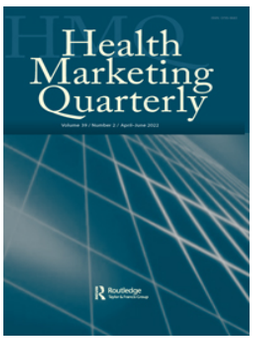

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The relative impact of health communication conveyed via quick response codes: A conjoint experiment among young thai consumers doing grocery shopping

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ABSTRACT

This paper explores the impact of health communication using smartphones and the outcome of healthier purchases when young Thai consumers shop for groceries. A conjoint experiment was arranged whereby participants ($n = 214$) purchased grocery using information conveyed via quick response (QR) codes. Results show that a healthy food label, and a good consumer rating on the food's health, evoked the consumers' tendencies towards interacting with a smartphone in the purchasing situation. In addition, likelihood of buying increased. Further simulations revealed that health communication conveyed via QR codes can be a good investment for brands to increase healthier purchases.

KEYWORDS

Conjoint experiment; health communication; point-of-purchase; quick response code; smartphone interaction

Modern retailing concepts, such as hypermarkets, supermarkets, and convenience stores, have expanded rapidly in Thailand over the past decades (Reardon et al., 2012), and, as a consequence, today's modern retail stores control half of all grocery purchases. Even though traditional fresh markets remain a dominant player in the distribution of groceries, there is a growing concern that the expansion of modern retail stores in Thailand will lead to a trend of consuming food with little nutritional value and those that are high in sugar, salt, and calories (Kelly et al., 2015; Teerawattananon & Luz, 2017). Unhealthy food is associated with negative health issues such as obesity, diabetes, cardiovascular disease, and, in some cases, cancer (Hawkes, 2005, 2008). In fact, obesity has increased considerably in Thailand through the past decades, so that it has become one of the

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South East Asian countries with the highest obesity rate in 2019 (Statista, 2020). This trend is especially observed in young Thai consumers (Hatthachote et al., 2019; Kotruchin et al., 2018), which is alarming since the youth represent the forefront of eating trends in a population. A better understanding of what influences young Thai consumers' choice of healthier food, and how to deal with it, might have an immensely positive effect on the health of Thailand's future population.

Healthy food labels are defined as single-level summary icons that signal that the product being considered is a healthier alternative compared to other food in the category (Hersey et al., 2013). Thus, healthy food labels function as a simple signal (or nudge) in the purchasing situation, and have been proven to influence consumers to make healthier choices (Hersey et al., 2013; Temple, 2020). In addition, it is known that peer consumers' ratings and reviews have a significant impact on purchasing behavior in the whole consumer journey, related to different types of products and services (Bauer & Reisch, 2019; King et al., 2014). Thus, health-related communication, such as healthy food labels and peer consumers' ratings on health, have the potential to influence young Thai consumers to make healthier food choices.

According to Inman et al. (2009), most food purchases are unplanned and dependent upon various factors in the retail environment. In this situation, consumers use their digital devices, such as their smartphones, to make in-store purchase decisions. According to a study by Nasır and Kurtuluş (2016), some of the most common smartphone activities for in-store shopping are "searching product information," "price comparison," and "reading online reviews." Consumers' use of smartphones for shopping is also perhaps driven by their brand and fashion consciousness, impulsiveness, and recreational shopping behavior (Eriksson et al., 2018). Grewal et al. (2018) demonstrate that use of a smartphone leads to more time being spent in the store and allows consumers to inspect product and price options more thoroughly. According to Kallweit et al. (2014) the smartphone's influence on decision-making support during shopping has shifted from the phone being the provider of straightforward information for consumers to being a provider of customized services. In fact, smartphone shopping apps are enabling smart retail shopping and giving the user efficiency plus added shopping value (Dacko, 2017; Fagerstrøm et al., 2020).

A survey by DataReportal (2021) shows that quick response (QR) codes are often used in Thailand. A QR code consists of a matrix bar code or two-dimensional code on a white background that can store a large number of alphanumeric characters which can be quickly read by an imaging device such as a camera on a smartphone (Tiwari, 2016). QR codes give consumers access to valuable information which can support them in the point-of-purchasing situation when shopping for groceries (Grewal et al.,

2018), and healthy food labels are one type of health-related communication that can be conveyed by a QR code in the point-of-purchase situation. Thus, smartphones provide an efficient in-store interaction channel for young Thai consumers; they can assimilate health-related communication through QR codes.

Based on the preceding discussion, the research question for this study was: How can health communication in the physical store, conveyed by a QR code at the point-of-purchase of groceries, influence young Thai consumers' motivation to interact with a smartphone and simultaneously influence their choice of healthier food? The two health-related attributes are investigated in combination with other relevant attributes such as "price," "consumers' ratings on taste," and "country of origin." Thus, this study expands on the understanding of the relative impact of health-related communication in the physical store, conveyed by a QR code, on young Thai consumers' food purchasing behavior. We investigated both young Thai consumers' motivation to interact with the smartphone app conveyed by a QR code, and the likelihood to buy based on the health-related communication. Findings show that "healthy food label" and "consumers' ratings on health" have a positive impact on young Thai consumers' motivation to interact with communication conveyed by a QR code and, in addition, increase their likelihood to buy. Health communication conveyed by digital technology in the physical store, such as QR codes, can be a good investment for brands and retailers to increase the likelihood of young Thai consumers purchasing healthy groceries.

The remainder of the article is structured as follows. First, literature on two health communication attributes, "healthy food labels" and "consumers' rating on health," which are the primary independent attributes in this study, are reviewed. A description of the conjoint experiment used in the study is then given, followed by a discussion of the results of our experiment. Lastly, the results, managerial effects, and recommendations for future research are outlined.

Theoretical framework

Motivation to interact with technology in the physical store and likelihood to purchase

Mehrabian and Russell's (1974) model has been applied on a wide scale to measure approach-avoidance reactions to physical atmospheric factors in a range of situations, particularly those involving retail choice (Baker et al., 1992; Donovan et al., 1994; Donovan & Rossiter, 1982). The model has been further developed to study approach-avoidance reactions to virtual atmospheric aspects in digital scenarios (Eroglu et al., 2001, 2003). Thus,

the Mehrabian and Russell model was considered suitable to account for approach-avoidance responses to digital variables at the point-of-purchase in the current study. Approach-avoidance responses are defined as: (a) the wish to physically stay in (or get out of) the environment, (b) the wish to explore (or avoid) the environment, (c) the desire to communicate with others (or avoid interacting) in the environment, and (d) the degree of enhancement (or hindrance) of performance and satisfaction. Moreover, Mehrabian and Russell suggested that three emotional states intermediate approach-avoidance behavior: pleasure, arousal, and dominance. However, the focus in the current study is not on the emotions elicited but on the impact of the affective state. Thus, the desire to explore (or avoid) the environment was seen as an appropriate dimension to investigate how health communication in the physical store, conveyed by a QR code at the point-of-purchase of groceries, influences young Thai consumers' motivation to interact with a smartphone. Likelihood to purchase the product based on the health communication conveyed via QR codes was measured to investigate whether the information had any impact on the consumers' point-of-purchase behaviors in the physical store.

Healthy food labels

Nations have implemented different policies to promote healthy food and increase the healthiness of consumer diets (Shill et al., 2012). Healthy food labels are one of the easiest strategies for implementing this objective. Healthy food labels, as described by Hersey et al. (2013), are single-level summary icons: logos, symbols, or other signage placed on the packaging of healthy foods. The aim of such icons is to tell consumers that the product is healthy and to affect their decision-making with this information. In physical retail environments, healthy food labels, such as single-level summary icons, are included on the package as a means to communicate the product's healthiness. These labels may also be placed on the retailer's website, or as detail provided using QR codes on product packaging in combination with other product information.

Thailand has a long history of food regulation. Thailand's minister of public health introduced the nation's healthy food label in 2016; it identifies healthier food options per food category (The Choices Programme, 2019). This label is implemented on a product category-specific level; typically, products are labeled in terms of how they compare to products in their category. For example, a sausage that is given a healthy food label will be healthier than other sausages or similar products, as well as adhering to other pre-determined nutrition standards. Therefore, healthy food labels purport to be founded on expert nutritional assessments. Their main aim is

to equip consumers to find and select healthier food. A literature review by Grunert and Wills (2007) suggests that consumers are aware of food nutrition information and see the link between the food they eat and their overall health. Further, consumers prefer basic front-of-package information such as healthy food labels, as they feel able to easily comprehend the meaning of such labels. Hersey et al. (2013), in their literature review regarding healthy food labels, highlight the fact that consumers who refer to healthy food information make quicker decisions at the point-of-purchase when they consult healthy food labels rather than nutrient-specific information. This shows that the information provided by a healthy food label empowers consumers to make a choice comparatively effortlessly. According to numerous empirical studies, consumers who are driven by health considerations, weight control, and product information select products marked with healthy food labels to a greater extent (Reid et al., 2004; Vyth et al., 2009, 2010). As a first assumption, we anticipate that a product with a healthy food label strengthens the motivation to interact with a smartphone in the point-of-purchase situation and, at the same time, strengthens the consumer's likelihood of buying it. A product without a healthy food label will have a reduced motivational effect on the consumer and is therefore less likely to be bought.

Peer consumers' ratings on health

Dellarocas (2003) explains that online consumer review systems are among the most significant channels for creating online word-of-mouth publicity. Organizations can reach large-scale audiences inexpensively and individuals can share their thoughts, responses, and views in a way that the global community can easily access (Dellarocas, 2003). Previous literature on online word-of-mouth (e.g., Chatterjee, 2001; Noone & McGuire, 2014) differentiated between two main types of online word-of-mouth communication: ratings that contain actual user comments on their experience with a product or service, and ratings shown on a scale as individual consumer's quantitative evaluation of their experience with a product or service. When consumers are purchasing products in a retail store, probabilities are omnipresent. For example, when choosing sausages in the grocery store, consumers must consider the probability that the product quality or the market price is correct, and so on. A study by Fagerstrøm et al. (2016) demonstrated experimentally that a consumer rating signals the probability of a successful transaction and therefore works as a guideline when making choices. Studies on the effects of product ratings on consumers' food preferences point in the same direction. For instance, product ratings had the highest importance score among all attributes examined in a study of the

relative importance of different attributes in driving consumer preferences for fresh fish in an e-commerce setting (Sigurdsson et al., 2020). From this, we decided to test the impact of peer consumers' ratings of health attributes in the point-of-purchase situation when young Thai consumers shop for groceries. As a second assumption, we anticipate that a good consumer rating on the health attributes would strengthen the motivation to interact with a smartphone in the point-of-purchase situation and, at the same time, strengthen the consumer's likelihood of buying. A bad consumer rating would create a reduced motivational effect on the consumer and make it less likely that the consumer would buy the product.

Method

The present study used conjoint experimentation. Conjoint experiments are used to match new products or service characteristics with consumers' preferences (Mohr et al., 2010). This method statistically predicts which combinations of attributes are preferred. It does so by asking participants to judge their preferences for attribute combinations (e.g., presence of a healthy food label or peer consumers' ratings of health attributes) that have different predefined levels (e.g., healthy food label and no healthy food label; or good, medium, and bad consumers' ratings of health). The purpose of conjoint experiments is to investigate the participants' tradeoffs for each attribute in the study and thereby uncover the importance of each attribute (Green & Srinivasan, 1978; Green & Wind, 1975).

Participants

Students at the university of this study's third and fourth authors agreed to participate in the study. The sample was comprised of 214 participants (eight cases were not included due to equal values in rank or score on approach and a tendency to avoid engagement with smartphones). There were 40 males and 174 females involved in the study, ranging in age from 19 to 29 (average 21). The participants were told about their rights and that they could leave the experiment at any time. No payment or other types of incentives were given to participants in the study. Participants were enlisted based on the criteria of making the sample as homogeneous as possible regarding age, similarity in socioeconomic status, and so on. However, we also chose to use a student sample due to limited resources; a student sample is easier to access in a university environment than a sample recruited among external participants. This is especially so when the experiment takes place in the environment of a physical space and not online. Moreover, when collecting demographic data, we asked the

participants "How frequently do you use your smartphone in-store to search for grocery product information?" The scale ranged from "Never" (coded 1), "Seldom" (coded 2), "Sometimes" (coded 3), "Often" (coded 4), and "Always" (coded 5). Findings show that 83.5% of the participants reported that they use their smartphone in-store "Sometime" and "Often" to search for grocery product information which indicates homogeneity among participants' use of technology when grocery shopping. An optimal sample size for conjoint analysis is above 200 participants, which is here exceeded ($N = 214$). By making this sample choice, we had a good sample size and some control over possible disturbing effects of participants' background characteristics and over the physical setting for the study, which sought to strengthen the study's internal validity (Selka et al., 2012).

Conjoint design

Five attributes constituted the independent variables of the study. "Healthy food labels" and "consumers ratings on health" were the primary independent variables. We also included "price," "consumers' ratings on taste," and "country of origin" to strengthen ecological validity. Each attribute had multiple levels. Healthy food label had two levels: "healthy food label" and "no healthy food label." Consumers' ratings on health had three levels: five out of five stars, four out of five stars, and three out of five stars. According to Vriens (1994), it is sufficient to use a few realistic price levels in situations where the impact of price is not the primary attribute. Therefore, price had three levels based on a calculation of price for 500 grams of sausages in the market: below average market price, average market price, and above average market price. Consumers' ratings on taste had three levels: five out of five stars, four out of five stars, and three out of five stars. Finally, the last attribute, country of origin, consisted of three levels based on an interview with a target group in the study: Germany, Thailand, and Vietnam. Table 1 shows the five attributes and their respective levels.

The Mehrabian and Russell (1974) model was implemented to examine consumers' approach-avoidance drive to engage with a smartphone in a point-of-purchase scenario while buying groceries. It was decided to measure the approach variable by asking the participants (translated from Thai to English), "How much would you like to *explore* the information from the QR code?" The avoidance variable was measured by asking (translated from Thai to English), "How much would you like to leave and get away from the information from the QR code?" The scale for the approach and avoidance variables ranged from "Not at all" (coded 0) to "Extremely so" (coded 7). The likelihood to buy based on information from the

Table 1. Attributes and levels considered in the study.

Attribute	Levels
Healthy food label	1. Healthy food label
	2. No healthy food label
Consumers' ratings on health	1. Five out of five stars
	2. Four out of five stars
	3. Three out of five stars
Price	1. Below average market price
	2. Average market price
	3. Above average market price
Consumers' ratings on taste	1. Five out of five stars
	2. Four out of five stars
	3. Three out of five stars
Country of origin	1. Germany
	2. Thailand
	3. Vietnam

smartphone was measured by asking the participants (translated from Thai to English), "Based on the information, what would be the likelihood that you would *buy* these sausages?" The likelihood to buy variable scale ranged from "Not at all likely to buy" (coded 0) to "Certainly would like to buy" (coded 7). A main-effects model was chosen for this study since it checks for the direct impact of each stimulus. Further, a full-profile method was selected to gather the data, with each stimulus card described on its own. This was selected due to its contribute to a good ecological validity and it gave us the ability to achieve a fractional factorial design, as well as due to the number of attributes in this study being fewer than six (Hair et al., 2014). When a factorial design is adopted, the number of combinations can be lessened; for this study, 20 stimulus cards (including four hold-out cards) were created in IBM SPSS Statistics 24™.

Apparatus

Holbrook and Moore (1981) suggest that, to guarantee good ecological validity, visual stimuli should be used as stimulus cards for conjoint experiments. As such, to give the study as much realism as possible, a mobile app user interface was devised in Microsoft PowerPoint™. The conjoint experiment was administered via a lecture room presentation to the participants coupled with a questionnaire.

Procedure

The study started by informing the participants about the background of the study and their role (to evaluate the 20 choice situations when shopping for groceries). They were then presented with a scenario in Thai (here translated to English). So there can be shared reference points, Wright and Kriewall (1980) suggest that all evaluations should be given in terms of one

scenario. In our scenario, participants were told to imagine they would be shopping for some groceries for a barbeque party with friends, as follows.

> Assume that you are going to have a barbecue party with your friends. Everybody should contribute, and you have been given the task to do some of the grocery shopping. In your shopping list, you have potatoes, vegetables, barbecue sauces, chicken, and sausages (500 grams). You are now in the grocery store, and you are using your smartphone to scan a QR code on the package to get product information. You are now in the process of selecting the sausages, and the QR code you have scanned gives you the following information regarding your choice.

After seeing and understanding the scenario, the participants were presented with an example of a stimulus card (choice situation) and examples of the evaluation scales. As we chose a full-profile method to collect data, each choice situation (the 20 stimulus cards generated in IBM SPSS^{TM}) were presented separately. Therefore, as listed with SPSS, the first-choice situation was presented as number one; after that, the second-choice situation, the third-choice situation, and so on until all 20 choice situations (the 20 stimulus cards) were shown to them. Simultaneously, the participants evaluated each choice situation by filling in the approach-avoidance evaluation scales and the likelihood-to-buy evaluation scale for each choice situation in a questionnaire (see the described evaluation scales in the Design section). This procedure allowed us to control for all participants receiving the same information regarding the experiment and that the choice situations were presented to them in exactly the same order and with the same presentation style. Participants were instructed to put away any smartphones and PCs, and they were not allowed to interact with each other during the experiment session. The procedure lasted for about 20 minutes.

Results

The findings demonstrate correlations between the observed and estimated preferences for approach (Pearson's $r = 0.973$, $p = .000$), avoidance (Pearson's $r = 0.973$, $p = .000$), and the likelihood to buy based on information from the smartphone (Pearson's $r = 0.982$, $p = .000$). Table 2 indicates the values for the "healthy food label," "consumers' ratings on health," "price," "consumers' ratings on taste," and "country of origin."

Table 2 shows that, on average, participants in the study valued "consumers' ratings on taste" as the most important attribute, scoring an importance value of 22.812% for approach and 22.669% for avoidance related to motivation to interact with the smartphone, and an importance value of 24.175% for likelihood of buying based on smartphone-provided information. The second-most important attribute was "price," which

Table 2. The impact of attributes on approach-avoidance behavior to interact with the smartphone, and likelihood of buying based on health-related communication conveyed by a QR code.

	Motivation to interact with the smartphone								
	Approach ($n = 206$)			Avoidance ($n = 206$)			Likelihood of buying based on information from the smartphone ($n = 214$)		
Attributes and levels	Impact estimate	Standard error	Importance values	Impact estimate	Standard error	Importance values	Impact estimate	Standard error	Importance values
Healthy food label			15.607			14.346			18.410
Healthy food label	0.275	0.049		−0.248	0.046		0.534	0.072	
No healthy food label	−0.275	0.049		0.248	0.046		−0.534	0.072	
Consumers' ratings on health			19.916			21.973			19.694
Five out of five stars	0.210	0.065		−0.286	0.061		0.393	0.096	
Four out of five stars	0.000	0.077		0.086	0.072		0.019	0.112	
Three out of five stars	−0.211	0.077		0.200	0.072		−0.412	0.112	
Price			21.843			20.628			20.522
Below average market price	0.310	0.065		−0.227	0.061		0.483	0.096	
Average market price	−0.058	0.077		−0.007	0.072		−0.102	0.112	
Above average market price	−0.251	0.077		0.234	0.072		−0.381	0.112	
Consumers' ratings on taste			22.812			22.699			24.175
Five out of five stars	0.376	0.065		−0.340	0.061		0.646	0.096	
Four out of five stars	−0.099	0.077		0.076	0.072		−0.109	0.112	
Three out of five stars	−0.277	0.077		0.264	0.072		−0.537	0.112	
Country of origin			19.822			19.868			17.200
Germany	0.057	0.065		−0.097	0.061		0.064	0.096	
Thailand	0.047	0.077		−0.059	0.072		0.193	0.112	
Vietnam	−0.105	0.077		0.150	0.072		−0.257	0.112	
(Constant)	4.444	0.059		2.867	0.055		3.748	0.086	

returned an importance value of 21.843% for approach and 20.628% for avoidance related to motivation to interact with the smartphone, and 20.522% for likelihood of buying based on smartphone-provided information. "Consumers' ratings on health" placed third, with an importance value of 19.916% for approach and 21.9732% for avoidance related to motivation to interact with the smartphone, and 19.694% for likelihood of buying based on smartphone-provided information. "Country of origin" and "healthy food label" were found to be the two least-valued factors, with importance values of 19.882% and 15.607% for approach (respectively) and 19.868% and 14.346% (respectively) for avoidance related to motivation to interact with the smartphone, and 17.200% and 18.410% (respectively) for likelihood of buying based on smartphone-provided information.

When considering the two health-related factors in the study, Table 2 indicates that "consumers' ratings on health" scored five out of five stars and has a positive impact estimate score (0.210) toward approach behavior to smartphone interaction, and a negative impact estimate score (–0.286) toward avoidance behavior to smartphone interaction. A "consumers' ratings on health" scored four out of five stars, and thus has a very low impact estimate score with 0.000 toward approach behavior to smartphone interaction, and 0.086 toward avoidance behavior to smartphone interaction. "Consumers' ratings on health" scored three out of five stars with a negative impact estimate score (–0.211) toward approach behavior to smartphone interaction, and a positive impact estimate score (0.200) toward avoidance behavior to smartphone interaction. Table 2 demonstrates that a product with a healthy food label has a positive estimate score (0.275) toward approach behavior to smartphone interaction, and a negative impact estimate score (–0.248) toward avoidance behavior to smartphone interaction. A product that does not have a healthy food label has a negative estimate score (–0.275) toward approach behavior to smartphone interaction, and a negative impact estimate score (0.248) toward avoidance behavior to smartphone interaction.

Table 3 shows the results from a simulated scenario based on the dependent variable "likelihood to buy." A total of six cases (A to F) were designed based on the result from the conjoint analysis and were analyzed in relation to each other (see Table 2). Case A is referred to as the Top scenario as the five attributes are all set to the top level. Cases B to E are referred to as the Middle scenario as the two attributes of healthy food label and consumers' rating on health are set to vary on a middle level. Scenario F is referred to as the Bottom scenario as the two attributes of healthy food label and consumers' rating on health are set to a bottom level. By keeping the other three attributes in the top level for all the scenarios, we were able to simulate preference probability scores for the five

Table 3. Outcomes of the scenario analysis.

Scenarios	Cases	Attributes and levels					Outcomes			
		Healthy food label	Consumers' ratings on health	Market price	Consumers' ratings on taste	Country of origin	Preference scores	Maximum Utility[a]	Bradley-Terry-Luce[b]	Logit[b]
Top	A	Label	Five out of five stars	Below	Five out of five stars	Thailand	5.996	46.0%	19.9%	30.8%
Middle	B	No label	Five out of five stars	Below	Five out of five stars	Thailand	4.929	13.1%	16.1%	14%
	C	Label	Four out of five stars	Below	Five out of five stars	Thailand	5.623	21%	18.5%	22.6%
	D	No label	Four out of five stars	Below	Five out of five stars	Thailand	4.555	5.6%	14.8%	9.5%
	E	Label	Three out of five stars	Below	Five out of five stars	Thailand	5.192	11.7%	17.2%	16.2%
Bottom	F	No label	Three out of five stars	Below	Five out of five stars	Thailand	4.124	2.6%	16.4%	6.8%

[a]Including tied simulations.
[b]214 out of 214 subjects are used in the Bradley-Terry-Luce and logit methods because these subjects all have non-negative scores.

cases. This is interesting, as the preference probability score, on a scale of 0–100, demonstrates the relative impact of a healthy food label and consumers' rating on health on the likelihood of buying, when we have a highly-competitive market (top level for all other attributes). Table 3 displays the output for each case in terms of three preference probability scores: Maximum utility, Bradley-Terry-Luce, and logit. Maximum utility is best applied in scenarios involving sporadic choices while, conversely, Bradley-Terry-Luce and logit are best used for routine decisions (Hair et al., 2014). The logit approach is advantageous due to the fact that the estimation procedure provides global maximum likelihood approximations (Green & Srinivasan, 1978). As purchasing groceries involves routine and not sporadic choices, to analyze the scenarios, we give logit probability precedence.

The results displayed in Table 3 show that case A is the most preferred according to the logit probability. Among the participants, 30.8% prefer case A, which confirms that it is the Top scenario. More interesting, however, is the drop in the logit probability score for case B, which 14% of the participants preferred. This basically means that, if healthy food labels are lacking, only 14% of the participants are likely to buy, even though everything else regarding the product is Top. The probability score drops even further to 6.8% (case F) if a low consumer rating (three out of five stars) on health is included in the simulation. All the other outcome scores in Table 3 follow the same pattern as the logit probability scores.

Discussion

This empirical study intended to examine the relative impact of health communication using smartphone interaction and the outcome of healthier purchases when young Thai consumers grocery shop. The study's research question that we wanted to answer was: How can health communication in the physical store, conveyed by a QR code at the point-of-purchase of groceries, influence young Thai consumers' motivation to interact with a smartphone and simultaneously influence their choice of healthier food? We designed a conjoint experiment to test the relative impact of healthy food labels and consumers' ratings on health when choosing sausage in the grocery store. The health communication was conveyed via a QR code that consumers scanned with their smartphones, giving them access to the information (healthy food label and consumers' ratings on health). To strengthen the ecological validity, we added price, consumers' ratings on taste, and country of origin to the study. Thus, the combination of attributes measured the impact of health communication (healthy food labels and consumers' ratings on health) relative to other important attributes in

the simulated point-of-purchase situation. The results show that a product with a healthy food label evokes an approach and abates an avoidance tendency to interact with the QR code when using a smartphone in the point-of-purchase situation. Simultaneously, the information from the QR code presented on the smartphone positively impacted the likelihood of buying. A product without a healthy food label had the opposite effect. Our first assumption is, thus, supported. This finding supports previous literature that states that consumers value healthy food labels when shopping, and they understand the information given by the labels (Grunert & Wills, 2007; Hersey et al., 2013). Furthermore, the findings indicate that healthy product labels increase the likelihood of interacting with a smartphone. The results indicate that the participants wanted to explore the food label information provided by the QR code using the smartphone as an interface. This indicates that digital technologies can provide an efficient platform to communicate information regarding health labels in a grocery store. In addition, the results from the conjoint analysis show that a good consumer rating on health evokes an approach tendency and abates an avoidance tendency to interact with the information conveyed by a QR code. Simultaneously, a good consumer rating on health (five out of five stars) increased the likelihood of buying the product. A bad consumer rating (three out of five stars) had the opposite effect. Thus, the second assumption is supported. These results are in accordance with the literature showing that consumers' ratings, used at the point-of-purchase, signal the probability of a successful choice (Fagerstrøm et al., 2016) and guide the consumer when making choices (Sigurdsson et al., 2020). Likewise, as with the healthy product label, digital technologies can provide an efficient platform to communicate information regarding consumers' ratings of products' health attributes in a grocery store.

Managerial implications

This study shows that consumers' ratings on taste were relatively the most important attribute in relation to price, consumers' ratings on health, healthy food label, and country of origin when choosing groceries. This supports the literature that has found that consumers' ratings function as a guide for consumers when making choices (Fagerstrøm et al., 2016). The second most important attribute was price. This makes sense because consumers want information not just regarding quality but also price (Kiran et al., 2012). However, the results show that a healthy food label can clearly increase young Thai consumers' likelihood of buying the investigated product. This is especially indicated by the large drops in preference probabilities in simulation scenarios in which there is no healthy product label, but

all other attributes are at top level (see Case B in Table 3). This bolsters Sherif (1935) view that social proof is a significant influence on individuals' everyday choices as, when circumstances are uncertain, people depend on others' discernments, opinions, and behavior to directly influence their own. Therefore, the result suggests that, from a brand and retailer perspective, healthy product labels conveyed by digital technologies in the physical store can be a good investment, especially in a highly competitive market with price pressure, and in which solutions for consumers to access peer consumer ratings at the point-of-purchase are available. Digital technologies for health communication may also benefit both retailers and brands wanting to stand out as responsible actors for healthier food choices. The results further indicate that the healthy food labels program introduced in Thailand (The Choices Programme, 2019) has a positive impact on young consumers' choice of healthier products. Aaker (1991) sees brand assets as a mixture of brand awareness, brand associations, and brand loyalty. This logic can be used for the branding of products and services and the branding of endorsement programs (Peter et al., 1994). The government should further develop and brand their healthy food labels as an important part of Thailand's health policy.

Limitations and future research

There is much left to be studied in the realm of consumer behavior and healthy food labels and recommendations. While scientists disagree on what is healthy and what is not, defining health labels on a global scale and making them applicable for all consumers is impossible. Therefore, it is worth researching whether more specialized health labels would be more effective than generic healthy food labels; using this approach, products would be labeled as suitable, healthy choices for people following specific diets. The same could be said about consumers' ratings on health; consumers might appreciate the ability to filter ratings and reviews based on categories that reflect their dietary preferences, showing only ratings and reviews from similar individuals. This would need to be studied further and with large, heterogeneous samples.

A conjoint experiment is regarded as a realistic method and technique to capture what influences choices. However, its design and execution assumptions and limitations must be taken into consideration by the researcher (Hair et al., 2014). The present conjoint experiment used a main-effects-only model, which does not allow for analysis of possible interaction effects between the attributes and the levels. Also, order effects will occur during data collection because the 20 situations were presented in the same order (Huertas-Garcia et al., 2016). Future research can address

these limitations by using a tool with which it is possible to analyze possible interaction effects and randomize the order of the situations. The study was done in a controlled setting using a quite homogenous sample that ought to give a strong internal validity. However, a controlled setting may have a weaker external validity. Camerer and Hogarth (1999) claim that studies on economic choice involving hypothetical choices and those involving real consequences usually show qualitatively similar results. Nevertheless, a good research practice would combine diverse experimental methods to increase understanding of consumer choices (Fagerstrøm & Sigurdsson, 2016). We suggest a study of consumers purchasing groceries in a natural setting, using a wide range of participants who are given access to health-related information conveyed via a QR code.

Conclusion

The overall aim of this study was to investigate how health communication in the physical store conveyed via a QR code at the point-of-purchase of groceries can influence young Thai consumers' motivation to interact with a smartphone and simultaneously increase their choice of healthier food purchases. Results from a conjoint experiment based on a scenario indicated that the two health communication attributes investigated, healthy product label and consumers' ratings on health, positively impact smartphone interaction and the likelihood of buying a healthier product. It should be noted that good consumers' ratings on taste, and a good price, did have the highest impact on the likelihood to buy. Nevertheless, the results indicated that health communication conveyed by digital technologies could be important investments for brands and retailers wanting to profile as responsible actors for healthier food purchases. The healthy food labels program that was introduced in Thailand seems to have a positive impact on young consumers' choice of groceries. Future research could replicate this study in a natural grocery store setting, and consider the discussed limitations and improve them.

All participants have been informed about why the research is being conducted, anonymity is assured, and they are informed about how the data is being stored. The participants are fully informed about the aims of the research and that no risks are associated with the study. Their consent is recorded.

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