Consumers Purchase Intentions for Carnosine-Enhanced Pork – a Functional Food

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INTRODUCTION

People are aware that we are what we eat. More and more consumers believe that foods contribute directly to their health. The advances in understanding the linkage between nutrition and health significantly led to the concept of functional food (Mollet and Rowland, 2002). Functional foods, such as eggs, milk, and meat with omega-3, are foods enhanced with bioactive ingredients and are demonstrated to have physiological benefits and/or to reduce the risk of chronic disease beyond basic nutritional functions (Agriculture and Agri-Food Canada, 2015). The benefits of increasing the health attributes of pork, which is the most consumed meat in the world, can be significant. Carnosine is a naturally occurring dipeptide that exhibits anti-aging properties and other health benefits. It is high in pork and can be enhanced through feed or genomic selection. Functional food uptake may be related to consumers' nutrition knowledge about food but also their attitude towards health.

OBJECTIVES

The objectives of this study are:
- To assess the impact of nutrition knowledge and health consciousness on Canadian consumers' willingness to pay for functional pork of different types.
- To examine the impact of socio-demographic factors of Canadian consumers on their purchase preferences for functional pork of different types.

Attributes included are:
- a carnosine health claim,
- a carnosine nutrient content claim,
- carnosine included in the nutrition facts table (NFT),
- a protein nutrient content claim, and
- a Verified Canadian Pork label (VCP, covering on farm food safety, animal welfare etc.).

DATA AND METHODS

In order to address the objectives of this study, 992 respondents participated in a Canadian national survey in 2015, including choice experiments. Respondents were asked to choose between two pork chops with different attributes or an opt-out option. Utilizing the data, conditional logit (CL), random parameters mixed logit (RPL) and latent class models (LCM) were estimated.
Table 1 and 2 show the scales that were used for measuring one's levels of nutrition knowledge and health consciousness. Willingness to pay (WTP) for each pork attribute was calculated ($/package(0.405kg)).

Table 1: Scale for measuring nutrition knowledge

Statements (Canadian pork council, 2013):
1. In a 100 gm portion of pork there is only 2 % of your recommended daily value of sodium.
2. In a 100 gm portion of pork, there are 25-29 gms of protein.
3. In a 100 gm portion of pork, there is 6% of your recommended daily intake of iron.
4. In a 100 gm portion of a grilled pork loin centre chop there are approximately 174 calories.
5. In a 100 gm portion of a grilled pork loin centre chop there is only 3.8 gms of fat about 5% of your recommended dairy value of total fat.

1- strongly disagree; 5- strongly agree (scores were summed up)

Table 2: Scale for measuring health consciousness

Factor	Item
Self-health awareness	1: I'm very self-conscious about my health. 2: I'm generally attentive to my inner feelings about my health. 3: I reflect about my health a lot. 4: I'm concerned about my health all the time.
Personal responsibility	5: I notice how I feel physically as I go through the day. 6: I take responsibility for the state of my health. 7: Good health takes active participation on my part. 8: I only worry about my health when I get sick. (R)
Health motivation	9: Living life without disease and illness is very important to me. 10: My health depends on how well I take care of myself. 11: Living life in the best possible health is very important to me .

1- strongly disagree; 5- strongly agree (Hong, 2009; factor analysis was conducted)

RESULTS

Table 3: Socio-demographic characteristics of the survey sample

		Survey (%)	Census 2006	Census 2016			Survey (%)	Census 2006
Gender	Male	49.6	48.9	49	Education	Elementary school	0.6	15.4
	Female	50.4	51.1	51		High school	33.2	23.9
Age	18-20	0.7	7			College	36.1	37.7
	21-24	1.9	7	66.5		University	22.6	22.9
	25-29	3.9	6	(15-64)		Post graduate studies	7.6	4
	30-39	17.9	13		Income	$ 24,999 or under	17.8	10
	40-49	13.8	16			$ 25,000 - $ 39,999	17.8	14
	50-64	39.6	19			$ 40,000 - $ 64,999	24.2	28
	65+	22.1	13.7	16.9		$ 65,000 - $ 79,999	10.7	15
Province	Mari	11.1	8	5.4		$ 80,000 - $ 99,999	10.3	12
	QC	28.7	23.9	23.6		$ 100,000 - $ 119,999	5.3	10
	ON	32.6	38.5	38.4		$ 120,000 or more	6.3	12
	MB	4.4	3.6	3.6	Area of residence	City	63	81
	SK	3	3.1	3.1		Town/countryside	37	19
	AB	8.9	10.4	10.9	Presence of child	Yes	19	
	BC	11.3	13	13.1		No	81	

Table 3 shows the demographic statistics of the survey sample and related census data in 2006 and 2016. Compared to census data, the survey population was older, had higher education levels, and lower income.

Table 4: Consumers' WTP for pork attributes

Attributes	Conditional logit	Random Parameters mixed logit	LCM Class 1 - 74.2%	LCM Class 2 - 25.8%
Carnosine health claim	-2.06***	-3.06***	-0.73***	-11.81***
Carnosine nutrient content claim	-1.40***	-1.76***	-0.13	-9.88***
Carnosine included in the NFT	0.12	0.46**	0.68***	-1.39**
Protein nutrient content claim	0.97***	0.99***	1.27***	0.36
Verified Canadian pork label	1.51***	1.42***	1.82***	0.24

Table 4 shows the consumers' WTP for pork attributes calculated from the conditional logit model, random parameters mixed logit and latent class models. Consumers prefer pork chops with carnosine included in the NFT, a protein nutrient content claim and the VCP label over pork chops with a carnosine health claim or a carnosine nutrient content claim. The latent class model captures heterogeneity in consumer responses. Based on selection criteria, a two-class model was selected as the best model. The classes contain 73.4% and 25.8% of the sample population, respectively. Compared to the respondents in class 2, respondents in class 1 have more significant and higher WTP for pork attributes.

Table 5: Profiles of respondents belong to the two classes in latent class model

	Class 1	Class 2		Class 1	Class 2
Age	51	50	Familiarity with genomics	1.8[a]	1.7
Gender (male)	53%[a]	45%	Frequency of purchasing meat	3.7[a]	3.1
Presence of children under 18 in the household	21%[a]	16%	Respondent doesn't eat meat	2%[a]	13%
Education (in year)	14	14	Nutrition knowledge	16.1	15.3
Respondent lives in Quebec	29%	27%	Self-health awareness	0.01	0.05
Respondent lives in city	61%[a]	70%	Personal responsibility	0.03	0.06
Income (in $1000)	59.2	55.5	Health motivation	0.02	0.07

a implies statistically significant difference at 10% between two classes

RESULTS CONT'D

The profile (Table 5) indicates that heterogeneity in consumers' socio-demographic factors, food purchase behavior, and health interest exists between the two classes. However, the levels of nutrition knowledge and health consciousness are not statistically significantly different between the two classes.

Figure 1: Consumers' WTP for carnosine included in the NFT grouped by different factors
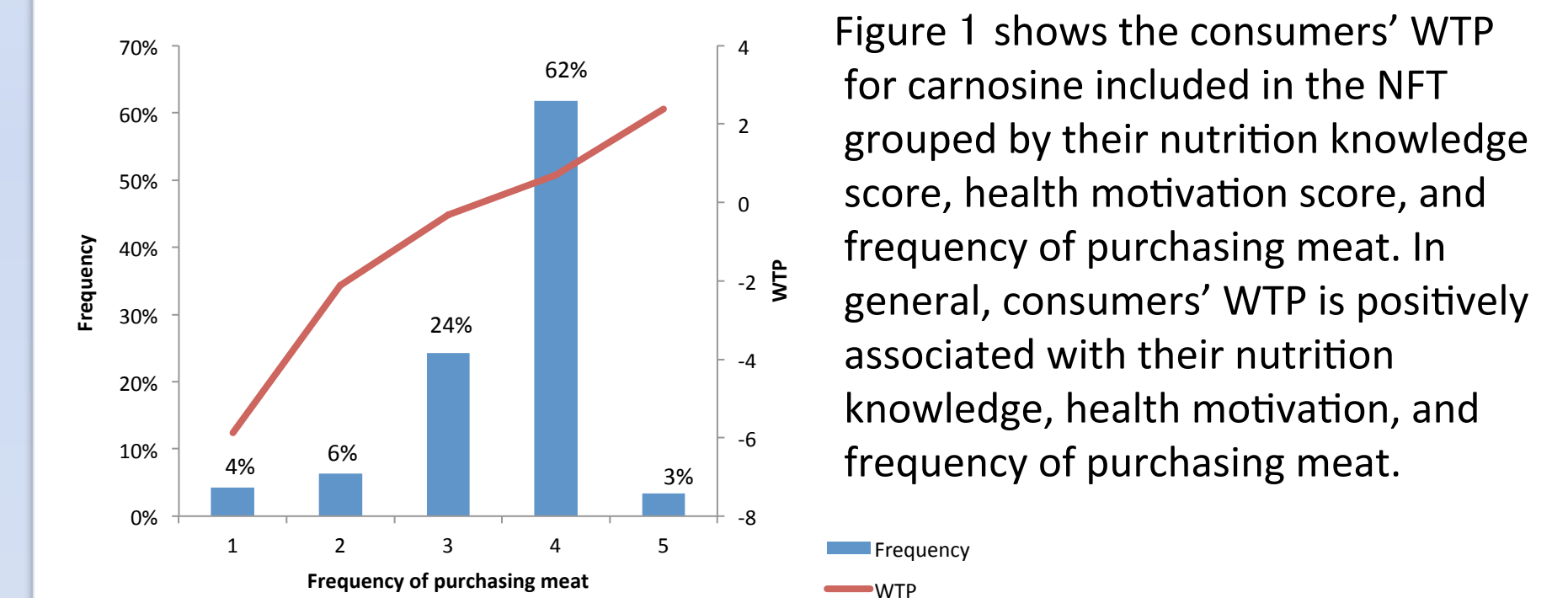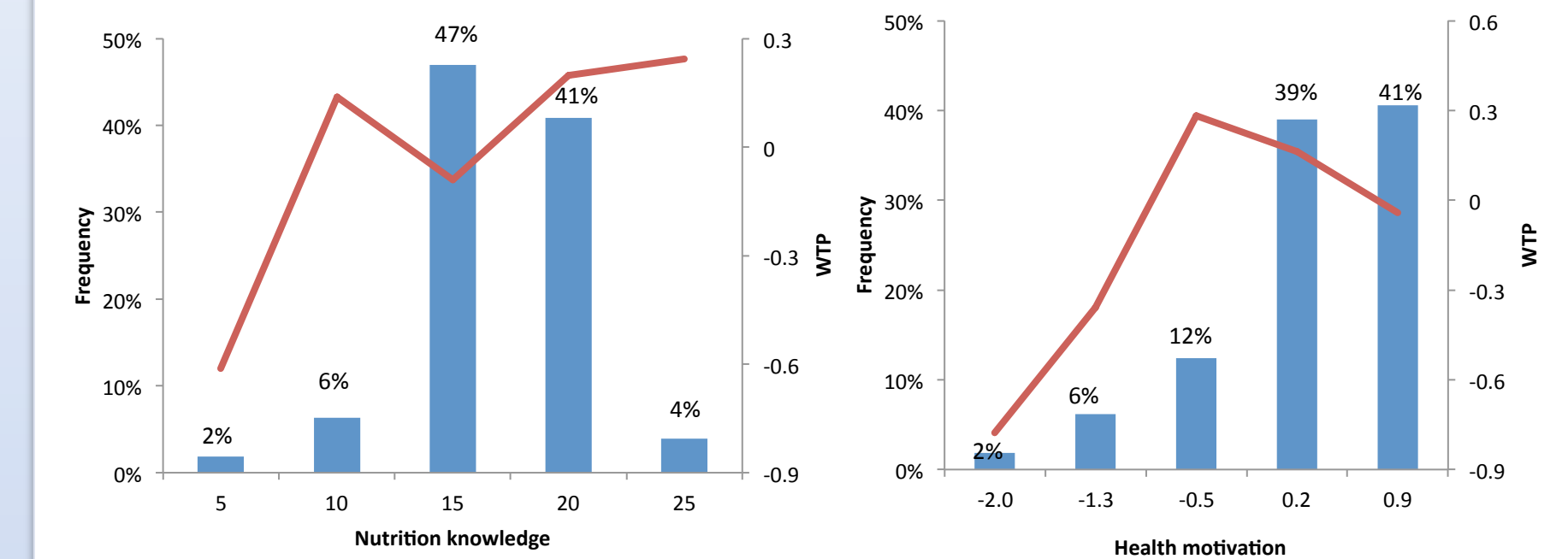

Figure 1 shows the consumers' WTP for carnosine included in the NFT grouped by their nutrition knowledge score, health motivation score, and frequency of purchasing meat. In general, consumers' WTP is positively associated with their nutrition knowledge, health motivation, and frequency of purchasing meat.

CONCLUSIONS

- Despite the fact that meat is a major source of protein, labelling protein is likely to have a positive effect on consumer purchase decision-making.
- Consumers have higher WTP for carnosine included in NFT, than for a carnosine health claim or a carnosine nutrient content claim. This may be due to the lack of knowledge about government assessment process to approve a health claim and a nutrient content claim that can appear on food (Romanowska, 2009). The negative WTP for carnosine labels is likely due to the lack of familiarity with the dipeptide.
- Heterogeneity in pork preferences exists among consumers with different socio-demographic characteristics, general meat eating habits, and familiarity with genomics.

REFERENCES

-"Nutrient Value of Canadian Pork," Canadian Pork Council, accessed April 16, 2017, http://www.cpc-ccp.com/documents/Nutrient_Value_of_Canadian_Pork-e.pdf.
-Hong, Hyehyun. "Scale development for measuring health consciousness: Re-conceptualization." In *12th Annual International Public Relations Research Conference, Holiday Inn University of Miami Coral Gables, Florida*. 2009.
-"Functional Foods and Natural Health Products Sector," Agriculture and Agri-Food Canada, accessed March 30, 2017, http://www.agr.gc.ca/eng/industry-markets-and-trade/statistics-and-market-information/by-product-sector/functional-foods-and-natural-health-products-sector/?id=1170856376710
-Mollet, Beat, and Ian Rowland."Functional foods: at the frontier between food and pharma." Curr Opin Biotechnol 13(5): 483-485.10. 2002
-Romanowska, P.E. "Consumer Preferences and Willingness to for Certification for Eggs with Credence Attributes" (Master's thesis, university of Alberta. 2009)