The Impact of Weight Control Belief on Cigarette Consumption among Adults: Findings from the ITC Project

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APACT 2013, August 19, 2013
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itc
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Background

- The association between smoking and weight-related concerns is complex.

- Combined evidence suggests that smoking may not help weight control or improve body image (Chioler et al. 2008).

- Although former smokers are likely to gain weight after quitting (Klesges et al. 1989; Williamson et al. 1991), the health benefit of quitting is still substantial even after taking the weight gain into account (Siahpush et al. 2013).

- Weight concerns and smoking behaviors related to weight concerns are widely documented among girls and young adult women (Charlton et al. 1984; Weekley et al.1992; French et al.1994 1995; Cawley et al. 2004; and others).

Background (contd.)

- Few studies examine the impact of weight concerns on cigarette consumption among adults by gender and age.

- Most existing evidence comes from high-income countries (HICs), especially the US.

- While cigarette taxes are the most effective tobacco control policies worldwide, no studies have investigated how weight concerns affect responses to changes in cigarette taxes or prices.

Motivation

- This is the first study to examine how weight control beliefs among adult smokers vary by gender, age, and country.

- Utilizes a unique, large survey that contains a self-reported measure from adult smokers on smoking-related weight control belief.

- Includes both HICs and LMICs:
  - Important for policy makers because the obesity epidemic is increasing greatly in LMICs
  - Continued smoking because of concerns about weight and beliefs that smoking can reduce weight may increase the smoking-related burden in LMICs

Data & Methodology

- Data from 8 countries in the International Tobacco Control Policy (ITC) Evaluation Project: US, UK, Australia, Canada, China, Malaysia, Mexico, and Uruguay.

Weight-control Belief:

- Respondents reported their level of agreement with the statement: "*Smoking helps weight control.*"

- Agreement reported on a 5-point scale (strongly agree, agree, neither agree nor disagree, disagree, and strongly disagree)

- Used to construct a dichotomous measure of the belief (strongly agree or agree=1; other responses=0)

Methodology (contd.)

Prices:

• Self-reported prices (in 2010 international $) are calculated using the last purchase information for each individual and aggregated at various sampling unit (SU) levels.

Exposure to tobacco control policies:

• Respondents report their recent exposure to tobacco control policies (including worksite smoking bans and anti-smoking media campaigns), manufacturers' promotion, and tobacco advertising.

• These indices also aggregated to SU-level measures.

Methodology (contd.)

For each country:

- Restricted to adult smokers aged 18-65.

- Stratified by country, gender, and age (18-40 vs. 41-65).

- Logistic regression is used to obtain the adjusted probability of having the weight control belief.

- Two-sample mean comparison test is used to test if the weight control belief differs by gender.

- Generalized estimating equations (GEE) is used to estimate the risk factors including the weight control belief for cigarette consumption.

Analysis: Adjusted Probability of Having Weight Control Belief

Men, by country and age
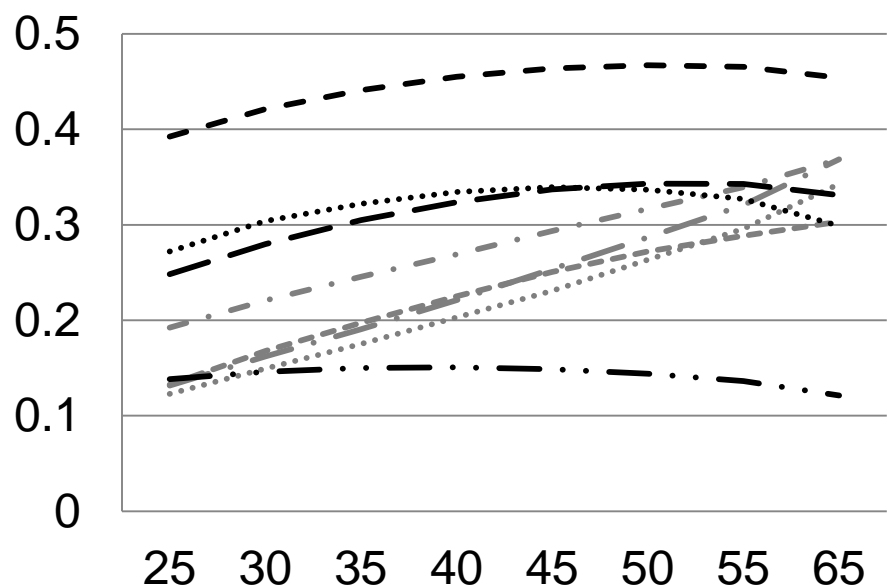
Women, by country and age
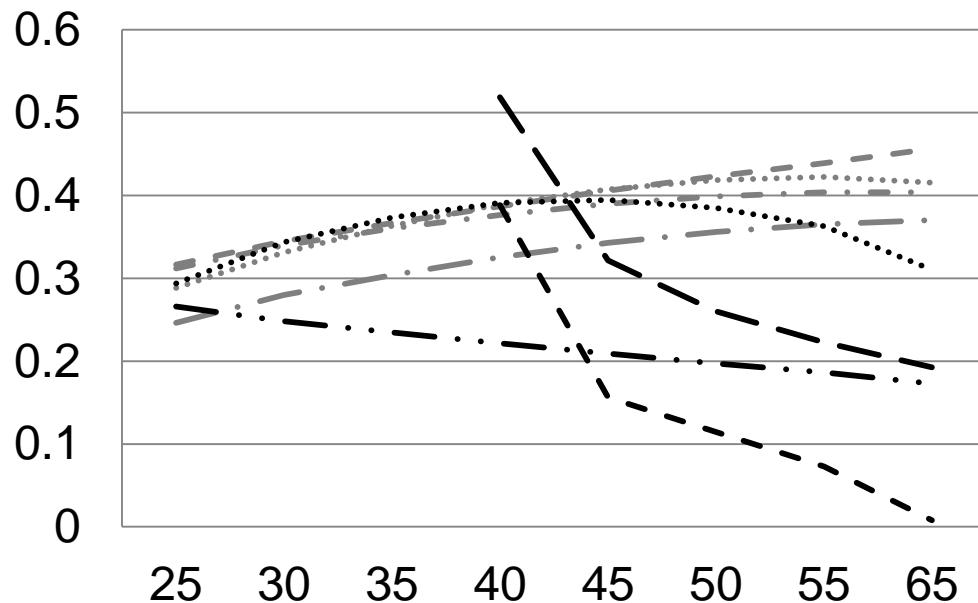
Legend: US · CA · UK · AU · MX · UY · RC · MY

Summary Statistics for Key Variables Adult Smokers, Aged 18-65

HICs	US		CA		UK		AU	
	Men	Women	Men	Women	Men	Women	Men	Women
Consumption	19.58	16.76***	18.00	15.15***	17.44	15.42***	18.38	16.44***
	(0.28)	(0.20)	(0.25)	(0.19)	(0.24)	(0.19)	(0.29)	(0.23)
Weight Control	0.23	0.37***	0.23	0.38***	0.28	0.39***	0.24	0.32***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N	3629	4801	3853	4839	3610	4784	4012	4844

LMICs	MX		UY		RC		MY	
	Men	Women	Men	Women	Men	Women	Men	Women
Consumption	7.26	6.05***	16.96	13.55***	16.97	9.49***	13.79	11.25
	(0.17)	(0.19)	(0.48)	(0.51)	(0.39)	(1.23)	(0.20)	(1.75)
Weight Control	0.15	0.23***	0.32	0.36	0.32	0.24	0.44	0.48
	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.07)	(0.01)	(0.09)
N	3757	2292	1346	1553	10321	348	3964	88

$*0.05 < p \leq 0.1, **0.01 < p \leq 0.05, *** \leq 0.01$

Analysis & Results

- Estimate the association between weight control belief and cigarette consumption by age, gender and country.

- Equation 1:

$$C_{it} = \alpha_0 + \alpha_1 P_{kt} + \alpha_2 X_{it} + \alpha_3 Belief_{it} + \varepsilon_{it}$$

$$i = 1,...,n; k = \# of\_SU$$

- Controls for individual education, income, employment, marital status, age categories, SU level cigarette prices and exposure measures, and year fixed effects.

The Effect of Weight Control Belief on Cigarette Consumption by Country, Age, and Gender

HICs	US	US	CA	CA	UK	UK	AU	AU
	18-40	41-65	18-40	41-65	18-40	41-65	18-40	41-65
Women	1.60***	0.85**	1.26***	0.63**	0.61*	0.37	0.21	0.59+
	(0.44)	(0.34)	(0.32)	(0.31)	(0.35)	(0.30)	(0.36)	(0.36)
Men	1.60**	1.12**	0.58+	0.50	0.97*	1.21***	0.76+	1.08**
	(0.66)	(0.52)	(0.43)	(0.78)	(0.54)	(0.37)	(0.53)	(0.52)
LMICs	MX	MX	UY	UY	RC	RC	MY	MY
Women	1.42***	-0.52	1.04*	0.01	-0.30		0.39	
	(0.41)	(0.50)	(0.58)	(0.78)	(0.93)		(1.96)	
Men	1.09**	0.87**	0.62	1.15	1.05**	1.07***	0.08	-0.01
	(0.46)	(0.41)	(0.69)	(1.26)	(0.44)	(0.23)	(0.32)	(0.39)

The association is stronger for young female smokers aged 18-40.

Analysis and Results (Contd.)

- Examine whether price responsiveness differs by weight control belief.

- Equation 2:

$$C_{it} = \alpha_0 + \alpha_1 P_{kt} + \alpha_2 X_{it} + \alpha_3 \text{Belief}_{it} + \alpha_4 \text{Belief}_{it} \times \Pr ice_{kt} + \varepsilon_{it}$$

- Other controls are same with those in Equation 1.

- A significant estimate of the interaction term of weight control belief and prices would imply that price responsiveness varies by weight control belief.

Price Responsiveness by Weight Control Belief by Country, Age, and Gender and Age—HICs

	US	US	CA	CA	UK	UK	AU	AU
Women	18-40	41-65	18-40	41-65	18-40	41-65	18-40	41-65
Belief	1.63***	0.86***	1.26***	0.64**	0.61*	0.37	0.20	0.59+
	(0.45)	(0.34)	(0.32)	(0.31)	(0.35)	(0.30)	(0.36)	(0.36)
Price elas.	-0.29***	-0.06	-0.38***	-0.01	0.01	-0.04	-0.14	-0.97*
Belief=0	(0.11)	(0.08)	(0.14)	(0.12)	(0.51)	(0.44)	(0.57)	(0.52)
Price elas.	-0.20*	-0.13*	-0.31**	-0.13	-0.03	0.02	0.01	-0.98**
Belief=1	(0.10)	(0.07)	(0.12)	(0.11)	(0.43)	(0.40)	(0.57)	(0.49)
Men								
Belief	1.61**	1.13**	0.58+	0.47	0.96*	1.21***	0.78+	1.08**
	(0.65)	(0.52)	(0.43)	(0.77)	(0.54)	(0.37)	(0.53)	(0.52)
Price elas.	0.02	-0.24**	-0.22*	-0.23+	-0.55	-0.11	-0.76	-0.54
Belief=0	(0.11)	(0.10)	(0.13)	(0.15)	(0.59)	(0.37)	(0.66)	(0.51)
Price elas.	0.03	-0.29***	-0.23*	-0.31**	-0.70+	-0.09	-1.18*	-0.42
Belief=1	(0.11)	(0.09)	(0.12)	(0.13)	(0.54)	(0.35)	(0.66)	(0.49)

Price Responsiveness by Weight Control Belief by Country, Age, and Gender and Age—LMICs

	MX	MX	UY	UY	RC	RC	MY	MY
Women	18-40	41-65	18-40	41-65	18-40	41-65	18-40	41-65
Belief	1.43***	-0.52	1.03*	0.02	-0.33		0.80	
	(0.41)	(0.49)	(0.58)	(0.78)	(0.93)		(1.91)	
Price elas. Belief=0	-0.47**	0.03	-0.14	0.09	-0.27*		-0.20	
	(0.20)	(0.21)	(0.11)	(0.11)	(0.16)		(0.21)	
Price elas. Belief=1	-0.51***	-0.05	-0.12+	0.04	-0.31**		-0.43**	
	(0.18)	(0.20)	(0.09)	(0.11)	(0.13)		(0.19)	
Men								
Belief	1.09**	0.89**	0.62	1.15	1.06**	1.06***	0.05	-0.02
	(0.46)	(0.41)	(0.69)	(1.26)	(0.44)	(0.23)	(0.33)	(0.39)
Price elas. Belief=0	-0.44***	-0.41**	-0.11	-0.06	-0.05	-0.02	-0.29**	-0.12+
	(0.12)	(0.19)	(0.10)	(0.14)	(0.05)	(0.03)	(0.13)	(0.09)
Price elas. Belief=1	-0.48***	-0.31+	-0.08	-0.06	-0.04	-0.03+	-0.23***	-0.09
	(0.12)	(0.19)	(0.08)	(0.10)	(0.05)	(0.03)	(0.09)	(0.08)

Conclusions

- Believing that smoking helps control weight is associated with smoking 0.4–1.7 more cigarettes per day, and this is stronger among younger female smokers.

- In HICs, younger female smokers are slightly less likely than older ones to believe that smoking helps control weight; in LMICs, younger female smokers are more likely to believe that smoking helps control weight.

- Gender difference in weight control belief was not found in some LMICs, although female smokers are more persistent in holding on to weight control beliefs.

Conclusions

- Believing that smoking helps control weight decreases price responsiveness by 0.6–0.9% among younger US female smokers and older Mexican male smokers as prices increase by 10%.

- Effective policies that inform smokers, in particular female and young smokers, that smoking does not necessarily help control weight is highly needed.

- Surveillance on weight concern-related smoking in LMICs is warranted.

ITC Project Research Organizations

ITC Project Research Support