Table 5. More than sixty percent of the respondents ($n = 186$) perceived personal risk but 18 of them did not intend to adopt self-protective behavior during the days of the SARS outbreak. Only 45 of the 168 respondents who had planned to adopt self-protective behavior did cease their restaurant dining patronage completely. On the other hand, there were still 84 (28.6%) respondents who perceived no personal risk at all and 24 (8.2%) respondents perceived that only others were at risk during those days.

Results regarding demographic, product-related psychographic, risk-attitude and willingness of dining service patronage differences between the five types of respondents are shown in Tables 5–7, respectively. There were significant differences in respondents' W1 and the frequency distributions of respondents' marital status and three (i.e., perceived sense of control, perceived personal avertibility, and magnitude of aversion) of the four risk-attitude elements between the five types. Relatively more unmarried respondents were in Type 1, Type 2 and Type 3, and

Table 4
Demographic profile of respondents.

Sample t_1 in 2003	Freq.	%	Sample t_2 in 2013	Freq.	%
Gender (valid N = 292)			Gender (valid N = 88)		
Male	71	24.3	Male	21	23.9
Female	221	75.7	Female	67	76.1
Age (valid N = 294)			Age (valid N = 88)		
Under 20	13	4.4	Under 30	5	5.7
20–24	41	13.9	30–34	12	13.6
25–29	83	28.2	35–39	21	23.9
30–34	61	20.7	40–44	14	15.9
35–39	40	13.6	45–49	15	17.0
40–44	31	10.5	50–54	11	12.5
45–49	11	3.7	55–59	6	6.8
50 or above	14	4.8	60 or above	4	4.5
Education level (valid N = 293)			Education level (valid N = 88)		
Secondary school	35	11.9	Secondary school	10	11.3
University/undergraduate	204	69.6	University/undergraduate	47	53.4
Postgraduate or above	54	18.4	Postgraduate or above	31	35.2
Marital status (valid N = 291)			Marital status (valid N = 85)		
Not married	153	52.6	Not married	22	25.9
Married	138	47.4	Married	63	74.1
Income per month (NTD) (valid N = 281)			Income per month (NTD) (valid N = 86)		
20,000 or less	55	19.6	40,000 or less	11	12.8
20,001–40,000	113	40.2	40,001–60,000	11	12.8
40,001–60,000	66	23.5	60,001–80,000	18	20.9
60,001–80,000	27	9.6	80,001–100,000	15	17.4
80,001 or above	20	7.1	100,001 or above	31	36.1
Family size (valid N = 294)			Family size (valid N = 87)		
1	28	9.6	1	10	11.5
2	39	13.4	2	13	14.9
3	70	24.0	3	20	23.0
4	67	22.9	4	22	25.3
5	44	15.1	5	12	13.8
6 or more	44	15.0	6	10	11.5

Table 5
The frequency distribution and profiles of the five types of respondents (sample t_1).

	Type 1	Type 2	Type 3	Type 4	Type 5
N = 294	84 (28.6%)	24 (8.2%)	18 (6.1%)	123 (41.8%)	45 (15.3%)
Marital status	53/30	14/9	13/5	56/66	17/28
Sense of control	3.33 (1.07)	3.63 (1.28)	4.28 (1.02)	3.95 (.95)	4.09 (1.04)
Personal avertibility	3.17 (1.14)	3.33 (1.31)	3.50 (1.04)	3.76 (.98)	4.20 (.97)
Magnitude of aversion	2.87 (.99)	3.29 (1.04)	3.72 (.96)	3.59 (.79)	4.16 (.85)
W1	2.22 (.59)	2.25 (.74)	1.89 (.58)	1.94 (.39)	1.27 (.50)
W2	4.06 (.70)	4.13 (.99)	3.56 (1.15)	3.76 (.84)	3.78 (1.11)

W1: Respondent's willingness to patronize regular restaurant dining services in a given context of next epidemic.
W2: In the given situation, respondent's willingness to patronize a value-enhanced package of dining services (i.e., 30-percent-off dining services in a disinfection certified restaurant).
Note: There are values of frequency distribution, frequency ratio or mean/standard deviation of corresponding variables shown in the columns across the five types.

conversely, relatively more married respondents were in Type 4 and Type 5. The results also reveal a significant straight ascending pattern of the magnitude of individual's aversion to the SARS outbreak from Type 1 to Type 5 respondents. However, no significant differences were found on respondents' age, household size, product involvement (Cronbach's α = 862), education attainment, income, gender and perceived personal susceptibility between the five types. Nevertheless, the theoretical applicability regarding the distinction between stages of the prospective model is empirically supported in this study.

Table 6
Results of chi-square tests between the five types (sample t_1).

Variable	N	χ^2	df	p
Marital status	291	13.788	4	.008
Gender	292	1.274	4	.866

Note: Cases in the sample of incomplete responses were excluded from the analyses.

Frequency distributions of the respondents of the sample t_2 classified in the five types and P-types self-protective behavior adoption are shown in Table 8. The advancing tendency of respondents' self-protective behavior adoption over time from types to P-types is supported by the significant result of Wilconxon signed rank sum test shown in Table 9.

Table 7
Results of one-way ANOVA between the five types (sample t_1).

Variable	N	F	df	p
Sense of control	294	15.818	293	.000
Personal susceptibility	294	2.296	293	.059
Personal avertibility	293	8.261	292	.000
Magnitude of aversion	293	17.299	292	.000
Involvement	294	1.115	293	.349
Household size	292	.746	291	.561
W1	292	27.572	291	.000
W2	294	17.307	293	.000

Note: Cases in the sample of incomplete responses were excluded from the analyses.

Table 8
The frequency distributions of the five types/P-types of respondents.

	P-type 1	P-type 2	P-type 3	P-type 4	P-type 5	Freq. (Nt_2)	Freq. (Nt_1)
Type 1	4	3	2	17	2	28 (31.8%)	84 (28.6%)
Type 2	0	0	0	1	2	3 (3.4%)	24 (8.2%)
Type 3	0	1	0	0	0	1 (1.1%)	18 (6.1%)
Type 4	2	1	0	24	9	36 (41.0%)	123 (41.8%)
Type 5	1	0	0	9	10	20 (22.7%)	45 (15.3%)
Freq.	7 (8.0%)	5 (5.7%)	2 (2.2%)	51 (58.0%)	23 (26.1%)	88 (100.0%)	294 (100.0%)

Table 9
Result of Wilconxon signed rank sum test between types and P-types (sample t_2).

Positive ranks	Negative ranks	Ties	z	p
$n = 36$	$n = 14$	$n = 38$	3.692	.000

$N = 88$.

5.4. Managerial applicability of the perspective model

Significant difference between the five types of respondents was found on their willingness to patronize a value-enhanced package of dining services in a given context of next epidemic (i.e., W2) (shown in Table 7). It means that '30-percent-off dining services in a disinfection certified restaurant' was not equally attractive to the five types of respondents. The result not only confirms the effectiveness of the practical suggestion from Tse et al. (2006) but also empirically supports the prospective model's managerial applicability in this study.

6. Discussion and conclusions

This study is designed to conceptually propose and empirically examine a theoretical model for restaurant diners' self-protective behavior in response to an epidemic crisis. As one of the first attempts to commence a research stream of restaurant diners' self-protective behavior in an epidemic crisis, this study proposes and verifies a model of restaurant diners' self-protective behavior empirically. Based on the findings of this study, also as one of the most important contributions of this study, a mechanism which explains the emergence of restaurant diners' self-protective behavior in an epidemic crisis is further discussed as follows.

6.1. Theoretical implications

Based on the findings of this study, the mechanism of restaurant diners' self-protective behavior emergence in an epidemic crisis consists of both progression and moderation parts. The five-stage self-protective model verified in this study may represent the progression part of the mechanism. The moderation part regulates the extent of self-protective response during the course of progression. The operation of the two parts of restaurant diners' self-protective mechanism in response to an epidemic crisis is further described respectively as follows.

At the very beginning, restaurant diners stand on the first stage of the model as soon as they recognize the existence of an epidemic crisis. In general, the type of self-protective behavior restaurant diners adopted is significantly associated with their risk-attitude toward the epidemic. The results of this study show that three risk-attitude elements were significantly different between the five types of self-protective adopters. Of the elements, magnitude of restaurant diners' aversion to infection is the most powerful determining indices to reflect the amount of their progression along the five stages.

However, the extent of restaurant diner's self-protective behavior progresses is moderated by a 'self-regulated priming effect (Higgins, 1997)' which is triggered by restaurant diners' own marital status in the crisis context. Many studies have been widely conducted to investigate the self-regulated priming effect on a variety of consumers' behavior by manipulating their self-view through such as referencing tasks (e.g., Aaker and Williams, 1998), situational contexts (e.g., Briley et al., 2000), and primes (e.g., Gardner et al., 1999). Among these studies, Mandel (2003) reveals a self-construal priming effect on consumers' risk-taking (the antithesis of self-protective) behavior and confirms that individuals demonstrate varying degrees of risk tolerance across experimental manipulations in which either their 'independent self' or 'dependent self' is primed. Aaker and Lee (2001) assure that consumers of an independent self tend to be gain-attainment focused and those of an interdependent self tend to be loss-prevention focused. Besides, Lee et al. (2000) confirm that consumers with a gain-attainment focus will regulate their behavior toward positive outcomes such as hedonic advancement and pleasure achievement, while those with a loss-prevention focus will regulate their behavior toward negative outcomes such as safety assurance and warranty request. As an application of the above research findings, restaurant diners may tend to be either gain-attainment or loss-prevention focused and demonstrate varying degrees of risk aversion when their independent or dependent self-view is activated. In specific, when restaurant diners' independent self is activated in response to an epidemic crisis, they may tend to limit the progression of their self-protective behavior in order to attain gains (e.g., convenience, enjoyments of the senses and hedonic experiences) from their dining service patronage. Contrary, those whose dependent self is activated may tend to adopt advanced types of self-protective behavior to avoid potential losses (e.g., personal infection or risking their lives) caused by the patronage in such a crisis. Therefore, results of this study 'significant more married restaurant diners were found in relatively advanced types (i.e., Type 4 and Type 5) of self-protective behavior adopters and more unmarried restaurant diners were found in less-advanced types of self-protective behavior adopters' can be interpreted with the above reasoning that married restaurant diners' dependent self and unmarried restaurant diners' independent self seem to be activated respectively in response to an epidemic crisis and the progression of their self-protective behavior adoption is correspondingly moderated by the self-regulated priming effect.

6.2. Managerial implications

People are hardly consistent in their consumption behaviors under a threat of a fatal contagious disease, especially with regard to the restaurant dining services which are of a highly interpersonal-contact nature. From the managerial perspective, to understand the consumers a business wants to serve is always the primary principle of planning an effective strategy. Therefore, the results of this study will help restaurant managers to better understand that unmarried consumers may tend to adopt lower level of self-protective behavior in an epidemic crisis. In addition, a valued-enhanced package consisting of both increased financial benefits (i.e., sales promotion) and decreased physical risk is confirmed to

be an effective means to stimulate potential consumers' willingness to patronize restaurant dining services during an epidemic crisis.

In order to change people's behavior in an epidemic crisis, risk communication has been one of the most popularly used approaches by governments or business organizations. In fact, the purposes of the risk communication are not only trying to educate the public on the accurate risk perceptions but also attempt to change people's attitudes toward the crisis (e.g., epidemic outbreak, milk with rbGH, BSE in beef). Since perceived sense of control, perceived personal avertibility, and magnitude of aversion are assured to be distinctive psychographic characteristics between types of restaurant diners in this study, it can be expected that their self-protective behavior will be minified in effect if (1) the trend of outbreak is perceived controllable; (2) official and medical supports are perceived not only sufficient but also effective; and (3) their aversion to the epidemic can be relieved. However, even by conducting a precise communication program, changing people's negative attitudes is probably the most difficult mission that communicators face because attitudes inherently tend to be enduring, let alone the conventional improvised practices.

It is not uncommon to see the broadcast of agricultural officers of the BSE affected areas or representatives of the contaminated livestock farms who demonstrate the safety of eating beef or chicken and the like on TV news. Unfortunately, it seems that the public panic has not been abated by these dramatic demonstrations. One of the most primary reasons for the communication failure lies in an inappropriate performer embodying social influences. In other words, the communication effect may be significant if similar demonstrations have been performed by reputed celebrities, opinion leaders or reference groups and especially in the form of an actual endorsement. For instance, managers can invite well-respected bloggers to experience value-enhanced packages of dining services for free and listen to a presentation of the disinfection procedures conducted in their restaurants in exchange for creating positive blog diary entries.

6.3. Limitations and future research

This study suffers from several limitations as expected in all research. First of all, as a case study, the generalizibility of the findings is limited. A more comprehensive sample is needed for future research. To deepen the understanding of restaurant diners' self-protective behavior, more factors (e.g., geographic, cultural, and ethnic), different restaurant categories, and various types of risks in the services context could also be incorporated in future research models.

Second, although individuals' risk perception tends to be overestimated in the context of epidemic outbreak, the exclusion of risk perception is still the irreparable deficiency of the current study. While people of 'unrealistic optimism' tend to estimate their risk of experiencing a negative event as below average to comparable others (Weinstein, 1980), restaurant diners' over-reacting self-protective behavior in the context of epidemic outbreak could be realized as a consequence triggered by their 'unrealistic pessimism' of vulnerability. Since the unrealistic pessimism tends to amplify people's estimation of the risk perception (i.e., estimated probability of infection) in an epidemic crisis, 'comparative risk appraisal (Van der Pligt, 1998; Radcliffe and Klein, 2002; Weinstein, 1984)'—the level of risk a person estimates he/she is taking compared to others—may preclude the effect of subjective biases on risk estimation through a comparative approach. By using the substitute, further research could be carried out to examine the effect of unrealistic pessimism on restaurant diners' self-protective behavior in response to various types of crises. However, when consumer's overreacting self-protective behavior is assumed to be amplified by their significant unrealistic pessimism, it should be noticed that Weinstein's PAPM seems not so appropriate to be the conceptual framework underlying the self-protective behavior since the sequential nature of the model presumes implicitly that people have to perceive other's risk before their personal risk when facing a particular crisis.

Last, based on the above managerial implications, risk communication research is suggested to investigate the relative effectiveness of: (1) the roles of social influences between different performers such as reputed celebrities, opinion leaders or reference groups on the minimization of consumers' overacting protective behavior and (2) interpersonal influence between various electronic word-of-mouth networks on consumers' risk attitude (especially extreme risk aversion) changes.

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Appendix A. The risk-attitude scale to the SARS outbreak

Statement	Strongly disagree	Disagree	Neither	Agree	Strongly agree
1. Whether we will be infected by SARS or not is beyond our control (perceived sense of control, reverse coded).	1	2	3	4	5
2. If we're careful, we can avoid the SARS infection (perceived personal susceptibility).	1	2	3	4	5
3. In spite of the SARS outbreak, we'll dine out if we want to (perceived avertibility, reverse coded).	1	2	3	4	5
4. To avoid infection, we should cease dining out temporarily (magnitude of aversion).	1	2	3	4	5

Appendix B. The product involvement scale for restaurant dining services

Statement	Strongly disagree	Disagree	Neither	Agree	Strongly agree
1. I would be interested in articles about gastronomy and restaurants.	1	2	3	4	5
2. I would like to read *Consumer Reports* articles about restaurants.	1	2	3	4	5
3. I have compared product characteristics among restaurants.	1	2	3	4	5
4. I usually pay attention to ads for dining services in restaurants.	1	2	3	4	5
5. I usually talk about cuisines and restaurants with friends.	1	2	3	4	5
6. I usually seek advice from others before patronizing a restaurant.	1	2	3	4	5

Appendix B (*Continued*).

Statement	Strongly disagree	Disagree	Neither	Agree	Strongly agree
7. I usually take many factors into account before patronizing a restaurant.	1	2	3	4	5
8. I usually spend lots of time deciding which restaurants to patronize.	1	2	3	4	5

Modified from McQuarrie and Munson (1992).

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