

# Prediction of the Students' Intention to the Consumption of Soft Drinks: Using the Extended Parallel Process Model

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Received: 26 December 2017

Revised: 06 March 2018

Accepted: 15 May 2018

## Abstract

**Background:** Soft drinks consumption is a major world public health concern. This study investigates the factors which influence the students' intention to consume fewer amounts of soft drinks, using The Extended Parallel Process Model.

**Methods:** This cross-sectional study was conducted on 320 high schools boys in Yazd, Iran (2014). A 15-item, 5-point Likert-type scale questionnaire was used to measure the participants' perceived susceptibility, severity, response-efficacy and self-efficacy and intention about soft drinks' consumption. Internal consistency (Cronbach alpha >0.7 for each construct) and external consistency:  $r=0.79$ ,  $P=0.01$ ) of questionnaire was approved. Data were analyzed by SPSS 16, using descriptive analysis, bivariate correlation, and stepwise multiple regression analysis. The level of significance was set at 0.05.

**Results:** The participants' average soft drink consumption was  $3\pm 3.4$  daily glasses. Danger control processes had more frequency over fear control ones (57.7% vs. 42.3% of participants). The intention of fewer amounts soft drinks consumption was positively correlated with perceived response efficacy, self-efficacy and total efficacy. 16% of the participants' intention variations were explained by self-efficacy. The odds of intention towards not to consume soft drinks were significantly higher for the high efficacy/ low threat category ( $OR=1.51$ ,  $P=0.04$ ) compared with low efficacy / low threat category.

**Conclusion:** The results revealed that inducing fear is not an effective way to promote healthy drinking behavior and the choice of fear appeals is often a poor choice in this subject. It can be suggested that health educators should move from traditional threatening fear arousal messages to improving their target audience's self-efficacy.

Please cite this article as: Karimi M, Zare Harohtah F, Baghianimoghadam MH, Bahrevar V, Ghiyasi H. Prediction of the Students' Intention to the Consumption of Soft Drinks: Using the Extended Parallel Process Model. *J Health Sci Surveillance Sys.* 2017;5(2):2-7.

**Keywords:** Carbonated beverages, Extended parallel process model, Students, Intention, Health behavior

## Introduction

High sugar intake, especially in soft drinks, has recently become a major public health concern and health policy problem.<sup>1,3</sup> Soft drinks including nonalcoholic,

flavored, carbonated or non-carbonated beverages are usually available in bottles or cans.<sup>1,3,4</sup> Although the Food Guide Pyramid suggested that the intake of added sweeteners should constitute 6-10 % of daily energy,<sup>2</sup> soft drinks are regarded as the largest source of added

sugar and important contributors of high diet calories in United States.<sup>2,4</sup>

Based on the reports, per capita milk consumption has decreased although the amount of consuming low nutrients soft drinks has increased dramatically in the last two decades.<sup>1,5</sup> Based on the informal reports, each Iranian citizen typically consumes about 33-42 liters of carbonated beverages per year which is three or four times more than the global average. Based on the result of the study in Farooj (Northern Khorasan, Iran), 94% of the secondary school students largely used soft drinks at home, with a frequency of 1-2 times per week.<sup>6</sup> Some studies indicated that beverage consumption depends on their availability at home,<sup>5</sup> while some reported the restaurants and fast food stores as the most rapidly growing sources of soft drinks.<sup>1</sup> Further, beverages are available in school cafeterias.<sup>7</sup>

Furthermore, the prevalence of obesity among the youth has substantially increased in recent years and Iran has not been an exception.<sup>8-11</sup> Soft drink consumption is known as a major contributor to obesity and its related health problems<sup>3, 12, 13</sup> such as disability and premature death which, in turn, threaten socioeconomic development.<sup>14, 15</sup> It is also believed that the substitution of milk by soft drinks can reduce calcium intake among children and adolescents, leading to an increase in the risk of osteoporosis in later life.<sup>1, 16</sup> In addition, it is evident that sugar-sweetened beverages may promote dental caries.<sup>2, 17, 18</sup>

As unhealthy diet is a key modifiable risk factor for a large number of NCDs,<sup>15</sup> and health education interventions can be regarded as a key strategic plan for changing the individuals' behaviors as a primary prevention goal. Planning effective educational programs necessitates a better understanding of those factors influencing beverage consumption.

Health behavior theories provided a framework to identify the determinants of any given behavior such as beverage consumption. Furthermore, they play a critical role throughout the program planning process.<sup>19, 20</sup> The Extended Parallel Process Model (EPPM) is regarded as one of the theories related to health behavior which emphasizes emotions and describes the interaction between emotion (perceived threat) and rationality (perceived efficacy) in behavioral decision-making.<sup>21</sup> According to the EPPM, when individuals encounter educational or advertising messages, they perform threat and efficacy appraisals, which may lead to three possible responses: non-response, danger or fear controlled responses. The subsequent outcomes such as intentions and behaviors depend on the interaction between their perceptions of the threat and efficacy to avert the threat.<sup>22-24</sup>

To our knowledge, no studies have been conducted

on the beverages consumption behavior based on EPPM, and other studies based on this model on other health behaviors have not achieved the consistent results; for example, Thrasher and others in a prospective cohort study on smokers concluded that prominent pictorial health warnings labels produce psychological and behavioral threat responses that independently promote smoking cessation behaviors at different levels of self-efficacy to quit or response efficacy.<sup>25</sup> However, Wong and others in an experimental study found that smokers who perceived high message threat and high message efficacy had the strongest intentions to seek help for quitting smoking. They suggested that both high threat-oriented and high efficacy-oriented information need to be present for smoking cessation messages to be most effective.<sup>26</sup>

Since health educators traditionally use threatening health messages for changing health behavior and because of inconsistencies in the results of the studies which have been conducted using EPPM on other health behaviors, the present study aimed to investigate the predictors of high school male students' intention to soft drink consumption, based on EPPM, in Yazd, Iran.

## Materials and Methods

In this cross-sectional study, the target population was high school male students (grades 9-12) of Yazd city. The only exclusion criterion was lack of willingness to participate in the study.

A sample size of at least 277 students was calculated ( $\alpha=0.05$ ,  $P=0.94$  and  $d=0.03$ ), using Cochran's formula. The participants were enrolled from three boys' high schools through a multistage sampling method. First of all, a convenience sample of three high schools were selected; then, in each high school, one class from each grade (9<sup>th</sup>, 10<sup>th</sup>, 11<sup>th</sup>, and 12<sup>th</sup>) was randomly selected.

Based on the extended parallel process model, the participants were asked to complete a self-report paper-and-pencil questionnaire including 15 Likert-scale items. The questionnaire was used to measure the participants' perceived threats including susceptibility, severity plus perceived efficacy including response-efficacy, self-efficacy about soft drink consumption, as well as their current intentions. For each construct, three items were selected and the participants' behaviors towards the beverage consumption were measured by the open-ended question: "How many glasses of soft drinks have you taken daily on average over the past month?"

Developing the questionnaire and calculating the participants' scores were based on the guideline of risk behavior diagnosis scale from Kim Witte's 1995.<sup>27</sup>

In order to calculate the scores, the sum of threat items scores (Perceived susceptibility and severity) was subtracted from the total of the efficacy items' scores (Perceived response efficacy +self-efficacy). The positive scores indicated danger control, while the negative scores showed fear control responses.

The content validity of the questionnaire was approved by a panel of experts, and internal consistency was calculated through Cronbach alpha (>0.7) for each construct. The external consistency was measured by test-retest Pearson correlation analysis (N=25, r=0.79, P=0.01).

The questionnaire was anonymous and all the participants were informed that participation in the study was voluntary, only the researchers would have access to the data, and all data would be presented on a group level.

Based on the median value of the perceived threat and perceived efficacy, four categories including low threat and low efficacy (LT/LE), low threat and high efficacy (LT/HE), high threat and low efficacy (HT/LE), and high threat and high efficacy (HT/HE) were created for the EPPM. Similarly, the participants' intention was categorized into high and low intention group.

SPSS 16 software was used for data analysis. Descriptive analysis, bivariate correlation (Pearson's product moment correlation coefficient) and stepwise multiple regression analysis were used to evaluate the relationships between the model constructs and the participants' intention of drinking beverages. Logistic regression analysis was utilized to evaluate the relationship between these EPPM categories and the participants' intentions to drink less soft drink.

**Results**

A total of 305 (95.3%) high school 14-19 year old students (Grade 9=96, Grade 10=86, Grade11=82 and grade 12=41)

responded all the items on the questionnaire. Incomplete questionnaires were excluded from the analysis. The participants' average soft drink consumption was 3±3.4 daily glasses (ranging from 0-10 glasses, mode=1 glass, Median=2 glasses). Table 1 indicates the scale means of all variables in the study.

Based on the means in Table 1, 57.7% of the participants had positive scores and 42.3% had negative scores, indicating that danger control processes had more frequency than fear control processes.

A Chi-square analysis was used to determine whether there is a significant association between the respondents' perceived danger and fear control along with the level of intention to consume less soft drink. As indicated in Table 2, the relationship between these variables was significant (X<sup>2</sup>(1, N=305)=11.03; P=0.001).

The intention to consume less soft drink was positively correlated with the perceived response efficacy, self-efficacy and total efficacy, while no statistical significance was observed between intention and perceived susceptibility, severity, and total threat (Table 3).

Now, as shown in Table 4, multiple linear regression analysis was used to develop a model for predicting the participants' intention to consume less soft drink, from their perceived response efficacy, self-efficacy, susceptibility and severity. In the full model, only self-efficacy had significant partial effects (P<0.001). 16% of the participants' intention variations were explained by the model which was statistically significant [F (4, 300)=14.16; R<sup>2</sup>=0.16, 90% CI (0.31, 0.57); P<0.001].

The second set of regression analysis was used to study the ability of EPPM categories (LT/LE, LT/HE, HT/LE and HT/HE) in order to predict the participants' intention to drink or not to drink industrial sweetened beverages. As illustrated in

**Table 1:** Descriptive statistics for the variables used in questionnaire

Variable	Mean±SD	Range	
		Minimum	Maximum
Perceived Response efficacy	10.25±2.63	3	15
Perceived Self-efficacy	9.77±3.26	1	15
Perceived severity	12.61±2.80	2	15
Perceived susceptibility	7.87±3.28	3	15
Intention	8.93±3.71	3	15
Perceived Efficacy <sup>1</sup>	20.02±4.87	4	30
Perceived Threat <sup>2</sup>	20.48±4.28	6	30
Raw Score <sup>3</sup>	-0.46±5.68	-15	19

**Table 2:** Intention levels among different perceived controls

	Levels of intention		Total
	High intention (%)	Low intention (%)	
Danger control	89 (69.0)	40 (31.0)	129
Fear control	88 (50)	88 (50)	176

**Table 3:** The correlation coefficients between Extended Parallel Process Model constructs

	1	2	3	4	5	6	7
1 Intention	1						
2 Perceived response efficacy	0.159**	1					
3 Perceived self-efficacy	0.350**	0.362**	1				
4 Perceived severity	0.080	0.252**	0.191**	1			
5 Perceived susceptibility	-0.024	0.087	0.064	0.027	1		
6 Perceived efficacy	0.320**	0.781**	0.865**	0.265**	0.091	1	
7 Perceived threat	0.047	0.215**	0.136*	0.643**	0.783**	0.209**	1

\*Correlation is significant at 0.05 level (2-tailed); \*\*Correlation is significant at 0.01 level (2-tailed)

**Table 4:** Linear regression analysis of the intention to consume less soft drink

Variable	$\beta$	CI95%	P
Constant		1.21-6.00	0.003
Perceived response efficacy	0.047	-0.09-0.23	0.418
Perceived self-efficacy	0.371	0.31-0.57	<0.001
Perceived severity	0.044	-0.09-0.21	0.417
Perceived susceptibility	-0.053	-0.18-0.06	0.319

Table 5, the odds of intention of not consuming soft drinks were significantly higher for the high efficacy/low threat (HE/HT) category than for the low efficacy/low threat (LE/LT) category.

## Discussion

Sugar-sweetened beverage consumption, as one of the major sources of added sugar and calories in adolescents' diet, is a modifiable behavior.<sup>4</sup> However, it is necessary to identify the determinants of this behavior to design interventions in order to effectively motivate adolescents to drink smaller amounts of beverages. Threatening health messages is common in health education design.<sup>28</sup> Traditionally, health educators use this type of messages to persuade people to change their behaviors. However, insufficient consistency exists in the results of the effectiveness of threatening communications. Therefore, the present study was conducted to investigate the variables of the students' intention to consume soft drink based on the Extended Parallel Process Model in Yazd, Iran.

The results of the study indicated that 57.7% of the participants belonged to danger control process group, among whom 69% believed that they had high intentions to consume less soft drink. No significant difference was reported among low and high intention categories in fear control process group. This result is consistent with the theoretical basis of EPPM which suggests that high perceived efficacy is related to high perceived threat, which promotes danger control responses and adopt the messages' recommendations

about changing risky behaviors.<sup>29</sup>

Furthermore, the results indicated a statistically significant correlation between the participants' intention to consume less soft drink and perceived response efficacy, self-efficacy and total efficacy. Based on the regression analysis, only self-efficacy explained 16% of the variations in the participants' intention ( $P < 0.001$ ). The results were partially consistent with other studies. For example, Peters et al, in their meta-analysis, concluded that efficacy should be high for the effect of threatening messages on behavior change.<sup>30</sup> In another study, Napper et al. observed that efficacy and the threat  $\times$  efficacy interaction were regarded as significant predictors on motivation to eat more fruit and vegetables.<sup>31</sup> However, the perceived threat (sensitivity and severity) had no statistically significant correlation with the intention to consume less soft drink in the present study.

The odds of intention to consume less soft drink were significantly higher among the high efficacy/low threat (HE/HT) category than the low efficacy /low threat (LE/LT) category although the two other categories failed to follow the same pattern. In other words, self-efficacy was the most important predictor of the students' intention not to consume soft drink, but perceived threat had no statistically significant predictive role in this area. These findings were confirmed in some other studies. For example, Ruiter et al. argued that information about the risks and probable diseases is the least persuasive component of threatening health communications. They suggested that arousing fear as a persuasive communication tool

**Table 5:** The relationship among the categories of the Extended Parallel Process Model and the participants' intentions to consume soft drink

Variable	Odds Ratio	CI 95%	P
Low efficacy/High threat	0.97	0.508-1.843	0.194
High efficacy/Low threat	1.51	0.779-2.869	0.037
High efficacy/ High threat	1.37	0.751-2.505	0.353

may result in defensive reactions such as risk denial, biased information processing and allocating less attention to the health promotion messages.<sup>28</sup> Floyd et al.<sup>32</sup> and Milne et al.,<sup>33</sup> in their meta-analysis on Protection Motivation Theory, reported that self-efficacy had the strongest relationship with the intention. Unlike the results of the present study, other constructs such as perceived response efficacy, severity and susceptibility had significant weak relationships with intention to consume less soft drink, which can be regarded as the result of applying the behavior model on different areas such as smoking and HIV/AIDS.

Overall, the results of the study indicated that being in the danger control process group increased the likelihood of making decisions for less soft drink consumption and the decisive factor in this field is perceived efficacy, especially self-efficacy (given the results of the regression analysis). Contrary to the model proposed by the Witte,<sup>34</sup> which suggests that people in low threat and high efficacy (LT/HE) category do not have enough motivation to act toward changing unhealthy behavior, in the present study, the most likelihood of behavior change was observed in students in this category and in terms of high perceived threats, any level of perceived efficacy had no statistical meaningful relationship with the chance of behavior change.

Although the study subject is a major public health concern and the theoretical framework of the EPPM has not been used in this topic, it has a number of limitations. The most important limitation lies in the generalizability of the findings. As our study was cross-sectional in nature, its results cannot be used to analyze behavior over a period of time and cannot help determine the cause and effect. Furthermore, the study participants were limited to urban male students. Finally, the study was conducted on a partially small sample size of participants because of time limitation.

## Conclusion

Inducing fear is not regarded as an effective way to improve healthy drinking behavior and the choice of fear appeals is often a poor choice like other issues in this respect. Moreover, it is suggested that health educators should move from traditional threatening or fear arousal messages to more effective communication ways such as improving their target audience's self-efficacy.

## Acknowledgement

This study was approved and supported by Shahid Sadoughi University of Medical Sciences, Yazd, Iran (reference number: 2625). It was not possible without the support of the Yazd province Department of Education and Training. The authors thank Dr. Lobat Salehi for

technical assistance.

## Funding

This research received no specific grant from any funding agency, commercial or not-for-profit sectors.

**Conflict of Interest:** None declared.

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