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An unintended consequence of Covid-19: Healthy nutrition

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ABSTRACT

The Covid-19 pandemic involving mass quarantines and stay at home orders in many nations has affected consumer behaviour including food intake. Despite the seriousness of the situation, spending more time at home may have had some unintended consequences for consumers. The aim of this study was to investigate the consequences of the current adverse circumstances on nutrition, within the framework of changes in attitude toward healthy eating, health consciousness, fear, and social influence of family, peers, and social media interactions. For this purpose, 732 participants, the majority of whom were female, aged between 26 and 55 years with university degrees, were surveyed online. Data were analyzed using a structural equation modeling approach. Based on results, family influence and social media influence were found to have positive effects on fear of Covid-19 and greater health consciousness. The effect of peer influence was only observed for health consciousness, not fear of Covid-19. Health consciousness and Covid-19 fears positively affected attitude and health consciousness, and attitude was positively related to healthy nutrition, indicating these individuals' beliefs about the healthiness of their current daily diets. Future research and practices may consider the effect of Covid-19 on humans' nutritional attitudes and behaviours based on our study so that health-related issues in the pandemic can be further examined and explained through nutritional consequences by researchers and practitioners in the future.

1. Introduction

Covid-19 is a strain of coronavirus, which is transmitted between people, has caused massive changes that have affected daily life (Haleem and Javaid, 2020). For instance, compulsory or voluntary quarantines have been experienced. As a result, daily habits and consumption patterns significantly changed. During this time, consumers started to buy certain products more often and stock up on essentials (i.e., non-perishable groceries, household & cleaning supplies, frozen food) (PWC, 2020). They also turned to certain experiences more often, such as their kinds of entertainment, watching/reading the news, hobbies, cooking, social media, household chores, shopping more online, and physical fitness (PWC, 2020). Consumers have also begun to focus more on online options to deal with the pandemic (McKinsey, 2020).

Covid-19 is still with us and has been considered a real-time experiment (Cohen, 2020) that can have new and different effects on various disciplines. The pandemic desires more attention on behavioural research, especially consumer behaviour. For example, more focus is needed for consumer behavioural research to determine the unintended consequences of this process, including the rising importance of health concern for consumption (Cranfield, 2020; Zwanka & Buff, 2020). Much of current research has focused on the significant impairment to daily life for individuals across nations (e.g., Ahorsu et al., 2020; Lee, 2020); however, some unintended consequences can be revealed during or after these events (Buheji and Ahmed, 2020). As an example, such collectively experienced events resulted in new situations, such as the development of health systems or the set of stage for the modern welfare state, in the past (Zwanka & Buff, 2020). On the other hand, some studies have emphasized that certain behaviours of consumers do start to change and pandemics do create fundamental changes in consumption and nutrition (Cranfield, 2020; Zwanka & Buff, 2020).

Thus, the aim of this study is to investigate the consequences of the current adverse circumstances on nutrition, within the framework of changes in attitude toward healthy eating, health consciousness, fear, and social influence of family, peers, and social media interactions. In this study, we defined healthy nutrition as individuals' beliefs about the healthiness of their current daily diets during the Covid-19 and desired to analyze this unintended consequence of the pandemic by explaining

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these beliefs of individuals for two key reasons.

First, positive effects concerning personal health are one of the important effects of the Covid-19 pandemic on consumer behaviour that despite the number of deaths and severe long-term illnesses suffered by those who have tested positive from the coronavirus, those who have remained well have had the opportunity to reflect on health behaviours including diet (Murphy, 2020; Oaklander, 2020). Healthiness becomes an important concern of individuals during Covid-19 (Cranfield, 2020; Zwanka & Buff, 2020) due to the desire of being sure about the ingredients of the foods and having a strong immune system in this time (Butler and Barrientos, 2020; Muscogiuri et al., 2020).

Second, we focused on exploring healthy nutrition that during the current pandemic, as there is a need for consumers to understand the role of healthy nutrition, in line with calls from the work of Zwanka and Buff (2020). Zwanka and Buff (2020) called for research and an empirical analysis of the implications of their framework, including *the shift to cooking at home, controlling ingredients to see what we actually eat, and the shift to healthiness* as an implication of the concerns about Covid-19.

2. Theoretical background

Fig. 1 shows the conceptual model of the study deriving from the desire to explore healthy nutrition, which was conceptualized based on the muddling-through theory (Lindblom, 1959) in this study. We focused on the issue of healthy food consumption that is in perfect harmony with the framework suggested by the muddling-through theory. In explaining these kinds of issues (i.e., healthy food consumption), some decision-making theories are weak, so this theory helps in understanding the complex decision-making processes of consumers caused by their behaviours (Hausman, 2012). On the other hand, Covid-19 is a complicated issue in and of itself and consumer behaviour that is already difficult to understand thus becomes even more complex. In this regard, the relevant theoretical approach helps us to understand healthiness-oriented positive consumer behaviour during an unusual and complex process.

This study examines social influence, Covid-19 fear, health consciousness and attitudes and how these turn into influence on nutrition. In this way, the psychological (i.e., fear) and the social conditions (i.e., social influence) revealed by the pandemic are kept within the framework of health consciousness and the positive attitudes toward giving up unhealthy foods to understand the healthiness that stands out both due to and during this pandemic.

3. Hypothesis development

3.1. The effects of social influence

Social influence refers to a concept that has been known and defined based on its effects on human behaviours for many years, and it is used as an essential factor in various theories to explain these behaviours (i.e., Ajzen, 1985, 1991; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). The influence is defined as the substantial impact of other people on the decision-making processes of individuals and the claim is that individuals may decide on something by undertaking various evaluations as a result of their interactions with their social environments, thereby representing the social influence on the decision-making process (Wood & Hayes, 2012). The concept is subject to studies in different contexts in several different disciplines, such as consumer behaviour (Batinic and Appel, 2013; Goodwin, 2013). The scope of social influence (family, peer, friends, etc.) on consumption has expanded as a result of developments in information technologies, and the effect of interactions on social media has also been included into these influences (Zhou, 2011, pp. 1–25). In our context, social influence includes the impacts of family, peers, and social media interactions on purchasing and consumption decisions of individuals, thereby revealing through interpersonal communication with family members, peers, and social media interactions about new consumption ideas during Covid-19. Here, family influence refers to the impacts arising from interpersonal communication between family members about purchasing and consumption decisions related to this process. Peer influence is the impact of the communication between friends on these decisions. Social media

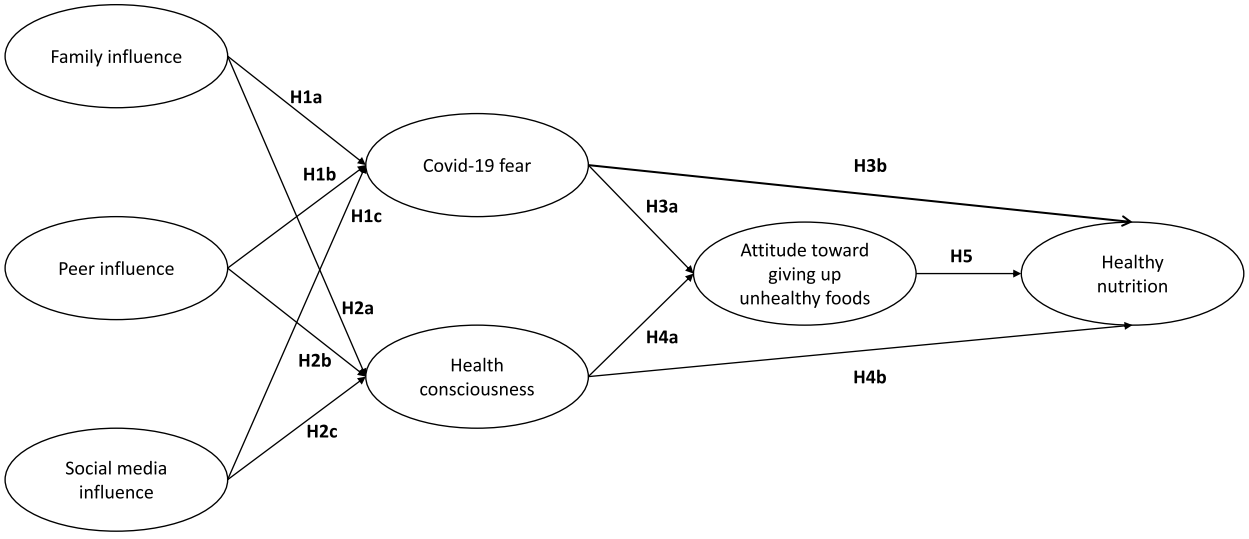

Fig. 1. Research model.
Note: Parameter estimates *p < .05, **p < .01, ***p < .001.

influence is the impact of the interactions between individuals on social media for such decisions during Covid-19.

We believed that family influence, peer influence, and social media influence are positively related to fear of Covid-19 and greater health consciousness during this adverse pandemic. In general, social influence is frequently used to explain different behaviours by associating it with both health-related issues (Butterfield & Lewis, 2002; Cruwys et al., 2015; Poirier & Cobb, 2012; Russell & Champion, 1996) and emotions (Jones, 2001; Scherer, 1993; Van Kleef et al., 2011). In addition, social influence has also been discussed in different studies to explore its effects on cataclysmic events, such as disasters (Riad et al., 1999; Rice et al., 2010). This knowledge gives us the basis to use to explain the effects of the same concept in the context of Covid-19. Moreover, in line with our focus, the approaches offered by social influences on health and health-related issues are vital to know to understand the pandemic and its unintended consequences. In the interaction between individuals, health issues are commonly handled and explained by showing the existence of social influence in health-related topics (Cline, 2003; Meng, 2016; Wang et al., 2008). Thus, individuals are afraid of an unusual event and become more conscious about their health so as to cope with the illness by trying to stay healthy. Because of this,

H1. Family influence (a), peer influence (b), and social media influence (c) positively relate to Covid-19 fear.

H2. Family influence (a), peer influence (b), and social media influence (c) positively relate to health consciousness.

3.2. The effects of Covid-19 fear

Covid-19 has different features than past cataclysmic events that individuals have experienced around the world (Cranfield, 2020). Since this virus is highly contagious, it has significantly changed the routines of individuals. They have changed their lives and ways of doing works; they have had to take on greater personal responsibility because of the risk of infecting someone else with the virus. Thus, individuals began to have negative toward this unusual and unknown virus and fear it and its consequences (Ahorsu et al., 2020). This fear is called Covid-19 fear in psychology and refers to a fear that includes being afraid of catching this illness, being anxious even while following the news about it, thinking about the situation they live in, and fear of losing loved ones because of the illness. This Covid-19 fear is one of the most important impacts of this pandemic in terms of the mental health of individuals, and there may be other situations and behaviours as well that this fear during the pandemic and/or afterwards can also impact.

In some cases, negative emotions may not produce completely negative results (Match, 2008). For example, individuals who are struggling with certain diseases can deal better with their illness in line with their negative feelings, and in that case, their negative feelings can act as a motivator in their lives and their decisions (Lee et al., 2008). In our context, it is predicted that individuals will focus more on positive behaviours and that will produce more positive results for dealing with this kind of fear and the effects of the pandemic. On the one hand, since this virus appeared as a food-centric event, it can also be associated with nutrition, and individuals may reassess their views or change their sensitivities and beliefs on food health issues in situations that arise from food safety crises (Xie et al., 2020). In that environment, people who are afraid of this event and its current or possible consequences may start to exhibit more positive attitudes and behaviours to increase their healthiness. When fear, a natural response to a pandemic, is ignored, no progress can be made, but that crisis will be easier to handle once its existence is actually accepted (Finset et al., 2020). In this case, human psychology and the possible positive consequences of negative emotions are not ignored, since the pandemic affects mental health as well as physical health (Ahorsu et al., 2020). In our context, the fear of Covid-19 affects a nutrition-related positive attitude, the attitude toward giving up unhealthy foods, and a nutrition-related belief of individuals. Thus,

H3. Covid-19 fear positively relates to the attitude toward giving up unhealthy foods (a) and healthy nutrition (b).

3.3. The effects of health consciousness

Health consciousness refers to an individual's readiness to take health actions (Becker et al., 1977). Conscious individuals reviewing their health monitor their own health and well-being and thus, they try to keep their health in good condition and not become ill (Michaelidou and Hassan, 2007). Further still, health-conscious people will consume based on their evaluations of food and apply a high consciousness. In our context, health consciousness is the readiness of people to take actions to stay healthy during the Covid-19 pandemic through more nutrition-related evaluations and their consequences. This action refers to an intrinsic driver of thinking about health-related issues deeply and then making the right decisions by choosing healthy foods, and behaving as a health-conscious individual.

During the Covid-19 pandemic, individuals have had more confrontation with health issues. We believe that individuals who have the opportunity to think about strengthening their immune systems and taking care of their health have a positive attitude about giving up unhealthy foods and adopting healthy nutrition as a health action. In general, health consciousness shapes the attitudes of individuals (Kumar & Smith, 2018; Michaelidou and Hassan, 2007; Rojas-Méndez et al., 2015) and prepares them for their actions towards increasing their health (Iversen & Kraft, 2006; Jayanti & Burns, 1998; Mai & Hoffmann, 2012). This concept was further examined in the context of disasters (Handler, 2016). It also provides a basis for studying these effects during an up-to-date cataclysmic event. The effects of health consciousness are not yet known fully for Covid-19 although health consciousness is seen as a reflection of the impacts of Covid-19 among people (e.g., Nicomedes & Avila, 2020). For instance, Zwanka and Buff (2020) argue that increased health consciousness in the Covid-19 pandemic will lead to increased demands on food safety and balanced nutrition; yet an empirical finding for this argument is not yet available in the extant literature. Therefore,

H4. Health consciousness is positively related to attitude toward giving up unhealthy foods (a) and healthy nutrition (b).

3.4. The effect of attitude

Attitude is a psychological tendency that is a predictor of behaviour and revealed as the result of one's positive or negative evaluations toward a particular product, service, or idea. (Ajzen, 1991; Davis, 1989; Holbrook et al., 2005; Venkatesh et al., 2003). It is possible to predict an individual's behavioural beliefs, intentions, and behaviours that have not yet turned into action and the behaviours that will be revealed as a result of attitudes. During the consumption process, we also see a strong effect, linking attitude to behaviour. In our context, the existence of a positive relationship between the attitude toward giving up unhealthy foods (energy-dense foods included high fat, saturates, sugar, salt) (Lobstein and Davies, 2008; Talukdar & Lindsey, 2013; Vandevijvere et al., 2018) and healthy nutrition is predicted. Another reason for this argument in addition to the evidence found in consumer behaviour research is that attitude towards healthy eating or food consumption also strongly and positively affects actions (Graham & Laska, 2012; Nardi et al., 2020; Pieniak et al., 2009; Sun, 2008; Vermeir & Verbeke, 2006). Individuals who develop positive attitudes towards certain products, services and behaviours are then prepared to take a health action. In our study, it is believed that individuals, who act from the effect of this approach, turn to healthy nutrition at a time (i.e., pandemic) when it is important to give up unhealthy foods and focus on attitude from a novel and new perspective. Such an attitude then positively affects the behaviour of healthy food consumption (Hausman, 2012). Here we examine a broader healthy consumption behaviour,

healthy nutrition, through individuals' self-assessments about it. Further, due to the lifestyle-changing nature of the pandemic (Van et al., 2010), we expect to reveal specific attitudes and consequent actions related to healthy nutrition beliefs. For this purpose,

H5. Attitude toward giving up unhealthy foods positively relates to healthy nutrition.

We also include multi-group analysis in our research to see the differential effects of using traditional versus online channels as an information source when gathering and sharing information about Covid-19. These two sources of information may have different features in some cases. There are certain fundamental differences, especially in terms of seeking health information and the use of traditional and online channels, and these differences can cause varying results (Cotten & Gupta, 2004; Rains, 2007). Following this perspective, we compare online channel users and traditional channel users based on their healthy nutrition using the effects of their attitudes toward giving up unhealthy foods, their Covid-19 fear, and their basic health consciousness.

4. Research method

4.1. Measurement

The questionnaire used for this study to examine the proposed hypotheses was developed using the multi-item scales in the prior literature. We assessed family influence, peer influence, and social media influence using eleven items adapted from Zhang et al. (2017). The fear of Covid-19 was measured using a novel scale consisting of seven items (Ahorsu et al., 2020). Four items were used to measure attitude toward giving up unhealthy foods (Hausman, 2012). We defined unhealthy foods as energy-dense foods (i.e., having high amount of energy (calorie) per gram) which include high fat, saturates, sugar, salt, and minimal amounts of vitamins and minerals. We asked our respondents to evaluate their approaches toward such foods in their daily nutrition (i.e., meals, snacks) during the Covid-19 pandemic through the idea of giving up them. The health consciousness scale proposed by Shin and Mattila (2019) who handled that construct by linking it to food choices and food consumption was also used in our study. For healthy nutrition, we adapted the health behaviour scale of Thomsen and Hansen (2015) including its three items. Healthy nutrition was defined in our questionnaire as following a healthy daily diet (i.e., following a balanced daily diet, implementing nutritional recommendations) and wanted our respondents to think about their daily diet through their intakes of foods and drinks and evaluate them based on their perception of healthiness of their daily nutrition. We modified the scale items based on our research context, consumption during the Covid-19 pandemic, as demonstrated here in Table 2. To measure the constructs, we used the itemized rating scale from 'Never' (1) to 'Always' (5). Table 1 shows demographics and pandemic-related general questions. Ratio or categorical scales were used or open-ended questions were posed to the respondents here.

The questionnaire was first created in the original language of the scales, in English. Then, two bilingual researchers translated the survey items into Turkish. A third researcher who is also proficient both in English and Turkish translated this Turkish version back into English. Afterwards, three researchers who studied the translation process and we examined the original items and the translated them to check any linguistic differences, expressions, wordings, and clarity. Following this evaluation process, we created a draft questionnaire to improve the content and face validity. During this process, three researchers in the consumer behaviour and marketing fields and 15 PhD students who had taken Marketing courses evaluated the entire draft questionnaire. We refined the questionnaire items further based on their feedback on content, clarity, meaningfulness of the items, and the questionnaire overall to produce its final version.

Table 1
Descriptive statistics of survey respondents (n = 688).

Demographics	Category	N	%
Gender	Female	468	68.1
	Male	220	31.9
Age	18–25	125	18.1
	26–39	325	47.2
	40–54	193	28.1
	>54	45	6.6
Educational level	~College	139	20.2
	University	434	63.1
	Graduate school	115	16.7
Household size	1	28	4.1
	2	142	20.6
	3	209	30.4
	4	212	30.8
	5	63	9.2
	>5	34	4.9
Household income per month[a]	<$250	29	4.2
	$250-$600	177	25.7
	$601-$1000	149	21.7
	>$1000	333	48.4
Information gathering and sharing channel during Covid-19	Twitter	167	24.3
	Instagram	88	12.8
	Facebook	10	1.5
	WhatsApp	35	5.1
	YouTube	3	0.4
	News portals	153	22.2
	TV news	232	33.7
Shopping frequency during Covid-19	Everyday	25	3.6
	3-4 in a week	69	10.1
	1-2 in a week	382	55.5
	Once every 10 days	136	19.8
	Twice a month	62	9
	Once a month	14	2
Most frequently used shopping channel during Covid-19	Physical store	455	66.1
	Corporate website of the firm	60	8.7
	Mobile application of the firm	78	11.4
	Intermediary firms' websites or applications	95	13.8

[a] This has been converted to dollars from Turkish Lira.

4.2. Sample and data collection

Empirical data were collected using the online survey method noted in this study. The questionnaire was designed in an online survey creating platform (surveey.com). A non-probability convenience sampling technique was used to reach respondents by sharing the survey link on social media and different communication platforms to gain representative results about the population (Krathwohl, 1977). First, we conducted a pilot test with 50 respondents most of which were female (59.4%), aged between 26 and 39 (56.7%) and then modified some of the questions and items based on those results. Then, we shared the survey link with our personal contacts through these platforms and they further contributed to the data collection process by personally sharing the link. The data collection took place between 15 April 2020 and 15 May 2020.

Turkey is one of the highest representative countries to investigate the effects of this pandemic due to the large number of infected people in that country. Turkey has been listed in the top ten countries with the highest numbers of total cases from March until December (Data Studio, 2020). As stated by Cohen (2020), observing the effects of Covid-19 pandemic on people's feelings, attitudes, and behaviours is possible in an environment where individuals must continue their lives under the intense influence of a pandemic.

We received 732 questionnaires using this process with a response

Table 2
Factor loadings, reliability, and validity.

Variables	Standardized loadings	AVE	Cronbach's alpha	CR
Family influence (adapted from Zhang et al., 2017)		.66	.88	.89
During the Covid-19 pandemic, I often ask my family for opinion to help me decide in the shopping and consumption process.	.87***			
During the Covid-19 pandemic, I highly value my family's opinion in the shopping and consumption process.	.87***			
During the Covid-19 pandemic, my family influence me a lot in the decision-making process.	.82***			
During the Covid-19 pandemic, I am more likely to buy or consume what my family think is right.	.68***			
Peer influence (adapted from Zhang et al., 2017)		.79	.94	.94
During the Covid-19 pandemic, I often ask my friends/peers for their opinion to assist with shopping and consumption decisions.	.88***			
During the Covid-19 pandemic, I highly value my friends/peers' opinion in the shopping and consumption process.	.91***			
During the Covid-19 pandemic, my friends/peers influence me a lot in decision-making process.	.90***			
During the Covid-19 pandemic, I am likely to choose to buy or consume what my friends/peers agree with.	.86***			
Social media influence (adapted from Zhang et al., 2017)		.72	.88	.88
During the Covid-19 pandemic, I visit social networking sites (such as Facebook, Twitter, Linkedin, Youtube) about my shopping and consumption process very often.	.84***			
During the Covid-19 pandemic, I frequently use social networking sites about my shopping and consumption process.	.92***			
During the Covid-19 pandemic, I am fond of interacting and communicating with others via social networking sites to assist with shopping and consumption decisions.	.77***			
Covid-19 fear (adapted from Ahorsu et al., 2020)		.50	.88	.87
I am most afraid of Covid-19.	.69***			
It makes me uncomfortable to think about Covid-19.	.72***			
My hands become clammy when I think about Covid-19.	.58***			
My heart races or palpitates when I think about getting Covid-19.	.76***			
I am afraid of losing my life because of Covid-19.	.76***			
I cannot sleep because I'm worrying about getting Covid-19.	.61***			
When watching news and stories about Covid-19 on social media, I become nervous or anxious.	.79***			
Attitude toward giving up unhealthy foods (adapted from Hausman, 2012)		.65	.88	.88
In the process of Covid-19 pandemic, giving up unhealthy foods is good.	.88***			
In the process of Covid-19 pandemic, giving up unhealthy foods is pleasant.	.71***			
In the process of Covid-19 pandemic, giving up unhealthy foods is favourable.	.86***			
In the process of Covid-19 pandemic, giving up unhealthy foods is useful.	.76***			
Health consciousness (adapted from Shin & Mattila, 2019)		.68	.86	.87
During the Covid-19 pandemic, I choose food carefully to ensure good health.	.87***			
During the Covid-19 pandemic, I think of myself as a health-conscious consumer.	.86***			
During the Covid-19 pandemic, I think often about health issues.	.74***			
Healthy nutrition (adapted from Thomsen & Hansen, 2015)		.65	.85	.85
During the Covid-19 pandemic, I believe that on average, my intake of drinks is healthy.	.73***			
During the Covid-19 pandemic, I believe that on average, my food intake is healthy.	.83***			
During the Covid-19 pandemic, my daily diet follows nutritional recommendations.	.86***			

$X^2 = 830.07$ ($df = 327$), $p < .001$; $X^2/df = 2.54$; RMSEA = 0.05; CFI = 0.96; TLI = 0.95; and IFI = 0.96, ***$p < .001$.

rate of approximately 78%. After eliminating inconsistent results (including too many missing values and/or careless responses that were completed in too little time), 688 questionnaires remained and these represented an adequate sample size (Hair et al., 2006; Westland 2010). Descriptive statistics of respondents are presented in Table 1. As shown in Table 1, most of the respondents were female (68.1%), ages between 26 and 39 (47.2%), with a University degree (63.1), living with 3 (30.4%) or 4 (30.8%) people in their homes, and with more than $1000 household income per month (48.4%). Of all the respondents, 33.7% use TV news, 24.3% use Twitter, and 22.2% use News portals on the web to gather and share information on the Covid-19 pandemic. Approximately half of the respondents (55.5%) have done their shopping 1–2 times in a week during the pandemic. Most of them (66.1%) prefer physical stores for shopping. The respondents were also asked specific questions about their shopping items. Based on these gathered results, most were buying foodstuffs, cleaning products, books, and hobby items. The edible items that these respondents consumed during Covid-19 more than usual were bread, coffee, fruit, flour, vitamin, and yogurt and inedible items were sanitizers and cologne. The edible items that the respondents consumed during Covid-19 less than usual were fast food, snacks, desserts, cigarettes, packaged foods, and delicatessen food and inedible items were gas and wearing apparels.

4.3. Measure validity and reliability

Confirmatory factor analysis (CFA) was used to assess the reliability and validity of the variables (Fornell & Larcker, 1981). We performed

CFA for family influence, peer influence, social media influence, Covid-19 fear, attitude toward giving up unhealthy foods, health consciousness, and healthy nutrition using all the surveys and AMOS 23. After eliminating one item from the variable of attitude toward giving up unhealthy foods due to low standardized loading, the measurement model took its final shape. The measurement model also had good fit with the observed data ($X^2 = 830.07$ ($df = 327$), $p < .001$; $X^2/df = 2.54$; root mean squares error approximation (RMSEA) = 0.05; comparative fit index (CFI) = 0.96; Tucker-Lewis index (TLI) = 0.95; and incremental fit index (IFI) = 0.96, ***$p < .001$) (Hu & Bentler, 1998, 1999).

Table 2 shows the factor loadings, average variance extracted (AVE), Cronbach's alpha, and composite reliability (CR). Factor loadings, AVE values, and reliability scores were well beyond the threshold values recommended by prior studies, thus showing an adequate level of convergent validity (Bagozzi & Yi, 1988; Fornell & Larcker, 1981; Hair et al., 2006; Nunally, 1978). Cronbach's alpha and CR ranging from 0.85 to 0.94 also indicated reasonable reliability and internal consistency. The square root of AVE for each construct was higher than its all correlations with the other constructs, thus showing an acceptable level of discriminant validity (Fornell & Larcker, 1981) (see Table 3).

4.4. Common method variance assessments

Common method bias was assessed using the Harman one-factor test and a common latent factor (CLF) analysis (Podsakoff et al., 2003). The results of the Harman one-factor test indicated seven factors with eigenvalues greater than 1. None of these factors explained the majority of the variance. The largest variance explained by a single factor was 24.8%. On the other hand, CLF analysis compared the measurement model with and without CLF. These results showed that fit indices and standardized regression weights did not significantly change before and after adding CLF. The model with CLF had $X^2/df = 2.523$; RMSEA = 0.047; and IFI = 0.959, and the model without CLF had $X^2/df = 2.538$; RMSEA = 0.047; and IFI = 0.958. The differences between the standardized regression weights of the two models was less than 0.20. Thus, common method bias was not a problematic concern for our study.

4.5. Hypothesis testing

We first evaluated the descriptive statistics and intercorrelations between seven constructs. Table 3 presents means, standard deviations, and bivariate correlations that all were significant and acceptable.

Structural equation modeling (SEM) was used to test the hypothesized relationships in this study. Fig. 2 shows the structural model with path coefficients. That model had a good fit with the observed data ($X^2 = 841.8$ ($df = 334$), $p < .001$; $X^2/df = 2.52$; RMSEA = 0.05; CFI = 0.96; TLI = 0.95; and IFI = 0.96, ***$p < .001$.). Further still, the results demonstrated that the model explained a good proportion of the variability in healthy nutrition (46%).

Table 3
Correlations and descriptive statistics.

	1	2	3	4	5	6	7
1 Family influence	(.81)						
2 Peer influence	.30	(.89)					
3 Social media influence	.23**	.57**	(.85)				
4 Covid-19 fear	.21**	.24**	.25	(.71).			
5 Attitude toward giving up unhealthy foods	.09*	.11**	.14**	.13**	(.81)		
6 Health consciousness	.18**	.17**	.21**	.21**	.40**	(.83)	
7 Healthy nutrition	.09*	.10**	.11**	.09*	.42**	.53**	(.81)
Mean	3.39	2.52	2.88	2.68	4.13	4.04	9.92
S. dev.	.99	1.01	1.14	.88	.84	.80	.79

Note: Numbers on diagonals show the square root of AVEs.
*$p < .05$, **$p < .01$.

For the hypothesized effects of social influence, we found that family influence (β, standardized path coefficient = 0.15; $p < .001$), peer influence ($\beta = 0.11$; $p < .01$), and social media influence ($\beta = 0.15$; $p < .001$) were positively related to Covid-19 fear, but only family influence ($\beta = 0.11$; $p < .01$) and social media influence ($\beta = 0.11$; $p < .01$) were positively related to health consciousness. Thus, H1a, H1b, H1c, H2a, and H2c were supported, but H2b ($\beta = 0.04$; $p > .05$) was not. In terms of the effects of Covid-19 fear, its effect on participant attitude toward giving up unhealthy foods ($\beta = 0.06$; $p < .05$) was supported but the effects of it on healthy nutrition ($\beta = -0.03$; $p > .05$) was not supported by the analysis. We also found that health consciousness positively related to both the attitude toward giving up unhealthy foods and healthy nutrition, thereby supporting H4a ($\beta = 0.46$; $p < .001$) and H4b ($\beta = 0.47$; $p < .001$). H5, which predicted the positive effect of attitude toward giving up unhealthy foods on healthy nutrition, was supported as well ($\beta = 0.22$; $p < .001$) (see Table 4).

To investigate the role of the channels that people use to gather and share information during the Covid-19 pandemic, a multi-group analysis was performed by comparing online and traditional channels. People who use online channels during Covid-19 constituted the first group. The second group consisted of people, who prefer to use TV news as the information channel during the pandemic. The first group included 456 respondents and most of them were female (67.5%), ages between 26 and 39 (52%), with a University degree (55%), living with 2 (29.2%) or 3 people (29.4%), and having more than $1000 as household income per month (49.3%). They mostly preferred to do their shopping 1–2 times a week (54.4%) using physical stores (37.7%). A total of 232 people are included in the second group, the majority of which were female (70%), ages between 40 and 54 (38.4%), with a University degree (52.2%), living with 3 people (33.6%), and having more than $1000 of household income per month (46.6%). Their shopping frequency was 1–2 times a week and their shopping channel was also the physical stores (69.8%).

Goodness of fit indices for the model of each group was satisfactory. Model 1, which represented the model for the preference of online channels, fits the observed data well ($X^2 = 668.89$ ($df = 334$), $p < .001$; $X^2/df = 2.00$; RMSEA = 0.05; CFI = 0.96; TLI = 0.95; and IFI = 0.96, ***$p < .001$.). The second model (Model 2) showing the circumstances for the traditional channels also had a good fit ($X^2 = 573.08$ ($df = 334$), $p < .001$; $X^2/df = 1.72$; RMSEA = 0.06; CFI = 0.94; TLI = 0.93; and IFI = 0.94, ***$p < .001$.). When the group equivalence was examined through unconstrained, measurement weights, and structural weights models (see Table 5 and Table 6), the structural weights model was used to evaluate the path differences based on two channels due to its acceptable fits and significant p value.

A multi-group analysis was performed to see the difference between the feelings of online channel- and traditional channel-users toward healthy nutrition based on the attitude related to giving up unhealthy foods and health consciousness. Since the effect of Covid-19 on healthy nutrition was already not found to be significant, this link was not investigated based on groups. Instead, this analysis was conducted by comparing these two groups via critical ratios for differences on the AMOS. As demonstrated in Table 7, the effect of attitude toward giving up unhealthy foods on nutrition was higher for the second group, traditional channels users, for gathering and sharing information during the pandemic. The effect of health consciousness on healthy nutrition was also higher for traditional channels users of information channels during the pandemic, but the change between groups was not significant. For the results of the multi-group analysis, the differences between online and traditional channels being used as an information source during the pandemic and based the formation of healthy nutrition were statistically significant for attitude, but not for health consciousness.

5. Discussion

This study focuses on social influence as a starting point for

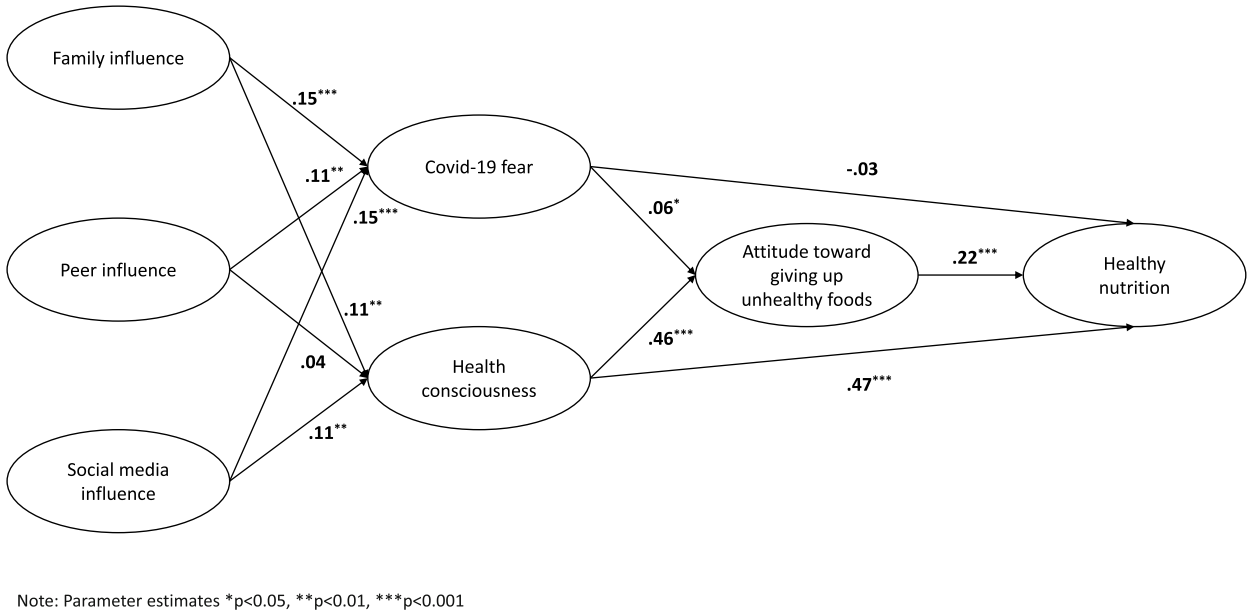

Fig. 2. Structural equation model with parameter estimates.

Table 4
Results of path model.

Hypothesized path	Path coefficient	*t*-value	Result
H1a: Family influence → Covid-19 fear	.15	3.49***	Supported
H1b: Peer influence → Covid-19 fear	.11	2.08**	Supported
H1c: Social media influence → Covid-19 fear	.15	3.08***	Supported
H2a: Family influence → Health consciousness	.11	3.27**	Supported
H2b: Peer influence → Health consciousness	.04	.83	Not supported
H2c: Social media influence → Health consciousness	.11	2.76**	Supported
H3a: Covid-19 fear → Attitude toward giving up unhealthy foods	.06	1.73*	Supported
H3b: Covid-19 fear → Healthy nutrition	-.03	−1.12	Not supported
H4a: Health consciousness → Attitude toward giving up unhealthy foods	.46	10.26***	Supported
H4b: Health consciousness → Healthy nutrition	.47	11.46***	Supported
H5: Attitude toward giving up unhealthy foods → Healthy nutrition	.22	6.27***	Supported

$^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Table 5
Goodness of fit indices - summary.

Model	df	X^2	RMSEA	CFI	TLI	IFI
Unconstrained	668	1242.3	.04	.95	.94	.95
Measurement weights	689	1265.89	.04	.95	.94	.95
Structural weights	728	1332.99	.04	.95	.94	.95

explaining healthy nutrition, and it extends the scope of social influence literature via the context of pandemics. In addition to the effects of social influence already known in consumer behaviour (e.g., Zhang et al., 2017), some individuals often take advice from their families and friends, value the evaluations of them, and make choices based on these

Table 6
Goodness of fit indices - differentiation.

Model	df	ΔX^2	*p* value
Measurement weights	21	23.59	Non-significant
Structural weights	60	90.69	Significant

Table 7
Multi-group analysis for healthy nutrition.

Model	Online channels	Traditional channels	Group differences
Attitude toward giving up unhealthy foods	.26	.27	Significant
Health consciousness	.52	53	Non-significant

evaluations during the pandemic. Besides, they often visit social media platforms (e.g., Facebook, Twitter, LinkedIn, YouTube), communicate here with their interactions, and use the information in these environments to make their decisions. Thus, social influence continues to affect key factors in the extant research, such as health-related consciousness and fear on consumer behaviour (e.g., Poirier & Cobb, 2012; Van Kleef et al., 2011). However, we did not observe the positive effect of peer influence on health consciousness. One reason may be the lack of health-related information that will increase health consciousness in one's communication with peers in the pandemic. Shared information can lead to the context of the process about Covid-19 and perhaps helpful suggestions to be followed for daily life activities or simply spending pleasant times during these days. Some effects are also rather small here. One reason may be that psychological and social variables were handled together in our study, and herein both strong negative feelings, such as fear and some social effects, personal characteristics, beliefs and attitudes were included in the model. Despite these small effects, we think these links have a vital role in the research model because addressing health consciousness in this way also allows us to

find higher effects for health consciousness leading to healthier nutrition and positive attitude towards giving up unhealthy foods. Regardless of the general health consciousness of individuals, during the pandemic, the increased health consciousness through the information they obtain within the framework of social influence has a positive effect on nutrition. This situation provides us an important finding to understand nutrition during the pandemic.

During the Covid-19 pandemic, some individuals may be afraid of this unusual and cataclysmic event, and they may start to show their reactions to it (Ahorsu et al., 2020). This fear acted as a motivator in their lives (Lee et al., 2008), and some people may have used this difficult and challenging time to reconsider the importance of health and wellbeing, and in turn made changes to the diet to improve nutrient content and healthy eating. Our research has shown that for some people, the pandemic has resulted in fearful behaviour which nonetheless has resulted in improved health focus and improved dietary intakes. Fear, which has a negative connotation, positively affects a desired outcome by acting as a motivator during the pandemic, which the literature supports (Lee et al., 2008). This relationship under a new adverse situation was able to produce a significant relationship with its small, but significant, effect.

We observed that some individuals choose their foods carefully during the Covid-19 pandemic, see themselves as health-conscious consumers, and always think about health-related issues during the pandemic. This rising health consciousness results in a positive attitude toward giving up unhealthy foods and having healthy nutrition. Therefore, our study provides empirical evidence of the importance of health consciousness for the Covid-19 pandemic and the predictions of its effects on increased demands for food safety and balanced nutrition (Zwanka & Buff, 2020). This study also expands the research linking health consciousness to attitude (e.g., Kumar & Smith, 2018) and health-related behaviours (e.g., Iversen & Kraft, 2006).

Concerning the power of attitude when explaining consumer behaviours (Venkatesh et a., 2003) and especially food consumption (Graham & Laska, 2012), the positive effect of attitude for giving up unhealthy foods on healthy nutrition was supported by statistical results in this study. Some people think that giving up unhealthy foods during the pandemic is good, pleasant, favourable, and useful. These attitudes enable individuals to consume healthy foods and drinks during the pandemic and comply with nutritional recommendations in their daily diets. In this regard, our study explains healthy nutrition by drawing more attention to the role of developing a positive attitude toward being healthy during the pandemic.

Since the pandemic is a period during which individuals must restrain their social lives, this process also affects the role and importance of communication sources. Thus, our study added a new perspective to the areas where traditional and online channels differ from each other in some respects (Rains, 2007). During the pandemic, the role of attitude toward giving up unhealthy foods for healthy nutrition is greater for traditional channel users. However, no effect was observed for the role of health consciousness. In this regard, while the attitudinal effects of the information shared in the related channels drew attention, a lack of consciousness-shaping effect can also be observed.

5.1. Practical implications

In an environment of uncertainty and not knowing when normal life might resume, governments might be able to use this period as an opportunity to advocate healthy eating, including cooking from scratch and becoming more physically active. Institutions and organizations working closely on this issue should provide information to the society about how people should eat healthier, how they can feel themselves in these days better and stay physically and mentally healthy. In this regard, communication campaigns that emphasize the importance of turning to healthy products rather than choosing unhealthy options can be carried out. For-profit firms should also emphasize the healthy aspects of their products. For example, they can highlight healthy ingredients of their products more frequently. They can also convey any service or experience which can benefit mental health positively. Such firms should emphasize the health concern of their brand. During this period, positioning against competitors can be accomplished by highlighting the importance of abandoning other less healthy options. Designing new messages and communicating with people in the electronic environment by both for-profit and non-profit parties may strengthen the ability of people to deal with the pandemic more easily.

6. Limitations and future research directions

This study does have some limitations. The main limitation is that the study covered only a part of the pandemic. This study was carried out only where the pandemic was heavily observed and its effects were strong. The permanence of the effects discussed in the study is thus open to be examined further in future research. Another limitation of this study is that no distinction was made for how the participants were actually being affected by the pandemic. The effect of these reactions and outcomes may differ for individuals who lost their loved ones in the pandemic, lost their jobs, have different physical or mental health problems, etc. In future studies, research into these effects can be conducted. Similarly, in countries where the pandemic is more intense or less frequent, the findings of this study can be re-evaluated for more information. Our study was carried out using data of a single country, Turkey, and our country is quite suitable for seeing the effects of the pandemic. Some of the issues that future studies can address could be different positive or unintended effects of Covid-19 on consumer behaviour. First, future studies could focus on other changes that can occur in consumer behaviours. For example, there has been an increase in turning to online channels and living online experiences. In this case, it would be good to determine how service or experience evaluations of individuals change? During Covid-19, how do consumers become more satisfied with their purchases or experiences of additional services? On the other hand, it could be important to examine this process from the different aspects of healthiness. For example, exercising can be included in future research to analyze healthiness from a more holistic perspective. The relevant factors that help explain healthiness, healthy eating, healthy food consumption, healthy nutrition, etc., can also be explored and included in future research. A more detailed examination of individual factors can be reviewed for better understanding the responses of individuals to the pandemic. For example, different comparative studies could be carried out on consumers who already have health consciousness, gained increased health consciousness in the pandemic, and thus lived healthier after the pandemic. Besides, various dimensions that affect health consciousness and fear of Covid-19 can also be included into future studies. For example, in this study, we determined a starting point in the context of social influences, and because of this, we discovered fear, consciousness, attitude, and nutrition. In addition, when we were communication-centred in understanding Covid-19 with the focus of social environment, we did not examine the relationship between health consciousness and Covid-19 fear. In future studies, more in-depth research can be conducted, discoveries can be made, and explanations can be presented to understand constructs such as fear and health consciousness, which are not the main dependent variables in our model.

7. Conclusion

This study investigates the consequences of Covid-19 on nutrition, within the framework of changes in attitude toward healthy eating, health consciousness, fear, and social influence. In times of Covid-19, social influences have small but significant effects on health consciousness, which lead to healthy nutrition and positive attitudes towards giving up unhealthy foods. Here, peer influence has no effect on health consciousness. Social influences have also small but significant

effects on Covid-19 fear, which have a positive effect on attitude toward giving up unhealthy foods but no effect on healthy nutrition. Besides, attitude toward giving up unhealthy foods positively affects healthy nutrition, which is also heavily affected by health consciousness. Thus, our study reveals the effects of the pandemic on individuals' nutritional attitudes and behaviours and provides evidence for the prominent roles of these psychological and social conditions on healthy nutrition during Covid-19.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent

Informed consent was obtained from all individual participants included in the study.

Declaration of competing interest

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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