

Measuring Smokers' Preferences for Low-Nicotine Cigarettes: Evidence from a Field Experiment

Daniel Monchuk, Matthew Rousu*, Jason F. Shogren, and Katherine M. Kosa**

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ABSTRACT

From a field experiment to estimate consumer preferences for reduced-nicotine cigarettes, our results suggest younger adult smokers who want to quit smoking are most likely to purchase low-nicotine cigarettes. Hard core smokers, however, revealed no demand for these cigarettes.

* Corresponding author. Address: RTI International, 3040 Cornwallis Rd., Research Triangle Park, NC 27709. mrousu@rti.org, 919-316-3748, fax 919-541-6683

** The authors are graduate student, Department of Economics, Iowa State University; Research Economist, RTI International; Stroock Distinguished Professor of Natural Resource Management and Conservation, Department of Economics and Finance, University of Wyoming; and Research Analyst, RTI International. Partial funding of this project came from the University of Wyoming. The authors thank James Nonnemaker and Brett Loomis for helpful comments on the survey design, Matthew Farrelly for helpful comments on an earlier version of this paper, Tony Albino for helping us obtain cigarettes for use in the experiment, and the managers of the 2 Hy-Vee stores in Ames, IA that let us use their facilities.

INTRODUCTION

Helping people quit smoking remains a key public health and economic issue for the United States. Smoking has been estimated to kill up to 440,000 U.S. citizens annually, to cause a variety of nonfatal illnesses, and to cost the U.S. economy up to \$92 billion in medical costs (Finkelstein et al.) and \$157 billion in overall economic losses (*Journal of the American Medical Association*, 2002). Although over one-third of U.S. smokers attempt to quit annually (Pierce and Gilpin, 2002), and approximately 1.3 million succeed (about 5 percent annually; see Fiore et al. [1990] and Gilpin and Pierce [2002]), many people still find it hard to quit. Most physical cessation aids help smokers quit by providing them with the appropriate amount of nicotine without having to smoke cigarettes, but they do not address the psychological addiction people have to the physical act of smoking (Zhu et al., 2000; Murray et al., 2000; Jenks et al., 1992, 1994).

A new cigarette brand, Quest, has recently been created which could help people quit smoking by allowing them to reduce nicotine intake while still smoking. Quest cigarettes are all low in nicotine relative to standard cigarettes like regular Marlboro and Marlboro Lights, which contain 1.2 mg and 0.8 mg of nicotine per cigarette (Federal Trade Commission, 1997). Quest Low Nicotine cigarettes contain 0.6 mg of nicotine per cigarette, Extra-Low cigarettes contain 0.3 mg, and Nicotine-Free has trace amounts of nicotine per cigarette. This paper describes a field experiment designed to examine the preferences for low-nicotine cigarettes as one method to reduce health risks for smokers by helping people quit smoking.

METHODS

Experimental auctions are an accepted method to help determine consumer preferences for new products in the field (see Shogren [forthcoming], Lusk et al. 2001). Consumers participate in real auctions involving a chance to purchase real products, which reduces problems of self-reporting and hypothetical biases that exist in many standard survey methods (e.g., mail, telephone). We conducted our field experiment on February 7, 2003 inside two grocery stores in Ames, IA, (population 50,000) where we recruited smokers to participate. We conducted our economics field experiment in a grocery store, because many smokers purchase their cigarettes at grocery stores. Inside the grocery store we posted signs indicating that smokers could earn \$10 for 10 to 15 minutes for a research project for Iowa State University. When participants indicated interest in participating in our experiment, they read and signed a consent form. We then gave them a small information packet to begin the experiment. For 95% power to detect a \$0.20 difference in bid prices within our field experiment, we needed a sample of at least 82 people (given a standard deviation of \$0.50), which we surpassed with our sample of 112 participants. Table 1 shows the demographic characteristics of the auction participants. For legal and ethical reasons, we did not conduct experiments with people younger than age 18.

We used a three-step experimental design. In Step 1, we explained to each participant how the auction would work. We used the Becker-DeGroot-Marschak (BDM) (1964) auction, which is explicitly designed so that each participant's best strategy is to tell the truth about his or her preferences for different cigarettes. The BDM auction works as follows: (1) each participant places an *auction bid* on each cigarette type. Because this is an auction, this bid represents an amount the consumer might pay to purchase cigarettes; (2) we

randomly select from a uniform distribution a *price* from a fixed interval of \$0.10 to \$6.00; and (3) a participant who bids less than the market-clearing price does not “win” the auction; if he/she bids more, he/she “wins” and purchases the cigarettes at the market-clearing price. We also explained to participants that, when more than one good is available for bidding, we would randomly choose only one good to be sold—this avoided the possibility that preferences could change because of the potential of purchasing more than one good. To help each participant better understand the auction, we conducted a practice round using candy bars. We then began the cigarette rounds.

In Step 2, we randomly assigned participants into either the treatment or control group based on the time they participated (the monitors switched between the treatment and control groups at the top of every hour). Treatment group participants received a short information packet with two statements about Quest cigarettes; control group participants did not receive any information. The information sheet had two bullets: (i) “Quest is a brand of cigarettes with low or no nicotine,” and (ii) “Although Quest cigarettes have less nicotine, they look, smoke, and burn the same as conventional cigarettes and offer the same smoking enjoyment.” These two bullet points synthesized information found on the manufacturer’s website. We used the statements to measure whether the brief description of the Quest cigarettes influenced consumers’ preferences for low-nicotine cigarettes.

In Step 3, we started the cigarette auctions. Each participant told us the brand of cigarettes he/she normally smoked—his/her “regular brand.” We then had the participant rank from *most to least preferred* the four packs of cigarettes—the three Quest packs and his/her regular brand. Once a participant ranked the cigarettes, he/she submitted one bid for each cigarette pack. Before bidding started, we re-emphasized that only one pack would be

randomly chosen to auction. After the bidding, we determined which pack would actually be auctioned off, the market-clearing price, and whether the participant would purchase cigarettes. Afterwards, auction participants filled out a short post-auction questionnaire and were paid \$10. Participants who “won” the auction purchased cigarettes.

RESULTS

Table 2 presents the summary statistics on bidding for each cigarette pack. The participants’ regular brand had the highest mean bid of \$2.69, about the average market price in the area. The mean bids for the Quest Low Nicotine, Quest Extra-Low Nicotine, and Quest Nicotine-Free cigarettes are substantially lower at \$1.66, \$1.59, and \$1.45. Because different consumers preferred different types of low-nicotine cigarettes (i.e., some consumers preferred nicotine-free cigarettes, while others preferred low-nicotine), we also examined the participants bid for the brand of Quest cigarettes they most preferred, which had a mean bid of \$1.84.

We examined the preferences for low-nicotine cigarettes using regression analysis, in which the dependent variable is the participants’ bid for their most preferred brand of Quest cigarettes. We run regressions using multiple specifications that differ only by the independent variables that are included. Table 3 shows three key results that emerged. First, if a participant said he or she tried to quit smoking within the past 6 months, which 38% of our participants indicated, they bid more for the Quest cigarettes. Second, we observed that younger adult consumers paid more for Quest cigarettes than older consumers. Third, if a participant was in the treatment group with Quest information, they were willing to pay more for the cigarettes, and these coefficients are statistically significant at the 5% or 10% level, depending on the model specification.

CONCLUSIONS

The results from our field experiment suggest that smokers who want to quit smoking now are more likely to prefer low-nicotine cigarettes. We observed that younger adult consumers paid more for Quest cigarettes than older consumers, which is consistent with younger smokers attempting to quit smoking more frequently (Derby et al., 1994). We also observed that if consumers are presented with even a small piece of information, they are more likely to prefer Quest cigarettes. What is striking about this result is how more, albeit brief, additional information caused such a large increase in preferences for low-nicotine cigarettes. These results suggest that these cigarettes as a cessation aid may help smokers become more confident in their belief that they can quit smoking, which has been shown to increase the probability of successfully quitting (Eiser et al., 1985). But we also find that hard core smokers had little to no demand for the low-nicotine cigarettes, which suggests their health risks will not be reduced (Warner and Burns, 2003).

Table 1. Characteristics of the Auction Participants

Variable	Definition	Mean	St. Dev.
Gender	1 if female	0.38	0.49
Age	The participant's age	28.9	12.1
College	The participant is currently enrolled in college now	0.43	0.50
Income	The household's income level (in thousands)	25.9	26.5
Quit-recent	The participant is either currently trying to quit smoking or has attempted to quit smoking within the past 6 months	0.38	0.49
Light	1 if the participant's usual brand of cigarettes was light cigarettes	0.51	0.50
Marlboro	1 if the participant smoked Marlboro cigarettes	0.72	0.45

Table 2. Summary Statistics for Bids for Cigarettes (N = 112)

	Mean	Median	Std. Deviation	Minimum	Maximum
Name brand cigarettes	2.69	2.75	0.85	0.50	5.00
Quest Low Nicotine	1.66	1.75	0.77	0	4.00
Quest Extra-Low Nicotine	1.59	1.50	0.80	0	4.00
Quest Nicotine-Free	1.45	1.50	1.11	0	6.00
Most preferred Quest cigarette	1.84	1.85	1.01	0	6.00

Table 3. Regression Results (Dependent variable: bid price most preferred Quest cigarettes)

Regressors	(1)	(2)	(3)	(4)
Intercept	2.308*** (0.248)	1.661*** (0.130)	1.641*** (0.134)	1.172*** (0.206)
Age	-0.016** (0.008)			
SHS not bad				0.317 (0.190)
Quest information		0.381** (0.188)		0.342* (0.187)
Light			0.401** (0.187)	0.330* (0.185)
Quit_recent				0.383** (0.191)

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