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Behavioral Economics of Cigarette Purchase Tasks: Within-Subject Comparison of Real, Potentially Real, and Hypothetical Cigarettes

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Abstract

Introduction: Hypothetical rewards are commonly used in studies of laboratory-based tobacco demand. However, behavioral economic demand procedures require confirmation that the behavior elicited from real and hypothetical reward types are equivalent, and that results attained from these procedures are comparable to other accepted tasks, such as the hypothetical purchase task.
Methods: Nineteen smokers were asked to purchase 1 week's worth of cigarettes that they would consume over the following week either at one price that incrementally increased across four weekly sessions ("real" sessions) or four prices in a single session ("potentially real" session), one of which was randomly chosen to be actualized. At each session, participants also completed a hypothetical cigarette purchase task. After each week, participants reported the number of cigarettes they actually smoked.
Results: Demand was found to be equivalent under both the real and potentially real reward conditions but statistically different from the demand captured in the hypothetical purchase task. However, the amounts purchased at specific prices in the hypothetical purchase task were significantly correlated with the amount purchased at comparable prices in the other two tasks (except for the highest price examined in both tasks of $1.00 per cigarette). Number of cigarettes consumed that were obtained outside of the study was correlated with study cigarette price.
Conclusions: Combined, these results suggest that purchasing behavior during potentially real sessions (1) was not functionally different from real sessions, (2) imposes fewer costs to the experimenter, and (3) has high levels of both internal and external validity.

Introduction

Within the United States, tobacco consumption causes extensive economic loss and poor health outcomes for smokers; between 2009 and 2012 there were 156 billion dollars in lost productivity reported due to smoking-related causes, and 133 billion dollars spent in direct medical care for smokers.[1] A public-policy strategy geared towards curtailing tobacco use has been to increase the cost of cigarettes thorough taxation with the assumption that increased cost will decrease consumption of cigarettes.[2,3] However, little information exists on the impact of increased cigarette prices has on heavy, long-term smokers.[4] Behavioral economics has been used to confirm that consumption of cigarettes does indeed decrease as price increases by applying economic principals and analyses to the behavior of individuals or small subsets of a population that can be subjected to experimental manipulation. Specifically, when cigarettes have

been made available at a variety of prices, an individual's rate of decreased consumption as price increases has been used as a laboratory measure of demand.[5,6] Consumption initially tends to decrease proportionally less than the proportional increase in price (called inelastic demand), but at higher prices consumption decreases proportionally greater than the proportional increases in price (ie, elastic demand).[7,8]

Assessment of drug demand (ie, cigarettes and other illicit substances) in human participants initially used operant laboratory studies in which the participant consumed the substances purchased as part of the session.[9–11] However, such studies incurred considerable costs in both time (frequent, long-duration sessions) and money (participant compensation). The low enrollment of subjects led to reduced statistical power to detect effects. Later work complimented these laboratory approaches with a hypothetical purchase task, where participants would indicate how many units of a substance they would consume at various prices, but participants were not provided the substances to consume.[12,13] The hypothetical purchase task has been adapted to capture consummatory behavior for cigarettes,[14] alcohol,[12,15] and heroin[13]; likewise, the cigarette version of the hypothetical purchase task has been shown to have high test-retest reliability.[16]

Taking from both lines of inquiry, in the following study we asked participants to purchase cigarettes at different prices after being endowed with a set amount of money to spend. Using this context we compared two conditions. During the "potentially real" session, participants made all their purchases at the four prices (ie, \$0.12, \$0.25, \$0.50, and \$1.00 per cigarette) at one time and one of the four purchase scenarios, selected at random, was actualized. During the "real" sessions participants engaged in four separate purchasing sessions (one for each price) separated by a week, where they were given the same study income, and purchased as many cigarettes as they wanted at the single price for that session. They were then given the cigarettes purchased, all excess money, and reported daily cigarette consumption after a week using the same procedure as the potentially real condition. Participants were given enough money to purchase the same number of cigarettes they consumed outside of the laboratory when cigarettes cost \$0.25 each (a price that was similar to actual market value for the area). Participants also completed the hypothetical purchase tasks at regular intervals during the study; performances on all three purchase tasks were then compared using several accepted measures of assessing demand of a commodity.

Methods

Participants

To participate, an individual had to (1) be between 18 and 65 years of age, (2) have no immediate plans to move away from the area, (3) be a daily smoker, (4) meet *DSM-IV* criteria[17] for nicotine dependence, (5) have no immediate plans to quit smoking, (6) smoke between 10 and 40 cigarettes per day, (7) provide a breath measure with parts per million of carbon monoxide consistent with recent smoking, as measured by a carbon monoxide monitor (CoVita Smokelyzer; Haddonfield, NJ), (8) have a negative urine test result for pregnancy (female participants), and (9) not be currently taking medications that aid in smoking cessation.

Materials

The Fagerström Test of Nicotine Dependence[18] was given during the consent session. During purchasing and follow-up sessions the revised 15-item ordinal-scale version of the Minnesota Nicotine Withdrawal Scale,[19] the 10-item version of the Questionnaire of Smoking Urges-Brief,[20] and a four-question version of the Perceived Stress Scale[21] were given. All surveys were administered using the on-line survey service Limesurvey.[22] After completing the surveys, participants were asked to complete the Hypothetical Purchase Task (described below) as well as the Delay Discounting procedure (see Bickel et al.,[23] for an in-depth explanation of the method) at each purchase and follow-up session; however, the data from the Delay Discounting procedure was collected for the purposes of an unrelated study and are not reported here.

Hypothetical Purchase Task

During the hypothetical purchase task a subject would read the following sentence on a computer screen "If individual cigarettes cost X: How many would you buy for one day?" where X was a price. They would then have to enter a number in a text box on the screen. After inputting a value, called Y here, the program would then read "You would buy Y cigarettes for one day if they cost X each?", at which point the subject would have to click one of two buttons that read "Yes" or "Change Answer" to continue. The prices increased after each trial, the prices used were: \$0.01, \$0.05, \$0.13, \$0.20, \$0.50, \$1, \$3, \$6, \$11, \$35, \$70, \$140, \$280, \$560, and \$1120 per cigarette, these were the same prices used in Jacobs and Bickel.[24] The subject would continue on this task until either they made purchases at all of the prices, or they had elected to purchase zero cigarettes on two successive prices.

Procedure

After providing informed consent, subjects reported the average number of cigarettes they smoked over the last 30 days using a timeline follow-back method Brown et al.[25] After the consent session, participants returned to the laboratory for five purchasing sessions.

During a purchasing session, the participants would first complete surveys, the hypothetical purchase task, and the delay discounting procedure. Participants would then be given a set amount of money (hereafter referred to as their study income), which they could use to purchase individual cigarettes of their usual brand. At the end of the session, the subject received the cigarettes they purchased and a check equal to their unspent study income. A subject's study income was determined by taking the number of cigarettes a participant reported smoking in a week and multiplying that number by \$0.25, which is similar to the market price of cigarettes in the community. A previous study had shown that subjects given this study income expressed purchasing behavior that was comparable to self-reported nicotine consumption.[26]

The five purchasing sessions were split into real (four sessions) and potentially real (one session) conditions, the order of these two conditions was counterbalanced across subjects. During each real session, the participants purchased and receive cigarettes at a single price, either \$0.12, \$0.25, \$0.50, or \$1.00 (presented in a randomized order). In these sessions, participants were aware of the cigarette price for that session, their study income, and that they would receive their purchases and their remaining balance. During the potentially real session, the participant indicated how many cigarettes they would purchase at each of the four prices, and then one of these prices was randomly selected to be "real," or actualized, based on the methods described in Kirby.[27] The participant made their purchases knowing that one price would be selected to be actualized, but did not know in advance which price would be selected. The participant then received the cigarettes and unspent money from the actualized price only.

After making their purchases, participants were asked to only smoke the cigarettes they purchased in the laboratory and refrain from smoking non-study cigarettes over the course of the following week. A week after completing all their real and potentially real sessions, participants were asked to come back to the laboratory for a single follow-up session in which they would again complete surveys, the hypothetical purchase task, and the delay discounting procedure. Finally, for each session after the first including the follow-up session, participants (1) reported all study cigarettes smoked the preceding week, (2) reported all non-study cigarettes smoked, and (3) were allowed to return study cigarettes that they did not smoke for a refund.

Data Analysis

The Hursh and Silberberg[28] model of demand (Equation 1) was fitted to demand data from both the real and potentially real sessions, as well as the participants' average performance on the hypothetical purchase task; data from the hypothetical purchase task was taken from both the full version (only nonzero values were fitted to the model) and truncated set of prices that were most similar to the prices used during the real and potentially real conditions). From this model, C equals the unit price, k represents the vertical span of the function in $\log_{10}$ units, Q_o equals consumption at minimal price, and finally α is equal to elasticity. The k parameter was fit to a common value across all conditions ($k = 1.365$ for these analyses), leaving the Q_0 and α to be estimated by the data. The values of Q_o and α were compared across the conditions in separate F analyses in GraphPad Prism 6 (La Jolla, CA). As the lowest price in the hypothetical purchase task (ie, \$0.01) was much smaller than the lowest priced used in the real and potentially-real tasks (ie, \$0.12), this model-fitting method affords the ability to directly compare a modelled measure of consumption as price approaches zero across the different tasks. P_{max} was obtained by taking the first derivative of Equation 1 and evaluating where this line crossed −1 for each set of demand parameters of interest. O_{max} values were obtained by multiplying the P_{max} price by number of cigarettes purchased at that price.

$$\log Q = \log Q_0 + k(e^{-\alpha(Q_0 C)} - 1) \quad (1)$$

The similarity between a participant's real and potentially real purchasing was investigated using (1) a Pearson's correlation analysis on the demand data from the real and potentially real conditions, and (2) nonlinear regression comparing the Q_o and α parameters from the Hursh and Silberberg[28] model. As participants bought 1 week's worth of cigarettes during the real and potentially real tasks, compared to 1 day's worth of cigarettes in the hypothetical purchase task, each participant's real and potentially real data were divided by seven before being submitted to this analysis. Further, as subjects completed the hypothetical purchase task six times over the course of six sessions, correlations were also computed to compare real and potentially real purchasing behavior with similar prices from the six session averages of the hypothetical purchase task.

Finally, a linear mixed model was used to predict participant cigarette purchasing outside the laboratory as the study price for cigarettes increased. Outside cigarette purchases were modeled as a linear function of study purchase price with a random effect to account for participant-to-participant variability. A natural log transformation was adopted to stabilize the variance of outside purchasing as cigarette price increased. Interaction between participant and price was assessed, and estimates for the linear effect of price, the random effect of participant, the error variance, and the model R^2 were computed, and normality of residuals was assessed using the Anderson–Darling test.[29]

Results

Demographics

Nineteen individuals (nine male) participated in the study; six of these subjects self-identified as black, 13 self-identified as Caucasian. The average age of these subjects was 38.42 ($SD = 12.67$) and the mean years of education was 12.74 ($SD = 2.26$) and the average number of cigarettes smoked by these subjects was 23.58 per day ($SD = 6.85$). Participants' study income, which was based on the number of cigarettes they smoked per day, was \$39.10 (SD = \$13.34). The average total Fagerström Test of Nicotine Dependence scores was 9.84 ($SD = 2.01$), the average total score of the Minnesota Nicotine Withdraw Scale was 11.0 ($SD = 6.74$), the average total score on the Questionnaire on Smoking Urges was 35.0 ($SD = 14.32$), and the average total score on the Perceived Stress Scale was 7.68 ($SD = 1.20$); no significant difference were found when comparing subject's performance of each individual question asked in these four surveys during the real and potentially real sessions.

Demand Data

The correlations between the real and potentially real conditions were significant for all four prices (\$0.12: $r = 0.72$, $P = .0005$; \$0.25: $r = 0.72$, $P = .0005$; \$0.50: $r = 0.54$, $P = .02$; \$1.00: $r = 0.74$, $P = .0003$). Table 1 shows the correlations among consumption on the real, potentially real, and hypothetical purchase tasks at similar prices. The hypothetical purchase task consumption was significantly correlated with consumption on the real and potentially real conditions for all prices except \$1.00 per cigarette. Note that the hypothetical purchase task prices were chosen to match the real and potentially real conditions as closely as possible.

The Hursh and Silberberg[28] model described the demand data well, with $R^2 \geq 0.99$ for the fits to mean data. Due to the heterogeneous responses of participants, group model R^2 values incorporating all participants were 0.71 and 0.58 in the real and potentially real conditions, respectively. The fitted Q_o parameter in the real condition was 42.16 (95% confidence interval [CI] = 25.59% to 58.73%) and in the potentially real condition was 42.89 (95% CI = 19.32% to 66.46%) which was not a significant difference [$F(1,148) = 0.00$, $P > .9$]. The fitted α parameters also did not differ significantly across conditions [$F(1,148) = 0.04$, $P = .8$], with fitted values of 0.036 (95% CI = 0.031% to 0.040%) in the real condition and 0.036 (95% CI = 0.030% to 0.042%) in the potentially real condition. Likewise, P_{max} values were similar in the real (\$0.38, 95% CI = \$0.33 to \$0.43) and potentially real (\$0.36, 95% CI = \$0.31 to \$0.44) conditions, as were O_{max} values (real mean = \$4.13, 95% CI = \$3.64 to \$4.70; potentially real mean = \$4.05, 95% CI = \$3.41 to \$4.81). Combined, these results strongly suggest that the data from the potentially real and real conditions were not different.

Hypothetical Purchase Task

To assess reliability among the six administrations of the purchase tasks (one hypothetical, four real, one follow-up), Cronbach's alpha[30] values were computed among these six tasks for each subject. These values showed high reliability overall, with a

Table 1. Correlations and *P* Values Comparing Real and Potentially Real Purchasing With the Hypothetical Purchase Task

	Potentially real $0.12	Real $0.12
Real $0.12	0.71***	
Hypothetical purchase task $0.13	0.54*	0.49*
	Potentially real $0.25	Real $0.25
Real $0.25	0.72***	
Hypothetical purchase task $0.20	0.64**	0.52*
	Potentially real $0.50	Real $0.50
Real $0.50	0.54*	
Hypothetical purchase task $0.50	0.56*	0.61**
	Potentially real $1.00	Real $1.00
Real $1.00	0.74***	
Hypothetical purchase task $1.00	0.41	0.43

Cigarette costs were chosen to be as similar as possible for these measures as noted in the table.
*$P < .05$; **$P < .01$; ***$P < .001$.

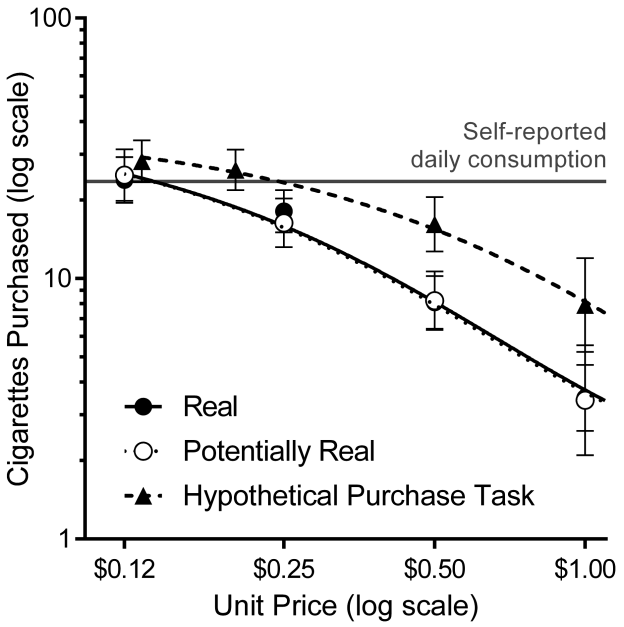

Figure 1. Comparison between averaged hypothetical purchase task, real, and potentially real consumption data (±95% confidence interval) and best-fit regression lines. Statistical tests showed that the participant's behavior was not different between the real and potential real conditions, but elasticity was lower in the hypothetical purchase task compared to both of these.

minimum α value of 0.75, a first decile of 0.89, and a median of 0.99 among the 19 participants. Demand captured in the real and potentially real conditions appeared to be different from hypothetical purchase task performance (Figure 1). To quantify this potential difference, the participant's hypothetical purchase task performance on the four prices closest to the ones used in the real and potentially real demand tasks (ie, $0.13, $0.20, $0.50, and $1.00) were fitted to the Hursh and Silberburg[28] equation and compared to the demand data from both the real and potentially real conditions. Hypothetical purchase task data were also well described by Equation 1, with mean-data $R^2 = 0.99$ and group model $R^2 = 0.46$. The fitted Q_0 parameter from the hypothetical purchase task of 38.03 (95% CI = 27.65% to 48.40%) was not different from either the real [$F(1,148) = 0.21$, $P = .6$] or potentially real [$F(1,148) = 0.20$, $P = .7$] Q_0 parameters above. However, the α parameter from the hypothetical purchase task of 0.018 (95% CI = 0.014% to 0.021%) was significantly less than that in both the real [$F(1,148) = 40.63$, $P < .0001$] and potentially real [$F(1,148) = 31.99$, $P < .0001$] conditions. Similarly, the P_{max} ($0.83, 95% CI = $0.69 to $1.03) and O_{max} ($8.22, 95% CI = $6.74 to $10.02) values from the hypothetical purchase task were larger than the values from the real and potentially real tasks.

Correlations Between Demand Data and Smoking Measures

Total scores of the four survey measures of cigarette use, dependence, and withdrawal were correlated with the demand parameters from the hypothetical purchase task and purchasing at a low price on all three tasks (Table 2). The total score on the Fagerström Test of Nicotine Dependence was found to significantly and positively correlate with demand intensity (Q_0) of the hypothetical purchase task and consumption at a low price on all three tasks with similar correlation coefficents across the three tasks on this measure ($r = 0.50–0.63$). The total score on the Questionnaire on Smoking Urges correlated with hypothetical purchase task demand elasticity (α), P_{max}, O_{max}, and purchases at $0.13, but did not significantly correlate with purchases at $0.12 on either the real or potentially real task (Table 2), suggesting that low-price purchases on the hypothetical purchase task may be more closely related to the Questionnaire on Smoking Urges than either of the other tasks.

Table 2. Spearman Correlations Between α, Q_0, P_{max}, and O_{max} Values Derived From Equation 1 From the Hypothetical Purchase Task (HPT) and the Scores on the Fagerström Test of Nicotine Dependence (FTND), Minnesota Nicotine Withdrawal Scale (MNWS), Questionnaire of Smoking Urges (QSU), and Perceived Stress Scale (PSS)

	FTND	MNWS	QSU	PSS
HPT				
α	−0.29	−0.09	−0.44*	−0.15
Q_0	0.46*	0.18	0.37	0.24
P_{max}	0.17	0.08	0.40*	0.15
O_{max}	0.29	0.09	0.44*	0.15
Purchases at $0.13	0.50*	0.15	0.40*	0.08
Purchases at $0.12				
Real	0.63*	0.01	0.05	0.15
Potentially real	0.54*	−0.04	0.23	0.08

Correlations with these measures and purchases at the lowest price of the real and potentially real tasks, as well as a comparable price on the HPT, are also included.
*Significant correlations.

Outside Purchasing as a Function of Price

As subjects consumed the cigarettes they purchased outside of the laboratory, participants did return unused study cigarettes for a refund as well as report non-study cigarettes they consumed (see Table 3 for the average number study cigarettes returned and non-study cigarettes consumed as a function of price and session type); the prices and session types where these outcomes occurred was further analyzed to see if an increase in cigarette prices differentially

Table 3. The Number of Study Cigarettes Returned and Non-Study Cigarettes Smoked 1 Week After the Each Purchase Session in the Real and Potentially Real Sessions

	Cigarette unit price			
	$0.12	$0.25	$0.50	$1.00
Real				
Cigarettes returned	12.8 (18.2)	3.0 (9.8)	0.2 (0.6)	0 (0)
Non-study cigarettes consumed	5.5 (14.2)	12.9 (18.2)	31 (28.4)	63.37 (49.1)
N	19	19	19	19
Potentially real				
Cigarettes returned	14 (14.3)	3.5 (8.1)	0 (0)	0 (0)
Non-study cigarettes consumed	5.6 (12.5)	14.9 (21.3)	63.5 (51.6)	71 (74.0)
N	5	8	2	4

The Mean (±*SD*) scores, along with the *N* of subjects contributing to those scores are presented.

affected participants' outside purchasing habits. Since 28 zero values were reported in the study, an additional cigarette was added to each outside purchase to accommodate zeroes in the natural log transformation. The log(y + 1) transformation allows reported zeroes to be retained by mapping them to zero post-transformation. The linear mixed model approach indicated no statistical interaction between participant and price [$F(18,38) = 0.56$, $P = .9$], indicating little statistical evidence that an increase in cigarette prices differentially affected participants' outside purchasing habits. Hence, the interaction term was dropped from subsequent analysis. The slope of price was 0.034 (95% CI = 0.026% to 0.042%). Translated back to the original scale, this suggests that an increase in the purchase price of cigarettes by one cent was associated with a 1.03 increase in the consumption of outside cigarettes (95% CI = 1.02% to 1.04%). The model R^2 was 0.71, the variance component for participant was 0.79, and the error variance was 1.35, suggesting an intraclass correlation of 0.37. Residuals from this model were plausibly normal according to the Anderson–Darling test ($P = .1$).

Discussion

In the current study, participants bought cigarettes in the potentially real condition, available at four different prices, in the laboratory. Purchases at one price were actualized and the participants received the purchased cigarettes as well as any excess money. The participants were instructed to consume those cigarettes outside of the laboratory over the course of 1 week. The findings from this single session were compared to four additional sessions where participants made purchases under a single unit price (ie, the real condition) and received the cigarette rewards they selected and any excess money. No difference was found between the real and potentially real data sets, suggesting that the change in price under both potentially real and real rewards affects tobacco consumption similarly.

Behavior on these tasks was compared with the commonly used hypothetical purchase task. In agreement with Few et al.,[16] we found that an individual's purchases on the hypothetical purchase task did not change significantly over the six separate times this task was administered. However, when modeled using the Hursh and Silberberg[28] equations, elasticity in the hypothetical purchase task at the four prices closest to those used in the real and potentially real conditions was significantly different. Correlational analysis suggested that the amount consumed at comparable prices was significantly correlated with the other two prices except for the highest price examined. A potential reason for difference in elasticity could be that the two procedures differed in the interval of time participants were asked to purchase cigarettes for consumption (ie, a day's worth of cigarettes in the hypothetical purchase task vs. a week's worth of cigarettes in the real and potentially real conditions). Individuals tend to adopt overly optimistic estimates of the time and resources required to meet a future need,[31,32] a bias that is exacerbated as the time under consideration is increased. Likewise, an individual's estimated future needs depend on whether a short versus long timeframe is being considered.[33] Further study comparing the same identical prices and consumption quantities will be needed for definitive comparison of the hypothetical purchase task with these other procedures.

By having participants consume the products they purchased in a naturalistic environment, this procedure addresses several problems with laboratory-based demand experiments. Real-world tobacco purchasing and consumption is affected by elements shown to affect smoking behavior that are not easily mimicked in a laboratory setting, including social interactions,[34] the effects of packaging and cigarette-pack display,[35] and workplace environments that either allow or ban smoking.[36] The methods and the findings attained in this study allow for possible future extensions of this work to more real-world scenarios. For example, prior work has shown that cigarette smokers will substitute de-nicotinized cigarettes for full-nicotine cigarettes when the prices for the former are substantially lower than the latter. The methods used here could also be modified in future study to identify the conditions under which cigarette smokers will substitute regular cigarettes for less harmful modified-risk tobacco products (eg, snus and e-cigarettes). However, the fact that participants purchased non-study cigarettes at a greater rate as price increased indicates that these methods are being conducted in an open economy where constraint on other sources of cigarettes is not feasible.

Limitations

In the real and potentially real conditions, participants did not always adhere to their agreed upon cigarette consumption for the week following the purchases in the laboratory (Table 3). During the week-long consumption phases after each purchase session, the participants consumed the products they purchased in the laboratory. In the purchase sessions, price of cigarettes was manipulated, but during the consumption phases the participants were in an environment where the cigarette prices were not manipulated. We asked participants to behave as if this was a closed economy and to avoid

purchasing cigarettes from outside sources, but many participants broke study procedure and consumed outside cigarettes after all their cigarettes purchased in the study were consumed, making this an open economy in practice. This does not necessarily indicate that their session purchases were incorrect or dishonest. If the participants were also subjected to the modified prices at local stores in the community, their consumption may have been closer to what was indicated in the purchasing sessions. Without replication in a more controlled environment (eg, a study comparing real and hypothetical rewards in a tightly controlled setting where no outside cigarette purchases are possible), the extent to which these purchases reflect actual consumption changes are unknown.

In the present study, the terms real, potentially real, and hypothetical were used similarly to previous behavioral economic experiments[37–40] to describe conditions where the rewards were or were not actually delivered to the participants. Real does not necessarily imply that this condition exactly mimics actual cigarette purchasing scenarios. In addition to the open economy in which the study took place, participants were also asked to purchase cigarettes in a quantity sufficient to last an entire week, which may not mimic the actual purchasing patterns of some participants.

Conclusions

In conclusion, this study confirmed, using two separate methods, that smokers purchasing cigarettes across four prices will make similar decisions when each of these purchasing decisions are actualized versus when only one decision is randomly chosen to be actualized. Further, the number of non-study cigarettes participants consume, or study cigarettes they return, is dependent on the price they paid for cigarettes within the session, and this was pattern of consumption was no different across the real and potentially real conditions. Finally, purchasing behavior in both conditions was different from the comparable hypothetical purchase task, but this may have been due to the different time horizons that were employed by these two methods. Having subjects purchase cigarettes at four prices, with only one actualized, is more an efficient use of the limited laboratory resources afforded to an experimenter; therefore the major advance this study is the demonstration that it is unnecessary to have smokers purchase cigarettes at all prices that an experimenter wishes to investigate—smokers will behave similarly in a more cost-effective procedure where multiple, hypothetical prices are used, but only one actualized.

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Declaration of Interests

None declared.

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