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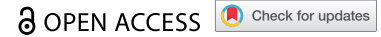


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RESEARCH ARTICLE



The mediating role of product judgment and country of origin effect on health literacy and behavioral intention: A study on COVID-19 vaccines perception of Turkish consumers

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ABSTRACT

This study is conducted on people in Turkey who had at least one dose of vaccination and it evaluates their differences in attitude in terms of health literacy, product judgment, the country of origin, intention to recommend and motivation to boycott. The 393 vaccine consumers were selected through convenient sampling and the data was collected through online questionnaires. The data was later analyzed by SPSS and AMOS. Normality, reliability tests and frequency analysis were conducted on the data. Afterward, a correlation was calculated using factor loadings to determine the relationship between the variables. The last was conducting the PATH analysis. Some consumers are prejudiced toward COVID-19 vaccines due to perceived distrust, hesitation, and lack of product information. Determining the prejudices of consumers, underlying causes and making inferences will provide more useful information on COVID-19 vaccines to health institutions, vaccine manufacturers, consumers and other organizations.

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KEYWORDS

Health literacy; country of origin; product judgment; recommend intention; boycott motivation; Covid-19 vaccines

Introduction

Throughout history, epidemics have been among the major problems that have affected humanity predominantly physically and psychologically. Coronavirus (COVID-19) has similar characteristics. First appeared in China in 2019, the epidemic spread rapidly all over the world and significantly affected the economic and social aspects of life.¹ It has been declared “a pandemic” by the World Health Organization (WHO)² and it has since changed the way people live and work. During this period, the health sector quickly adapted to the pandemic conditions and focused on developing vaccines.³ Vaccination is an effective, safe and inexpensive method used in the prevention of infectious diseases.¹ Therefore, there is great competition among healthcare companies to develop such vaccines on a global scale.⁴ The two most important representatives of this competition are Pfizer/BioNTech and CoronaVac/Sinovac. The Pfizer/BioNTech vaccine was developed with the joint contributions of German-US companies. The phase 3 trials conducted in five countries, tested the effectiveness of the vaccine with 43,538 volunteers, aged 16 and older. The results show the vaccine is 95% effective. While, CoronaVac/Sinovac vaccine is an inactivated vaccine originating in China. The phase 3 trials conducted in Turkey tested the effectiveness of the vaccine on 10216 volunteers aged 18–59, showing that it was 835% effective.⁵ Community immunity can be obtained when 80–95% of the population is vaccinated. Although some progress has been made, the lack of knowledge, future concerns and doubts regarding the COVID-19 vaccine make people hesitate.⁶

Vaccination have been among the most successful public health practices since the 1800s. The success of vaccination is based on healthy and reliable communication with the society. For example, the presentation of contradictory information about the real effects of the COVID-19 vaccine and what kind of treatment it will offer have caused doubts.⁷ The key to sustaining trust in vaccines is the interaction between health institutions and the society. If health institutions or experts confirm the effectiveness of the vaccines, it will be easier for the society to comply with the vaccination rules. In short, vaccinated healthcare professionals have a significant impact on eliminating hesitations.⁶ Defines vaccine hesitancy as “the delay in accepting or rejecting vaccines despite the availability of vaccine services.”⁸ Vaccine hesitancy has many social, cultural, political, and personal roots. These factors include peacefulness, convenience, and trust. Many studies have been conducted on public hesitations regarding COVID-19 vaccines. Accordingly, COVID-19 vaccine acceptance rates are higher in Ecuador (97%), Malaysia (94%), Indonesia (93%) and China (91%) than in other world countries. While that of Lebanon (21%), Jordan (28.4%), Qatar (43%), Iraq (62%), Saudi Arabia (65%), and Turkey (66%) are lower in comparison. The rates in USA and Israel are 78% and 75% respectively.⁹

Health literacy also plays an important role in understanding the risks associated with COVID-19 and initiating preventive behaviors. The World Health Organization (WHO) defines health literacy as “a concept that represents cognitive and social skills that determine individuals’ access, understanding and use of information that will promote and protect their health.”² This definition shows the importance of health literacy in the prevention and control of COVID-19.¹⁰ Vaccine

literacy, on the other hand, is a basic health literacy element necessary to control the current pandemic. Vaccine literacy can be discussed if people have sufficient access to and information sources on the vaccines.¹¹ A study conducted by Biasio et al.¹² determined that individuals with high vaccine literacy have a more positive attitude toward COVID-19 vaccination. Turhan, et al.¹³ on the other hand, found that insufficient information about vaccines was the reason for the lack of trust in COVID-19 vaccines.

In addition to health literacy and vaccine literacy, there are many factors that affect the attitudes toward COVID-19 vaccines. The country of origin and product judgment are among these factors. Countries play an important part in product evaluations. Because each country has a brand image in the minds of consumers. This image contributes to the economic, social, and political power of the country.³ For example, a study conducted by Dror, et al.¹⁴ found that people who live in Israel have more confidence in COVID-19 vaccines originated in the USA and United Kingdom compared to those from China or Russia. While Aydın, et al.³ argued that the vaccines originated in Germany and China affect the attitudes of consumers differently. Similarly, in another study carried out in Brazil by Gramacho and Turgeon¹⁵ found the country of origin to be an important factor in accepting the vaccine. According to Lee et al.¹⁶ product judgment is related to the country of origin. Products of brands from developed countries tend to be considered more quality. This is supported by the study of Suhud and Allen.⁴ As the study suggests product judgment and the country of origin to be related. Product judgment also affects the attitude toward the COVID-19 vaccines.

Consumers behaviorally express their opinions when they like, or dislike actions taken by any institution, organization, or country. If the consumers have negative emotions (hatred, dislike), they can boycott the products produced by the relevant institutions, organizations, or countries; while in the opposite case, these products are recommended by the consumers. This study aims to evaluate the differences in attitude based on health literacy, product judgment, the country of origin, recommendation, and boycotting. It was conducted on a target population consisting of people in Turkey who had been vaccinated at least once.

Literature review and hypothesis development

Health literature

Health literacy has been defined by the World Health Organization (WHO) as “cognitive and social abilities that determine the motivation and ability to access, understand and use information that will promote and protect good health.”² Health literacy encompasses the ability to talk, understand, read, and listen to issues about health and being aware of these abilities.¹⁷ Another definition of health literacy is the ability to understand and manage health-related decisions and to evaluate the quality of the health service.¹⁸ Considering these definitions, health literacy is being able to access and learn correct information and to be able to lead a life around the obtained information.¹⁹

The importance of health literacy has increased during the pandemic period and studies in the literature have been mainly about vaccine literacy and health literacy. The recent studies on health literacy have been mostly about vaccine hesitancy, the attitude toward the vaccines and the anti-vaccination movement^{18,20,21} measured the health literacy level for vaccines and determined that young women with at least a bachelor's degree had the highest literacy level.²² Another study by Patil²⁰ was conducted on students in the USA and examined the effect of the level of information, access, and attitudes of students on health literacy and digital health literacy. The results of the study show a relationship between high digital health literacy have the tendency to access and use information, and vaccine acceptance rates. Rauh et al.¹¹ mentioned the necessity of creating informative websites about the vaccination stages to increase health literacy. On the other hand, Masiello et al.²³ suggested that students should be informed on vaccines in school.

Country of origin

The place of production of a product or service expresses its country of origin and establishes a parallel relationship between country image and product quality.²⁴ As the country of origin of the vaccine is affected by the political debates and conflicts between countries and it is not yet known how this is received by consumers and how it is affecting COVID-19.¹⁵ As COVID-19 started in China, it has created a major distrust among consumers toward Chinese products and the biggest reason for this distrust is said to be technological developments.^{14,25}

Aydın et al.³ examined the attitudes regarding the COVID-19 vaccines in terms of the country of origin. As a result, they found that the image of the country of origin for German and Chinese vaccines was a variable associated with the intention to be vaccinated. Wang et al.²⁶ studied the country of origin and consumer hostility during the pandemic and revealed that with the increase in cases, brand loyalty decreased, and consumer hostility had a mediating role. Elarbah and Shebli²⁷ investigated the effect of the country of origin and product quality on product selection, while İzmir²⁸ investigated the effect of the country of origin on purchasing decisions. It revealed a significant positive relationship. Berry et al.²⁹ examined the effect of country of origin on purchasing food products. Türk³⁰ on the other hand, made a comparison of US and Chinese products in terms of the tendency to purchase foreign products, and stated that while the image of China had a negative effect on purchasing, that of US had a positive effect. In the study conducted by Gramacho and Turgeon¹⁵ on 2771 individuals in Brazil, the vaccines developed in China and Russia were rejected more than the vaccines developed in the USA and England showing that the country origin does have an effect. With the above studies in mind, the following hypotheses were formulated.

H1: *Health Literature effects of Country of Origin.*

H5: *Country of Origin effects the Intention to Recommend.*

H6: *Country of Origin affects the Motivation to Boycott.*

Product judgment

For consumers to be willing to accept a product, it is necessary for them to have positive judgments on the price, quality, country image, packaging and most importantly, the benefits of the product. After these positive perceptions, the product can be put on the market.³¹ The ignorance of the side effects of vaccines, the negative impact of religious beliefs on intention to be vaccinated, the aim of vaccine manufacturers to generate economic rent, and the concept of ethnocentrism are the main reasons that affect product judgments.³²

Ali³³ stated in his study that product judgment and consumer boycotts have a direct effect on reluctance to purchase in cases where countries have political conflicts. Okuhara et al.³⁴ on the other hand, mentioned that the vaccine judgments of health consumers could be resolved with the dual process theory. He states that people think analytically according to system 1, while according to system 2, vaccine judgments are formed with the effect of advice on the vaccine, and he adds that system 1 is more effective on judgments. Adeyanju et al.³⁵ stated that pregnant women are at the forefront of consumers approaching vaccines with prejudice, and this judgment may be due to the lack of knowledge about vaccines and the negative psychological perception of the risk of miscarriage. Bouchez et al.³⁶ studied HPV vaccines and found that it is important for healthcare professionals reassure the consumers on getting the vaccine, and that lack of confidence causes product judgment and vaccine hesitancy. Kömür et al.³⁷ on the other hand, found that country image has positive effects on the behavioral intentions of consumers. Aydoğan³⁸ on the other hand, found that there is a negative relationship between consumer ethnocentrism and the tendency to buy foreign products while there is a positive relationship with the country of origin. With the above studies in mind, the following hypotheses were formulated.

H2: *Health Literature affects Product Judgment.*

H7: *Product Judgment affects the Intention to Recommend.*

H8: *Product Judgment affects the Motivation to Boycott.*

The intention to recommend

In order to understand the behavioral intentions of consumers, it is necessary to first understand the impact of vaccines on health consumers, to be informed on the side effects of vaccines, and to identify the hesitations regarding vaccines.^{39,40} Informing the public and managing the risks and crisis in health consumption is effective in increasing cognitive risk perception and reducing their emotional risk perception.^{41,42} From this point of view, the health literacy levels of consumers can be said to shape their behavioral intentions. The following hypotheses were formulated based on previous studies.

H3: *Health Literature affects the Intention to Recommend.*

Liu and Liu⁴³ created a dataset over 5000 tweets to examine behavioral attitudes of consumers toward vaccines and found that behavioral intentions became positive thanks to the positive effects of vaccines. They also observed that anxiety, values, and attitudes toward the disease cause negative intentions. Thus, it was determined that positive behavioral intention leads to the intention to recommend vaccines. Gilca et al.⁴⁴ stated that the recommendation of the nurses for a new vaccine in Canada is directly related to the trust the consumers have in the vaccine and the intention to be vaccinated. LaVela et al.⁴⁵ revealed that healthcare professionals working in the USA are less likely to advise patients if they are unsure of the safety and efficacy of the vaccine. Zhang et al.⁴⁶ on the other hand, conducted a survey on 2053 Chinese factory workers and stated that the workers believe in the preventive quality of the vaccines and the benefits for their immune systems. Additionally, the intention to be vaccinated was found to have a significant relationship between the intention to recommend it to other workers. With the above studies in mind, the following hypotheses were formulated.

H9: *Health Literature affects the Intention to Recommend through Country of Origin.*

H12: *Health Literature affects the Intention to Recommend through Product Judgment.*

The motivation to boycott

The motivation to boycott started with mass consumption in the 1950s and has since been seen in many countries with the development of multinational companies and the social and economic problems caused by globalization.⁴⁷ Friedman⁴⁸ defines the motivation to boycott as “an effort by one or more parties to achieve their goals by encouraging individual consumers not to purchase certain products.” After the meningitis vaccine and polio vaccines, which started in the 1990s, the trust in pharmaceutical companies has decreased, the effects of which can be seen in Covid-19 vaccines as well.⁴⁹ Today, with Covid-19, consumers have been caught up in the perception of social boycott due to the risk of infection of products and political policies between countries revealed that healthcare professionals play an important role in the approval of vaccines, and that health literacy greatly benefits the approval of vaccines, the intention to recommend, and preventing boycotts. Based on the above information, the following hypothesis was formulated.⁵⁰⁻⁵²

H4: *Health Literature effects of the Motivation to Boycott.*

Ltifi⁴⁷ examined the effects of consumer boycotts of Chinese goods on brand image and product judgments during the pandemic. The results showed how the nationality of the consumer is not important, while brand image is important. Suhud and Allan⁴ evaluated the opinions of consumers in Indonesia in terms of hostility, brand image, boycott, and product judgments. The study found that hostility had a positive effect on boycott and a negative effect on the brand image. On the other

hand, consumer boycott was found to significantly affect vaccination intention through brand image and product judgment. In their research on Facebook, Ginder and Kwon⁵³ stated that consumers continue their boycott over social media, while Wiedman et al.⁵⁴ stated that consumers boycott in a viral way. Shin and Yoon⁵⁵ also argued the reliability of the message given to consumers, the effectiveness of the boycott and the participation in the boycott to be the most effective concepts in consumer decision. Nasution and Rossanty⁵⁶ on the other hand, examined the mediating role of country of origin between non-halal products and the purchasing tendency in Muslim countries and found a positive effect. Likewise, Abdul-Talip et al.⁵¹ observed how the warring countries in the Middle East boycott the products of the USA and Israel due to religious reasons. With the above studies in mind, the following hypotheses were formulated.

H10: *Health Literacy affects the Motivation to Boycott through the Country of Origin.*

H11: *Health Literacy affects the Motivation to Boycott through Product Judgment.*

Methodology

Research population and sample

The population of the research consists of participants living in Turkey who have been vaccinated with either BioNTech or Sinovac. The sample group consists of 416 people in total, selected through the convenient sampling method. After eliminating the incomplete and incorrect questionnaires, the analysis was conducted on the data of 393 people. The target number of participants for each region is reliable with a 5% margin of error.

Collection of the research data

The data was collected through online questionnaires. The questionnaire form was created using the 5-point Likert scale. The expressions in the questionnaire were translated both into English and Turkish to ensure the integrity of meaning. The

data was collected in the first quarter of 2022. The data was transferred to SPSS and AMOS programs and analyzed. This study abode by the scientific, ethical and citation rules and the data has not been distorted; it has not been sent anywhere for academic publication. Ethics committee approval, numbered 2021/123 and dated 15.12.2021, was obtained from Sırnak University Ethics Committee for this study.

Analysis of the research data

The overall aim of the research is to measure the consumer perception of BioNTech and Sinovac vaccines. More specifically, it is aimed to examine the population living in Turkey who are the consumers of either of these vaccines in terms of health literacy, product judgment, country of origin, intention to recommend and motivation to boycott. The first step of the analysis was obtaining information about the participants through descriptive statistics. The second step investigates the correlation levels between the variables. The third step consists of reliability and validity analyses. Cronbach's Alpha (Ca) values were used for reliability while Average Variance Explained (AVE) and Combined Reliability (CR) values were examined for validity. Afterward, the factor loadings of the scale were determined through confirmatory factor analysis. In the fourth stage relationships between the research variables were determined by PATH analysis. In this step the goodness-of-fit values, effect levels and mediation tests regarding the variables were examined.

Research model and scale development

The scales of the research were tested in different cultures and sectors. This was an important fact in choosing the scales. The reliability and validity values of the relevant scales were also an important factor in choosing them. The "Health Literacy" scale was taken from Aras and Temel;⁵⁷ "Country of Origin" scale from Yousif;⁵⁸ The "Product Judgment" scale from Nakos and Haji;⁵⁹ "Intention to Recommend" scale, from Hoşgör;⁶⁰ The "Motivation to Boycott" scale was taken from Klein&John⁶¹ and Tian.⁶² The research model, on the other hand, was created to reveal the relationships between the variables. (Figure 1) presents the model.

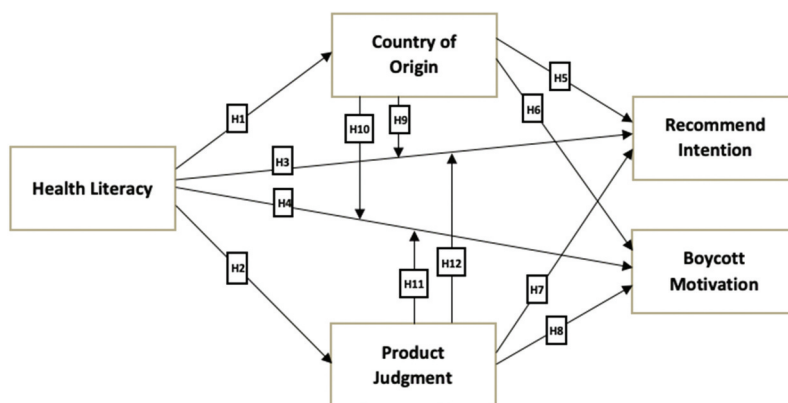


Figure 1. Research model.

The hypotheses designed in line with the research model can be listed as follows:

- H1:** Health Literacy affects Country of Origin.
- H2:** Health Literacy affects Product Judgment.
- H3:** Health Literacy affects Recommend Intention.
- H4:** Health Literacy affects Boycott Motivation.
- H5:** Country of Origin affects Recommend Intention.
- H6:** Country of Origin affects Boycott Motivation.
- H7:** Product Judgment affects Recommend Intention.
- H8:** Product Judgment affects Boycott Motivation.
- H9:** Health Literacy affects Recommend Intention through Country of Origin.
- H10:** Health Literacy affects Boycott Motivation through Country of Origin.
- H11:** Health Literacy affects Boycott Motivation through Product Judgment.
- H12:** Health Literacy affects Recommend Intention through Product Judgment.

In this study, four mediating effects were measured. Firstly, we aimed to explore the mediating role of country of origin between health literacy affects recommend intention (H9). Secondly, we aimed to explore the mediating role boycott motivation between health literacy affects boycott motivation (H10). Thirdly, we aimed to explore the mediating role product judgment between health literacy affects boycott motivation (H11). Fourthly, we aimed to explore the mediating role boycott motivation between health literacy affects recommend intention (H12).

Findings

Participants

The universe of the research consists of vaccine consumers in Turkey. The sample consists of a total of 393 people selected by the convenient sampling method. (Table 1) contains demographic information about the participants.

The participants were classified according to gender, marital status, age, occupational group, income, and educational status in (Table 1). Accordingly, 244 (62.1%) of the participants were female and 149 (37.9%) were male; it is seen that 119 (30.3%) of them are married and 274 (69.7%) of them are single. It is seen that 231 of the participants (58.8%) are between the ages of 21 and 30. It is seen that 119 (30.3%) of the participants received an education at the bachelor's degree level. It is seen that 139 (35.4%) of the participants have an

Table 1. Demographic information.

Variables	Groups	N	%
Gender	Female	244	62,1
	Male	149	37,9
Civil Status	Married	119	30,3
	Single	274	69,7
Age	20 and below	55	14,0
	21-30	231	58,8
	31-40	88	22,4
	41-50	16	4,1
Education Status	51 and above	3	0,8
	Primary-Middle School	16	4,1
	High School	84	25,4
	Associate Degree	115	29,3
	Bachelor's Degree	119	30,3
Income Status	Master	47	12,0
	PhD	12	3,1
	1000TL and below	139	35,4
	1001TL-3000TL	58	14,8
	3001TL-5000TL	76	19,3
	5001TL-7000TL	65	16,5
Profession Group	7001tl and above	55	14,0
	Public Sector Employee	98	24,9
	Private Sector Employee	81	20,6
	Industrialist and Businessman	8	2,0
	Tradesman and Craftsman	7	1,8
	Employee	14	3,6
	Student	159	40,5
	Others	26	6,6
Total		393	100

Table 2. Other information about participants.

Variables	Groups	N	%
Have you been infected with Covid-19 before?	Yes	117	29,8
	No	276	70,2
How many doses of Covid-19 vaccine have you had?	1 Doses	63	16,0
	2 Doses	242	61,6
	3 Doses	68	17,3
	4 Doses	20	5,1
What type of Covid-19 vaccine have you had?	BioNTech	328	83,5
	Sinovac	65	16,5
Total		393	100

income of 1000TL or less. It is seen that 159 (40.5%) of the participants are student. (Table 2) contains other information about the participants.

The participants were classified according to the state of being infected with Covid-19 disease is classified according to which type and how many doses of Covid-19 vaccine they have in (Table 2). Accordingly, 276 (70.2%) of the participants declared that they had not been diagnosed with Covid-19 before. 328 (83.5%) of the participants had BioNTech and 242 (61.6%) had two doses of Covid-19 vaccine.

Relationships between variables

Before testing the hypothesis of the research, it is necessary to examine the relationships between the variables. Accordingly, correlation analysis was applied to the variables of "Health Literacy (HL)," "Product Judgment (PJ)," "Country of Origin (CO)," "Recommend Intention (RI)" and "Boycott Motivation (BM)." (Table 3) shows the means, standard deviations, and correlation values of the data obtained because of the Pearson Correlation analysis.

Table 3. Values of variables.

Variables	Mean	S.S.	HL	PJ	CO	RI	BM
HL	3,6124	,81686	1				
PJ	3,7272	,89835	.504**	1			
CO	3,4538	,77567	.275**	.139**	1		
RI	3,4179	,88934	-.259**	-.508*	-.082	1	
BM	1,9771	,80086	.431*	.818*	.201**	-.417*	1

*p<.05; **p<.01; ***p<.001.

It can be said that there are significant relationships between all the variables of the study in (Table 3). Therefore, it is possible to predict various effects among the variables.

Reliability and validity analysis

Reliability was determined by Cronbach's Alpha (Ca) values and validity was determined by Average Explained Variance (AVE) and Composite Reliability (CR) values. As a result of the analysis, it was determined that the skewness and kurtosis values were between +2.0 and -2.0. According to George and Mallery⁶³ it is accepted that the kurtosis and skewness values show a normal distribution. (Table 4) shows the skewness, kurtosis, reliability, and validity values of the scales of the study.

As a result of factor analysis, one item each from negative WOM (.462) and boycott motivation (-.307) scales; was excluded due to low factor loadings and negative loading. George and Mallery⁶³ the fact that loads of each factor are higher than 0.50 indicates that the relevant items are at an acceptable level. According to the findings, factor loads consisted of statistically significant values ranging from 0.587 to 0.917. So, it was concluded that the loadings of the factors were sufficient to measure the research variables. The cumulative variance explanatory power of the scale was determined as 66.464%. Kalaycı⁶⁴ if the alpha value is 0.70 and above, the relevant scale is reliable. Fornell and Larcker⁶⁵ the AVE value should be above 0.50 and the CR value above 0.70. As can be

Table 4. Reliability and validity analysis.

Scale Dimensions	Scale Items	Skewness	Kurtosis	Factor Weights	Ca	CR	AVE
Health Literacy	HL1	-0,821	-0,130	.733	.848	.848	.580
	HL2	-0,532	-0,574	.742			
	HL3	-0,937	0,231	.757			
	HL4	-1,150	1,084	.696			
	HL5	-0,838	-0,023	.643			
	HL6	-0,960	0,599	.588			
Country of Origin	CO1	-0,943	0,285	.587	.881	.883	.608
	CO2	-0,781	-0,091	.672			
	CO3	-0,777	-0,130	.854			
	CO4	-0,890	0,128	.891			
	CO5	-0,975	0,467	.850			
Product Judgment	PJ1	-0,554	0,957	.711	.854	.857	.669
	PJ2	-0,368	0,135	.836			
	PJ3	-0,375	0,376	.897			
Recommend Intention	RI1	-0,542	-0,005	.802	.886	.888	.667
	RI2	-0,703	0,200	.871			
	RI3	-0,434	-0,258	.888			
	RI4	-0,017	-0,589	.692			
Boycott Motivation	BM1	0,859	0,714	.594	.880	.886	.665
	BM2	1,197	1,437	.824			
	BM3	1,056	1,340	.889			
	BM4	1,007	1,218	.917			

Overall Scale Ca: .820.

seen in (Table 1), belonging to the scale; it can be said that all the alpha, CR and AVE values are at a sufficient level. Accordingly, it can be said that the scales provide construct and discriminant validity.

Hypotheses analysis

Structural equation model (SEM) analysis was used to test the hypothesis of the research. Through SEM, direct and indirect effects between variables were determined. The PATH analysis proposed by Wright⁶⁶ tests the relationships between model variables. It was possible to evaluate the model holistically by analyzing the mutual interactions of the variables. As seen in (Figure 1), significant relationships were found between "Health Literacy (HL)," "Product Judgment (PJ)," "Country of Origin (CO)," "Recommend Intention (RI)" and "Boycott Motivation (BM)."

The goodness of fit values for the model subjected to PATH analysis (CMIN/d: 2.251, NFI: 0.918, CFI: 0.953, GFI: 0.904, RMSEA: 0.056) was at a p = .000 significance level and was at an acceptable level. The acceptable fit range is $0.05 \leq RMSEA \leq 0.08$ ⁶⁷ $0.090 \leq NFI \leq 0.095$. and $0.095 \leq CFI \leq 0.097$ ⁶⁸ $0.085 \leq GFI$ and $AGFI \leq 0.089$, and $\chi^2/sd < 3$.⁶⁹ It has been determined that 22 items and 5 dimensions that make up the scale are about the scale structure. (Table 5) shows the PATH results of the analysis regarding the research model.

As seen in (Figure 2), a positive (.249) and significant (.000) relationship between health literacy and country of origin; a positive (.288) and significant (.000) relationship between country of origin and recommend intention was found. Also, it was concluded that there is a positive (.450) and significant (.000) relationship between health literacy and recommend intention. To talk about a mediation relationship between the variables, this relationship should weaken or become

Table 5. Hypothesis analysis results.

Hypothesis	Regression	β	p	Results
H1 Health Literacy affects Country of Origin.	CO ← HL	.249	.000	Accepted
H2 Health Literacy affects Product Judgment.	PJ ← HL	.475	.000	Accepted
H3 Health Literacy affects Recommend Intention.	RI ← HL	.450	.000	Accepted
H4 Health Literacy affects Boycott Motivation.	BM ← HL	-.396	.000	Accepted
H5 Country of Origin affects Recommend Intention.	RI ← CO	.288	.000	Accepted
H6 Country of Origin affects Boycott Motivation.	BM ← CO	-.113	.037	Accepted
H7 Product Judgment affects Recommend Intention.	RI ← PJ	.797	.000	Accepted
H8 Product Judgment affects Boycott Motivation.	BM ← PJ	-.422	.000	Accepted
H9 Health Literacy affects Recommend Intention through Country of Origin.	RI ← CO ← HL	.072	.002	Accepted
H10 Health Literacy affects Boycott Motivation through Country of Origin.	BM ← CO ← HL	-.028	.041	Rejected
H11 Health Literacy affects Boycott Motivation through Product Judgment.	BM ← PJ ← HL	-.200	.005	Rejected
H12 Health Literacy affects Recommend Intention through Product Judgment.	RI ← PJ ← HL	.379	.010	Accepted

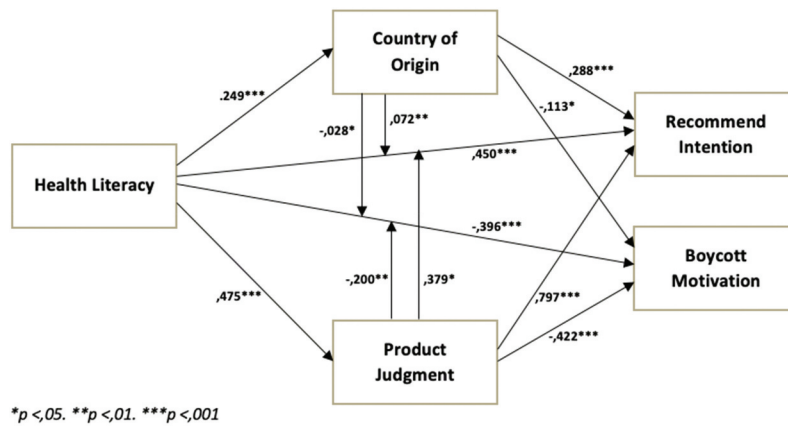


Figure 2. PATH analysis.

statistically insignificant when the mediation variable is included. In this study, when the mediating role of origin of country is added between the health literacy and recommend intention variables, it is seen that the relationship between the two variables is still significant (.000), but the relationship weakens (.072). As a result, country of origin has a significant mediating effect between health literacy and recommend intention variables.

According to the results, a positive (.475) and significant (.000) relationship between health literacy and product judgment; a positive (.797) and significant (.000) relationship between product judgment and recommend intention was found. Also, it was concluded that there is a positive (.450) and significant (.000) relationship between health literacy and recommend intention. When the mediating role of product judgment is added between the health literacy and recommend intention variables, it is seen that the relationship between the two variables is still significant (.000), but the relationship weakens (.379). As a result, product judgment has a significant mediating effect between health literacy and recommend intention variables.

Finally, it has been determined that there is no mediating effect of any variable between health literacy and boycott motivation. When the mediating role of country of origin and product judgment is added between the variables of health literacy and boycott motivation, it is seen that the relationship between the two variables is significant (.041; .005), but the relationship does not weaken (-.028; -.200). As a result, country of origin and product judgment has no mediating effect between health literacy and boycott motivation variables.

Discussion

Covid-19 has globally caused changes in consumer perceptions. Especially in terms of vaccines, the recommendations of healthcare workers and scientists plays a big role in gaining consumer confidence. The country of origin of the vaccines also plays a considerable role. Great powers such as China, Germany, USA and Russia show extraordinary efforts for producing vaccines. Consumers, on the other hand, first try to analyze the information they have obtained from their close

environment and scientists regarding vaccines, and then they tend to get the vaccinations. Social media can also cause reluctance to get vaccinated. The lack of knowledge about vaccines or the low level of health literacy of consumers and the negative behaviors they see around them can motivate them to boycott.

Most of the participants who had Sinovac and BioNTech vaccines in Turkey had at least 2 doses of vaccination. What has been effective in this situation is the way that Turkey has been trying to encourage people to get vaccinated. Consumers were compelled to get at least 2 doses of the vaccinations or show a negative PCR test to travel, shop or enter public enterprises. BioNTech has been preferred more due to the effectiveness of the vaccine, and Sinovac has been recommended to healthcare workers and the elderly.

Consumer evaluations showed that health literacy has a significant and positive effect on the country of origin of the vaccine. High levels of health literacy are needed to understand the importance of the country of origin, and the effects of these two variables are supported by previous studies.^{70,71} The effect of health literacy on product judgment is also significant and positive. In this case, a consumer with a high level of health literacy, researches the product in detail and has positive and/or negative thoughts following their research. Additionally, it was found that health literacy has a positive significant effect on the intention to recommend. Health literacy helps consumers understand, criticize, analyze, and make decisions about what they consume. That is why health literacy is vital. When it comes to vaccines, people are expected to have advanced health literacy to be able to make recommendations. Studies on this subject show that the doubts about the vaccine should be eliminated^{39,40} and consumers need to receive positive feedback on the vaccines to be able to recommend them. Thus, previous studies on the subject support the hypotheses of this study. Health literacy also has a significant and positive effect on the last variable, the motivation to boycott. Nzaji et al.⁵² stated that health literacy is crucial in preventing boycott.

According to the analyses of this study, the country of origin of the vaccine has a significant and positive effect on the motivation to boycott. Previous studies have observed how the lack of trust in the quality of Chinese goods creates negative

thoughts in consumers, and this is how Chinese goods come to be boycotted.^{26,56,72} Another hypothesis was on the effect of the country of origin of the vaccine on the intention to recommend. The country of origin has a direct impact on the quality perception of the countries and consumers tend to buy and recommend new products by relying on the quality of the country without doing much research, which supports our hypothesis.^{3,28,38,73}

Another hypothesis was on the effect of product judgment on the motivation to boycott and intention to recommend. Product judgment was found to have a positive significant effect on the intention to recommend. When the literature is examined, consumers have the intention to recommend after having learned enough information about the content of the product and, the recommendation is mainly made through word-of-mouth communication.^{74–76} On the other hand, the lack of information about the vaccine and the lack of confidence on the vaccines affect the intention to recommend by forming product judgment against them.^{35,36} Product judgment was, again, found to have a positive significant effect on the motivation to boycott. Other studies have argued that especially Chinese goods greatly affect the brand image of the product and tend to be boycotted due to political and religious reasons.^{4,47,77}

According to the PATH analyses, the country of origin has a mediating role between health literacy and the intention to recommend the vaccine. To recommend the vaccine, it is necessary to know the effects and the content of the vaccine. Additionally, the guidance of the healthcare professionals creates trust and increases the intention to recommend. This hypothesis is supported by other studies in the literature.^{44,46} In particular, the brand images and quality perceptions of countries create the perception that Chinese products are cheap and of poor quality, while German products are seen as high quality.^{27,28}

The product judgment does not have a mediating role between health literacy and the motivation to boycott. Ltifi⁴⁷ revealed that brand image has an important role while the country of origin is not important which supports the hypothesis of the study. Studies show how social media is an important tool for consumers to be triggered to boycott the vaccines, and that not only health literacy is ignored but also each consumer creates negative judgments about the product by sharing their hostility.^{52,54} In their study, Gramacho and Turgeon¹⁵ stated that after the negative criticism of the Brazilian president regarding China and Russia, people preferred the vaccines produced in England and the USA while boycotted the other countries.

The product judgment was found not to have a mediating role between health literacy and the motivation to boycott. This situation is thought to be caused by the fear and panic due to the rapid increase in the number of cases where the study was conducted. People, thus, do not boycott any vaccines without product judgment because they need the vaccines. Especially in the period where the data was collected, there was a shortage of vaccines all over the world and consumers began to get vaccinated without question. This may have caused product judgment not to have a mediating role in boycotting the vaccines. In the previous studies, consumer hostility toward other

products has been observed to occur with brand loyalty, and the image of the country has been found to have a negative effect on purchasing intention.^{3,30,41}

Finally, it was observed that the mediating role of product judgment between the intention to recommend and health literacy was significant and positive. When consumers buy a health-related product, they may have positive or negative attitudes toward it and then they may recommend it to others accordingly. Considering other studies in the literature⁷⁸ showed that consumers with high health literacy recommend the vaccine because of getting enough information and having confidence in it. In another study¹³ stated that those with low health literacy and prejudices about vaccines, hesitate to get vaccinated.

The sample of the study was limited to 393 people living in Turkey who had at least one dose of BioNTech or Sinovac vaccines. The presenting comparative findings with data from different vaccine user groups, and different countries will be useful for more generalizable findings. Also, researchers can be reevaluated different demographic segments in terms of evaluating the vaccine intention of consumers. In future research, different qualitative methods may be preferred to measure vaccine consumers' health literacy, product judgment, country of origin, intention to use, and boycott intentions. In this way, it can obtain more in-depth information about vaccine consumption perceptions of vaccine consumers. The perceptions of vaccine consumers living in different countries and their preferences for different COVID-19 vaccines (Moderna, Astra Zeneca, etc.) can be reevaluated. In addition, examining the relationship between variables such as brand image, ethnocentrism, hostility, religiosity, and the use of vaccines will be useful for obtaining findings on health marketing.

Conclusion

According to the results of the analyses, health literacy has a significant effect on product judgment, the country of origin, motivation to boycott and intention to recommend. It is no question that health literacy plays an important role for consumers to have sufficient product knowledge, a sense of trust and the ability to interpret, which would create positive or negative attitudes toward the vaccine. It was thought that the country of origin and product judgment would play a mediating role between the absence of vaccine hesitation and the intention to recommend. The country of origin and product judgment of the vaccine were found to have a significant mediating effect on the intention to recommend. The confidence of the healthcare professionals, the brand image and quality perception of countries can render the perception of vaccines positive. Consumers currently show great interest in vaccines due to the high demand and insufficient supply. Free vaccinations and the encouragements on getting vaccinated have eliminated the motivation to boycott the vaccines in Turkey. Additionally, the people who developed the BioNTech vaccine are a Turkish couple. Most of the consumers who participated in the study have also got the BioNTech vaccine which diminishes the motivation to boycott considering its country of origin and the nationality of the people who developed the vaccine. Future studies can be conducted on different countries and vaccination types.

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