

THE PSYCHOLOGICAL DETERMINANTS TOWARD THE VALUE OF HEALTHY FOOD AMONG TYPE 2 DIABETES MELITUS CONSUMERS

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ABSTRACT

Adults and middle-aged food consumers are the most at risk of type 2 diabetes, and these consumers are varied across demographics. While few and fragmented studies are associated with psychological determinants and healthy food value through food choices. Few consumer roles are involved in research for business success. The psychological determinants toward the value of healthy food for type 2 diabetes consumers used consumer behavior and psychological theories of consumer choices. An associative method with purposive sampling was conducted from 165 adults and middle-aged consumers with type 2 diabetes using Structural Equation Modeling/SEM. The finding showed that the belief, attitude, and mood affected the value of healthy food through food choice, but not psychological distress. The attitude had the greatest effect on food choice and toward the value of healthy food, and the causal of the highest result effect of life experiences. The belief was directly affected food choice and value, and the causal for the highest effect of self-consciousness and health maintenance. The mood negatively affected both food choice and value of healthy food mood and the causal for the smallest effect of health maintenance. The food choice affected the values of healthy food. Life experience was the most direct and indirect effect of food choice and self-consciousness was the most direct effect of the value of healthy food. Some highlights of this study were (i) market segmentation and segmentation variable; (ii) social marketing; (iii) mass media campaign by considering attitude, belief, and mood; and (iv) human capital management strategy with targeted audiences.

Keywords: food choice, psychological determinant, value of healthy food, type 2 diabetes, consumer.

INTRODUCTION

Recently, adults and middle-aged food consumers are the most at risk of type 2 diabetes. Diabetes is corresponding to 6.28% of the world's population (Abdul et al., 2020). It is reported as one of the nine leading causes of death (Abdul et al., 2020), and particularly bring substantial economic loss in developing countries (WHO, 2014; WHO, 2016). Nutrition transition (Lucchese et al., 2016), sedentary lifestyle (Basiak-Rasała et al., 2019; Park et al., 2020), and obesity (Bertoglia et al., 2017) are important risk factors that lead to diabetes.

Meanwhile, type 2 diabetes consumers are more diverse in the future (Faerch et al., 2016) and varied across demographics (Cheng et al., 2019), leading to heterogeneity changes in purchasing behavior (Oster, 2018). These heterogeneity changes of consumer behaviors are a market challenge and beneficial for market segmentation (Zanden et al., 2017), and consumer satisfaction–loyalty (Fuentes-Blasco et al., 2014). Besides,

there are significant response to diabetes-related products in food items, timing of purchases, combination of purchases, etc. in households food purchase (Oster, 2018).

Furthermore, type 2 diabetes consumers need to make sensible food choices. Understanding individual food choices and healthy food are critical (Chen & Antonelli, 2020) for underlying healthy eating. Informed food choices will promoted healthier consumers (Castres, 2015). Healthy foods are associated with decreament of diabetes case (Nagarajan et al., 2017), and healthy eating help managing long-term health (Swanson & Maltinsky, 2019), even if it is not low cost (Fanzo et al., 2020).

In addition, few studies associated psychological determinants with healthy food values through food choices for type 2 diabetes consumers. Some issues of treatment adherence have been acknowledged for years, which are diverse cost-effectiveness of interventions and a few consumer role research for business success

(Roberts et al., 2017; Soler et al., 2018; Khunti et al., 2019; Zhou et al., 2020). While the literature on the value of healthy food to improve diet quality in the population is still fragmented (Heijden et al., 2020).

Diabetes consumers also demand psychological (Swanson & Maltinsky, 2019; American-Diabetes-Association, 2019), and distinctive psychosocial needs (Bhat et al., 2020). Diabetes impacts cognitive, emotional, behavioral, and social factors in psychosocial aspects (Kalra et al., 2018). Hardcastle et al. (2015) show the importance of psychological factors on food choices. While psychological distress, belief, attitude, and mood are a response to eating behavior (Heewon et al., 2018; Wehling & Lusher, 2019; Bartkiene et al., 2019; Bemanian et al., 2021). Personality (Smith, 2020), motive (Poeller, 2021), and attitude (Wu et al., 2021) are essentially driving a person to seek satisfaction.

Meanwhile, values ensure strategic perspective and fundamental behavior of purchasing decision. The valuation of value is a relational process between value and the object to be valued (Himes & Muraca, 2018). The purchasing decisions reflect the values, beliefs, and collective needs of consumers (Yu & Lee, 2019). On the other side, the necessity of type 2 diabetes consumers value generating appropriate psychographic segmentation because of lifestyle changes (Van Huy et al., 2019), and customers loyalty (Gajanova et al., 2019) in the relevant market.

This study tried to build simultaneous relationship between psychological determinant and value of healthy food through food choices using consumer behavior theory (Mowen, 1995) and psychological theory of consumer choice (Hansen, 1976). The perceived health benefits influenced type 2 diabetes consumer behavior (Ali et al., 2018), which make value considerations and show the predictability of consumers behaviors for marketers. While psychological theory of consumers choice characterized by decision making that related to psychological process (Hansen, 1976), focused on the nature of needs and consumers motivations (Gârdan & Gârdan, 2015), and making decision in consumption (Vainikka, 2015).

METHOD

The research used an associative method with purposive sampling from a cross sectional design of 165 adults (aged over 18 years or older) and middle-aged (aged about 45 to 65) food consumers of type 2 diabetes in West Kalimantan Province in 2021 that has continued to increase over the last 6 years (Pramoedyo & Sumarminingsih, 2018; Kemenkes, 2018; Arifin et al., 2019). The participants had been recruited through a non-proportional sampling using semi-structured questionnaire with an in-depth interview to deepen and sharpen the understanding of reason and reflective listening (Brounéus, 2011).

There were two phases of the study. First, identify type 2 diabetes consumer characteristics, which include gender, formal education, occupation, family member, expenditure (Seng et al., 2021), metabolic rate, diabetes status, and period of having diabetes (Caron et al., 2016). Second, to build simultaneous relationship of psychological determinants (Heewon et al., 2018; Wehling & Lusher, 2019; Bartkiene et al., 2019; Bemanian et al., 2021; Smith, 2020; Poeller, 2021; Wu et al., 2021) toward the value of healthy food (Himes & Muraca, 2018) through food choices (Yu & Lee, 2019) using Structural Equation Modelling or SEM (Narimawati & Sarwono, 2017) due to the great flexibility of SEM (Gana & Broc, 2019) with Lisrel software.

The psychological determinants toward food choices were consisted of psychological distress, belief, attitude, and mood. Anxiety, apathy, depression, fatigue, insomnia, and guilty were included in psychological distress (RACGP, 2016; Darwish et al., 2018; Stevanovic et al., 2019; Amankwah-poku & Amankwah-poku, 2020). Religious, cultural, opinion were included in belief (Gorter et al., 2011; Ameyaw & Ameyaw, 2020; Omodaraa et al., 2021). Personality, traveling experience, and perceived constraint were included in attitude (Izadi et al., 2015; Pretty et al., 2016; Adu et al., 2019). Positive mood and negative mood were included in mood (Du et al., 2021).

While food choices were measured on individual measurements, such as self-consciousness, emotional intelligence, and life

stage. Family, life experience, food origin, and health maintenance were included in the value of healthy food (Pathak, 2014; Pamungkas et al., 2017; Fonseca et al., 2018; Idris et al., 2019).

In SEM, there were six key procedural steps (Thakkar, 2020): (i) model specification; (ii) model identification; (iii) model estimation; (iv) model testing; and (v) model modification. The value of healthy food for type 2 diabetes consumers model combine measured and latent variables as predictive variables, both exogenous (i.e. psychological distress, belief, attitude, and mood) and endogenous (i.e. food value and food choice). The measurement model indicates how observed indicators linked to underlying latent variables, while the structural model indicates how the latent variables linked to each other (Gana & Broc, 2019).

The 5-point Likert scale was used to measure indicators of a latent variable (i.e. strongly disagree, disagree, neutral, and strongly agree) without successive interval (MSI) methods because RMSEA (Root Mean Square Error Approximation) value had the same conclusion in the testing model suitability (Pramoedyo & Sumarminingsih, 2018).

RESULT AND DISCUSSION

Characteristics of Type 2 Diabetes Consumers

An overview understanding of consumers characteristics for better comprehending type 2 diabetes consumers' perceived value of healthy food value through food choice, which included gender, formal education, occupation, family members, expenditure, metabolic rate, diabetes status, and period of having diabetes were presented in Table 1.

Table 1 shows that most type 2 diabetes consumers were older adult male with low to moderate formal education, housewife, 3 members of the family, with 2,000,000 - 5,000,000 rupiah of expenditure per month. Most of them were overweight with low BMR for more than 5 years of period. Thus, their diabetes status were uncontrolled condition.

Type 2 diabetes consumers of older adults both men and women are reaching epidemic in many countries (Bradley, 2016) due to increasing rates of overweight and obesity, combined effects

Table 1. The Characteristics of Type 2 Diabetes Consumers

Characteristics	%
Gender	
Male	51.52
Female	48.48
Formal Education (year)	
< 6	1.21
6 - 9	9.09
9 - 12	68.48
> 12	33.33
Occupation	
Farmer	1.82
Government employee	10.91
Private employee	13.94
Entrepreneur	25.45
Retired	9.09
Housewife	38.79
Family Member (people)	
1	3.64
2	9.09
3	44.24
4	32.73
5	13.94
6	5.45
> 9	3.03
Expenditure (rupiah/month)	
< 2,000,000	15.76
2,000,000 - 5,000,000	75.76
> 5,000,000 - 10,000,000	15.15
> 10,000,000	5.45
Body Dimention	
Weight (kg)	
< 50	7.88
50 - 68	38.18
> 68	53.94
Height (cm)	
< 160	9.09
160 - 170	75.76
> 170	15.15
Basal Metabolic Rate/BMR (kcal)	
< 1,400	57.24
1,400 - 1,600	37.88
> 1,600	4.88
Diabetes status	
Uncontrollable	45.45
Moderate controlled	39.39
Very restrained	15.15
Period of having diabetes (year):	
< 5	47.27
≥ 5	52.73

of unhealthy eating habits (Afroz et al., 2019), physical inactivity and poor healthy lifestyles (Galaviz et al., 2018). Besides, the control of type 2 diabetes consumers was inadequate because of smokeless tobacco (Afroz et al., 2019). While low BMR stimulated the risk of insulin resistance metabolism (MacIak et al., 2020). Thus, market segmentation and variables segmentation can be used to form the heterogeneous market into relatively homogenous clusters (Wilhelm, 2015).

Psychological determinants toward the value of healthy food

The validity and reliability test are important in the second phase to build the simultaneous relationship of psychological determinants toward the value of healthy food through food choices using Structural Equation Modelling/SEM as presented in Table 2.

Table 2 shows the quality of research, meaning that the results can be accurately interpreted, and there was a consistency in measuring outcomes (Schumacker & Lomax, 2010). While the goodness of fit-test that described how well the model fits into a set of observations is presented in Table 3.

Table 3 shows that there were eleven criteria in proper conclusions for the interpretation as

Table 2. Construct Reliability (CR) and Variance Extracted (VE)

Criteria	Value of healthy food	Food choices	Psych. distress	Belief	Attitude	Mood
Std. loading factor of VE	0.97	0.69	1.22	0.75	0.85	0.77
Errors of VE	1.01	0.66	0.55	0.78	0.61	0.53
VE	0.51	0.57	0.82	0.65	0.50	0.88
Overall VE	> 0.50					
Std. loading factor of CR	1.44	1.23	1.11	1.12	1.02	1.08
Errors of CR	1.21	0.67	0.81	0.63	0.78	0.80
CR	0.87	0.61	0.69	0.59	0.77	0.99
Overall CR	≥ 0.70					

Note: accepted if CR ≥ 0.7 and VE > 0.50

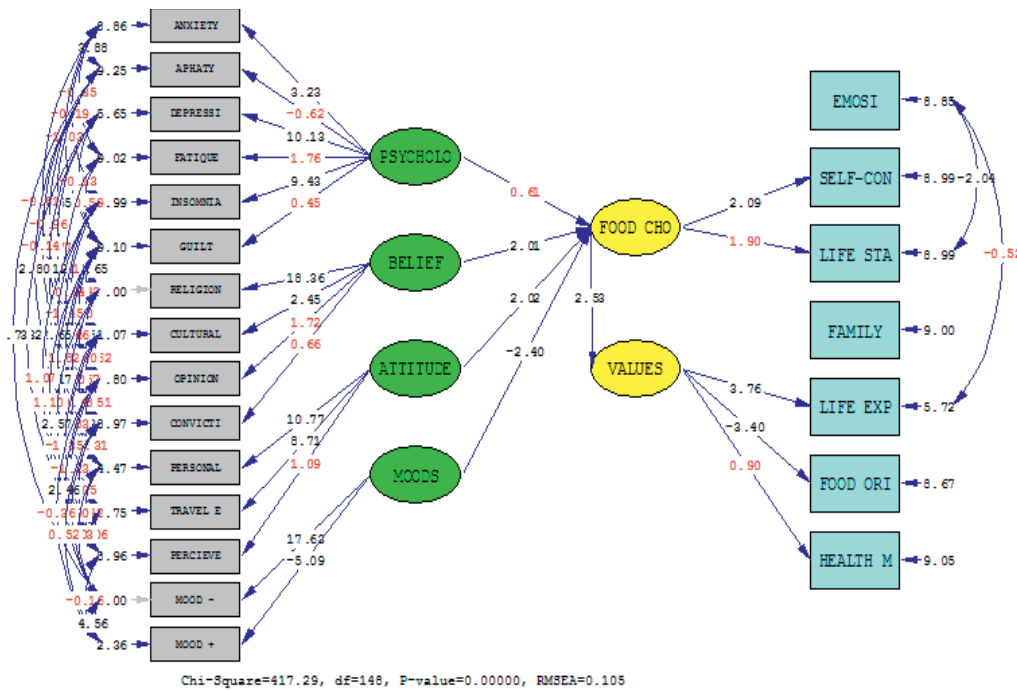
Table 3. Goodness of Fit-Test

Criteria	Std. value	Initial		Final	
		Estimate	Conclusion	Estimate	Conclusion
Chi-Square / χ^2	Small value	698.07	Poor	474.99	Good
χ^2/DF	$1.0 \geq x \leq 5.0$	3.49	Poor	3.21	Good
NCP	Small value with a narrow interval	455.30 (381.54; 536.65)	Poor	269.29 (212.12); 334.11)	Good
SNCP (NCP/n)	Small value	3.04	Poor	1.79	Good
RMSEA	≤ 0.08	0.12	Poor	0.11	Good
ECVI	Small value and close to saturated ECVI	I=8.87 M=4.64 S=3.09	Poor	I=8.87 M=3.82 S=3.09	Good
AIC	Small value and close to saturated AIC	I=1544.55 M=761.30 S=506.00	Poor	I=1454.22 M=627.29 S=506.00	Good
CAIC	Small value and close to saturated CAIC	I=1544.55 M=978.91 S=1544.8	Poor	I=1544.55 M=1058.4 S=1544.80	Good
PGFI	0-1	0.58	Good	0.48	Good
RMR	≤ 0.05	0.081	Good	0.066	Good

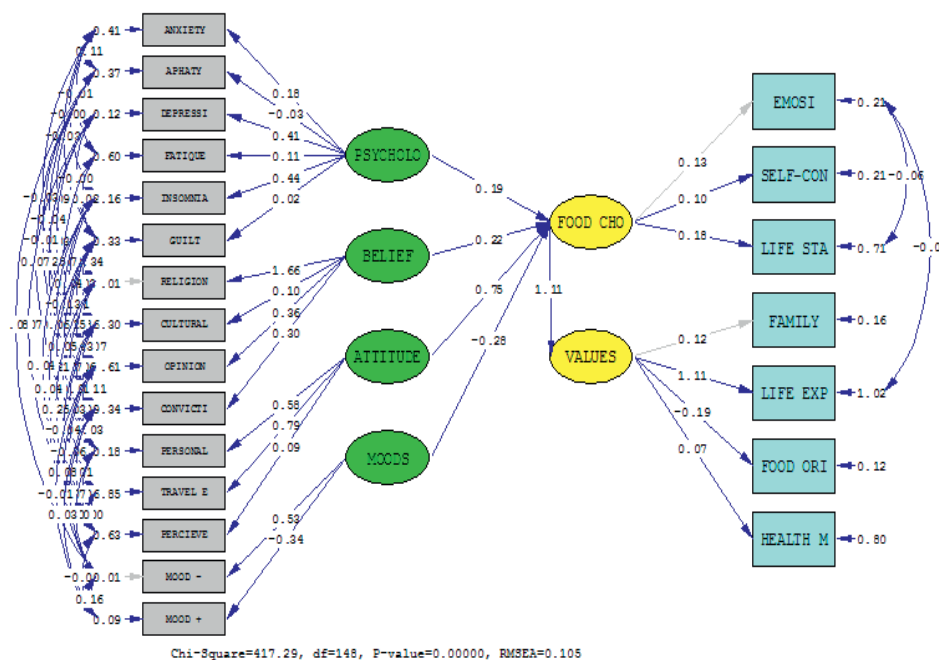
presented in a structural model in Figure 1 and path diagram analysis in Table 4.

Figure 1 shows that each box images are the indicator of latent exogenous variables (observed variables) that correspond to the latent endogenous variables. All covariance of the observed variables described the relationship between observed

variable and latent variable. Psychological distress, belief, attitude, and mood explained 73% of food choice and 90% of value of healthy food in a structural model. The finding showed that belief, attitude, and mood affect the value of healthy food through food choice, but not psychological distress



(a) t-value model



(b) estimate coefficient model

Figure 1. Structural model of psychological determinants toward the value of healthy food

due to the healthy food category (Teufel-Shone et al., 2018).

Within belief variables, religion and culture were positively affect the value of healthy food through food choice but not opinion. Consumers with different culture and religion are varied in all aspects of food choice and value of healthy food (Sibal, 2018). While opinions are not related to the potential moral issue of food sources, and low awareness of thoughts related to healthy food (Rontelap et al., 2012).

Among the attitude measurements, the positive aspects of personality traits affected the value for healthy food through food choice (Najmeh et al., 2021), this research was contrary to El Ansari et al. (2014) due to gender, food insecurity (Leung et al., 2020), and lower socioeconomic status (Spinosa et al., 2019). The value of healthy food has physical and mental health benefit for a long-term investment of well-being (Wahl et al., 2017). While travel experiences are positively related to food choice, affect the value of healthy food because of need and perception (van der Velde et al., 2019), and influence the destination of food experiences (Björk & Kauppinen-Räsänen, 2017).

In mood measurement, the negative and positive emotion were associated with food choices (Ashurst et al., 2018) that lead to eating behavior (Reents et al., 2020) and basis in value of healthy food. A negative mood or low mood leads to indulgent food or unhealthy food over healthy food (Gardner et al., 2014). The improved mood is correlated with more healthy eating (Leeds, 2020). Besides food can serve emotional consolation (Cardoso et al., 2020) and reductions of mood swings (Jenkins et al., 2016) though vary through sociodemographic (Cardoso et al., 2020). While eating healthy food has a positive effect on certain size, composition, expectation, and need (Gibson, 2006).

In the food choice variable, the self-consciousness and emotional intelligence were positively related to food choice and toward the value of healthy food due to the preference in choosing healthy food (Hanspal & Devasagayam, 2017). However, the life stage was not related to food choice and toward value for healthy food because of the sociodemographic characteristic differences (Konttinen et al., 2021), life transitions

(Winpenny et al., 2018), and external impact (Chen & Antonelli, 2020).

Value of healthy food are inevitable consequences of the evolving global culture and environment. Consumers reportedly prefer value drivers of health, wellness, and safety over traditional value (i.e. price, taste, and convenience) (Godfray et al., 2010). Thus, life experience and food origin were positively related to the value of healthy food (Farhud, 2015). Life satisfaction, a self-transcendence orientation, and wisdom stimulated life experience for healthy food (Le, 2011). While, food origin is a normative sense of quality and ethnocentrism because of education and income level (Yormirzoev et al., 2019). In addition, family eating habits are dominant factor for healthy food choice and eating behavior due to interaction between individuals in a family (Risti et al., 2021).

Health maintenance was not related to the food choice and toward the value of healthy food which was contrary to Reitmeier (2016) and Jun et al. (2014) because of the sociodemographic characteristic differences (Konttinen et al., 2021) such as formal education, occupation, family members, expenditure, preference changes (Vilaro et al., 2018), and external impact (Chen &

Table 4. Path Diagram Analysis

Path diagram analysis	Estimate coef.	Conclusion	Direct effect	Indirect effect
Psychological distress → Food choice	0.19	Not significant	0.19	-
Belief → Food choice	0.22	Positive significant	0.22	-
Attitude → Food choice	0.75	Positive significant	0.75	-
Mood → Food choice	-0.28	Negative significant	-0.28	-
Psychological distress → Value	0.21	Not significant	0.21	0.21
Belief → Value	0.25	Positive significant	0.25	0.25
Attitude → Value	0.84	Positive significant	0.84	0.84
Mood → Value	-0.31	Negative significant	-0.31	-0.31
Food choice → Value	1.11	Positive significant	1.11	-

Antonelli, 2020). Furthermore, there were direct and indirect effect of psychology determinants on value for healthy food through food choice as presented in path diagram analysis in Table 4.

Table 4 shows that the attitude had the strongest direct effect on food choice and toward the value of healthy food, followed by the mood and belief. An increase in 1.0% of attitude led to a direct increase in 0.75% of food choice and 0.84% of the value of healthy food. However, mood negatively affected both food choice and value of healthy food, an increase in 1.0% of mood led to a direct decrease in 0.28% of food choice and 0.31% of the value of healthy food. Belief was directly affected the food choice and value, an increase in 1.0% of belief led to a direct increase in 0.22% of food choice and 0.25% of the value of healthy food. Food choice affected value of healthy food. An increase in 1.0 % of food choice led to a direct increase in 1.11% of values of healthy food. While measurement model is presented in Table 5.

Table 5 shows that life experience, followed by food origin, family, and emotional intelligence had the strongest direct effect of food choice. The life experience, followed by food origin, and family also had the highest positive indirect effect on the food choice. Self-consciousness had the direct effect of the value of healthy food, which is consistent with Souter & Keller (2002) due to the different interactivity of cognitive, affective, and normative aspect (Luomala, 2007). The value of healthy was food positively and directly affected by the attitude and behavioral intention (Jun et al.,

Tabel 5. Measurement model

Indicator of latent variable	Direct effect		Indirect effect	
	of food choice	of the value of healthy food	of food choice	of the value of healthy food
On food choice				
Emotional intelligence	0.13	-	-	-
Self-consciousness	0.10	-	-	-
On the value of healthy food				
Family	0.13	0.12	0.13	-
Life experience	1.24	1.11	1.24	-
Food origin	-0.21	-0.19	-0.21	-

Tabel 6. Effect of belief, attitude, the mood on the indicator of food choice and the value of healthy food

Indicator of latent variable	Belief	Attitude	Mood
On food choice			
Emotional intelligence	0.03	0.10	-0.04
Self-consciousness	0.02	0.08	-0.03
Life stage	0.04	0.14	-0.05
On the value of healthy food			
Family	0.03	0.10	-0.04
Life experience	0.28	0.93	-0.34
Food origin	-0.05	-0.16	0.06
Health maintenance	0.02	0.05	-0.02

2014). In addition, family norm as family identity reduced the food choice conflict (Cong et al., 2013). Table 6 presented the effect of exogenous variables on endogenous indicators.

Table 6 corroborated the previous result that the highest total effect of psychological determinants is a life experience. The life experience had greater positive indirect effect to food choice due to the difference in interactivity of cognitive, affective, and normative aspect (Luomala, 2007). The highest effect on the food choice and value of healthy food was attitude. The mood had a negative effect on all of the indicators of food choice and value of healthy food, except food origin. In food choice indicators, all psychological determinants had the highest effect on life stage, while the smallest was self-consciousness. In the value of healthy food indicator, all psychological determinants had the highest effect on life experience, while the smallest was health maintenance. The attitude was the causal for the highest result effect on life experience. The belief was the causal for the highest effect on self-consciousness and health maintenance, and the mood was the causal for the smallest effect on health maintenance.

Therefore, some suggestions can be taken into consideration regarding type 2 diabetes consumers as follow. First, social marketing with an emphasis on timely acceptance and usage of attitude, belief, and mood to achieve behavior change (Kalra & Sahay, 2016). Second, mass media campaign to influence consumers' change and make healthy behavior more than the norm by considering attitude, belief, and mood of

type 2 diabetes consumers (WHO, 2016). Third, enhancing value for type 2 diabetes consumers using elements of health care marketing that build consumer satisfaction–loyalty (Fuentes-Blasco et al., 2014; Health et al., 2021). The organization determines differentiation of human potential and its involvement in various organizational processes or human capital management strategies (Toszewska, 2019) with target audience (Wilhelm, 2015).

CONCLUSION

The belief, attitude and mood affected the value of healthy food through the food choice, but not psychological distress. Psychological distress, belief, attitude, and mood explained 73% of food choices and 90% of the value of healthy food. The attitude had the greatest direct effect on the food choice and toward the value of healthy food, followed by the mood and belief. Life experience resulted the biggest direct and indirect effect of the food choice. The self-consciousness had the highest direct effect on the value of healthy food. Some highlights of this study were (i) market segmentation and segmentation variables, (ii) social marketing, (iii) mass media campaigns by considering attitude, belief, and mood, and (iv) human capital management strategy with target audiences.

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