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| **About the Measure** |
| **Protocol Id** | 710401 |
| **Domain:** | Tobacco Regulatory Research - Host: Social/Cognitive  |
| **Measure:** | Behavior Economics/Purchase Behavior  |
| **Definition:** | This assessment establishes the value of a product and related purchase behaviors, including the point at which the cost (i.e. in money, time) exceeds the user’s willingness to pay to use the cigarettes or other nicotine products; the rewarding value of the product.  |
| **Purpose:** | To assess the relative reward value or reinforcing efficacy of a tobacco product to a user through a purchase task.  |
| **Essential PhenX Protocols:** | Current Age [10101]Cigarette Smoking Status - Adolescent [30603]Cigarette Smoking Status - Adult [30604]  |
| **Related PhenX Protocols:** | Cigarette Nicotine Dependence [31001]  |
| **Measure Release Date:** | February 20, 2015  |

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| **About the Protocol** |
| **Protocol Release Date:** | February 20, 2015  |
| **Protocol Review Date:** | February 20, 2015  |
| **PhenX Protocol Name:** | Behavior Economics/Purchase Behavior  |
| **Protocol Name From Source:** | The Cigarette Purchase Task (CPT)  |
| **Protocol Availability:** | Available  |
| **Keywords:** | Cigarette purchase task; behavioral economics; cigarette value; purchase behavior; reward value  |
| **Description:** | The Cigarette Purchase Task (CPT) is a simulation procedure to assess reinforcement efficacy of cigarettes within a specific context. The CPT came from an adaptation of a progressive-ratio operant schedule and early studies were a bit literal in the use of doubling response requirements, up to prices that were not plausible in the current market. Subsequent studies have involved using different prices to find the right balance of precision and comprehensiveness. |
| **Specific Instructions:** | Current smoking status must be ascertained before implementing this protocol. Proceed only if subject is a current smoker. |
| **Protocol:** | Read to participant: **CPT - State assessment**: Imagine that you could smoke RIGHT NOW. The following questions ask how many cigarettes you would consume if they cost various amounts of money. Assume the available cigarettes are your favorite brand. Assume that you have the same income/savings that you have now and NO ACCESS to any cigarettes or other nicotine products. In addition, assume that you cannot save or stockpile cigarettes for a later date. Be sure to consider each price increment carefully.

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| 1. How many cigarettes would you smoke RIGHT NOW if they were | **FREE?** | [$0/pack] |
| 2. How many cigarettes would you smoke RIGHT NOW if they were | **1¢ each?** | [20¢/pack] |
| 3. How many cigarettes would you smoke RIGHT NOW if they were | **5¢ each?** | [$1/pack] |
| 4. How many cigarettes would you smoke RIGHT NOW if they were | **13¢ each?** | [$2.60/pack] |
| 5. How many cigarettes would you smoke RIGHT NOW if they were | **25¢ each?** | [$5.00/pack] |
| 6. How many cigarettes would you smoke RIGHT NOW if they were | **50¢ each?** | [$10/pack] |
| 7. How many cigarettes would you smoke RIGHT NOW if they were | **$1 each?** | [$20/pack] |
| 8. How many cigarettes would you smoke RIGHT NOW if they were | **$2 each?** | [$40/pack] |
| 9. How many cigarettes would you smoke RIGHT NOW if they were | **$3 each?** | [$60/pack] |
| 10. How many cigarettes would you smoke RIGHT NOW if they were | **$4 each?** | [$80/pack] |
| 11. How many cigarettes would you smoke RIGHT NOW if they were | **$5 each?**  | [$100/pack] |
| 12. How many cigarettes would you smoke RIGHT NOW if they were | **$6 each?** | [$120/pack] |
| 13. How many cigarettes would you smoke RIGHT NOW if they were | **$11 each?**  | [$220/pack] |
| 14. How many cigarettes would you smoke RIGHT NOW if they were | **$35 each?** | [$700/pack] |
| 15. How many cigarettes would you smoke RIGHT NOW if they were | **$70 each?** | [$1,400/pack] |
| 16. How many cigarettes would you smoke RIGHT NOW if they were | **$140 each?** | [$2,800/pack] |
| 17. How many cigarettes would you smoke RIGHT NOW if they were | **$280 each?** | [$5,600/pack] |
| 18. How many cigarettes would you smoke RIGHT NOW if they were | **$560 each?** | [$11,200/pack] |
| 19. How many cigarettes would you smoke RIGHT NOW if they were | **$1,120?** | [$22,400/pack] |

**CPT - Trait assessment**: Think about a TYPICAL DAY. The following questions ask how many cigarettes you would consume if they cost various amounts of money. Assume the available cigarettes are your favorite brand. Assume that you have the same income/savings that you have now and NO ACCESS to any cigarettes or nicotine products other than those offered at these prices. In addition, assume that you would consume cigarettes that you request at this time. You cannot save or stockpile cigarettes for a later date. Be sure to consider each price increment carefully.

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| 1. How many cigarettes would you smoke on a typical day if they were | **FREE?** | [$0/pack] |
| 2. How many cigarettes would you smoke on a typical day if they were | **1¢ each?** | [20¢/pack] |
| 3. How many cigarettes would you smoke on a typical day if they were | **5¢ each?** | [$1/pack] |
| 4. How many cigarettes would you smoke on a typical day if they were | **13¢ each?** | [$2.60/pack] |
| 5. How many cigarettes would you smoke on a typical day if they were | **25¢ each?** | [$5/pack] |
| 6. How many cigarettes would you smoke on a typical day if they were | **50¢ each?** | [$10/pack] |
| 7. How many cigarettes would you smoke on a typical day if they were | **$1 each?** | [$20/pack] |
| 8. How many cigarettes would you smoke on a typical day if they were | **$2 each?** | [$40/pack] |
| 9. How many cigarettes would you smoke on a typical day if they were | **$3 each?** | [$60/pack] |
| 10. How many cigarettes would you smoke on a typical day if they were | **$4 each?** | [$80/pack] |
| 11. How many cigarettes would you smoke on a typical day if they were | **$5 each?** | [$100/pack] |
| 12. How many cigarettes would you smoke on a typical day if they were | **$6 each?** | [$120/pack] |
| 13. How many cigarettes would you smoke on a typical day if they were | **$11 each?** | [$220/pack] |
| 14. How many cigarettes would you smoke on a typical day if they were | **$35 each?** | [$700/pack] |
| 15. How many cigarettes would you smoke on a typical day if they were | **$70 each?** | [$1,400/pack] |
| 16. How many cigarettes would you smoke on a typical day if they were | **$140each?** | [$2,800/pack] |
| 17. How many cigarettes would you smoke on a typical day if they were | **$280each?** | [$5,600/pack] |
| 18. How many cigarettes would you smoke on a typical day if they were | **$560each?** | [$11,200/pack] |
| 19. How many cigarettes would you smoke on a typical day if they were | **$1,120each** | [$22,400/pack] |

For adolescents, alternate prices can be considered: Estimated cigarette consumption was assessed at $0.00, $0.01, $0.05, $0.13, $0.25, $0.50, $1.00, $1.50, $2.00, $2.50, $3.00, $4.00, $5.00, $6.00, $7.00, $8.00, $9.00, $11.00, $35.00, $70.00, $140.00, $280.00, $560.00, and $1,120.00 per cigarette."The CPT data can generate five demand indices:1. breakpoint (first price at which cigarette consumption is zero; 2. demand intensity (cigarette consumption at the lowest price); 3. Omax (output maximum, or maximum financial expenditure on cigarettes);4. Pmax (price maximum, or price at which expenditure is maximized); and5. elasticity of demand (sensitivity of cigarette consumption to increases in cost). To generate an estimate of elasticity, demand curves were estimated by fitting each participant’s reported consumption across the range of prices to Hursh and Silberberg’s (2008) exponential demand curve equation: ln Q: = lnQ0 + *k*(e−αP −1), in which Q is the quantity consumed, k specifies the range of the dependent variable (cigarette consumption) in logarithmic units, and α specifies the rate of change in consumption with changes in price (elasticity). The value of k (3.5 in natural log units in the present study, based on the best fit with the sample mean consumption values) is constant across all curve fits. Individual differences in elasticity are thereby scaled with a single parameter (α) which is standardized and independent of reinforcer magnitude. Larger α values reflect greater price sensitivity (elasticity). Demand curves were fit according to the Hursh and Silberberg (2008) guidelines using the calculator provided on the Institute for Behavioral Resources website. This nonlinear regression was used to generate an R2 value, reflecting percentage of variance accounted for by the equation. Consistent with Jacobs and Bickel (1999), when fitting the demand curve data, the first zero consumption value (i.e., breakpoint) was replaced by an arbitrarily low but nonzero value of .001, which is necessary for the logarithmic transformations. We did not include subsequent 0 consumption values in our curve estimates." Taken from Murphy et al. (2011). |
| **Selection Rationale:** | The Cigarette Purchase Task (CPT) is a time- and cost-efficient assessment of cigarette value. It has good reliability and test-retest stability. It is related to dependence and cigarettes per day and has been validated with adolescents. Behavioral economics and purchase behavior are primary outcomes of tobacco regulatory research and can be used to assess the abuse liability of tobacco products. |
| **Source:** | Few, L. R., Acker, J., Murphy, C., & MacKillop, J. (2012). Temporal stability of a cigarette purchase task. *Nicotine & Tobacco Research, 14*, 761-765.Hursh, S. R., & Silberberg, A. (2008). Economic demand and essential value. *Psychological Review, 115*, 186-198.Murphy, J. G., MacKillop, J., Tidey, J. W., Brazil, L. A., & Colby, S. M. (2011). Validity of a demand curve measure of nicotine reinforcement with adolescent smokers. *Drug and Alcohol Dependence, 113*, 207-214. |
| **Language** | English  |
| **Participant:** | Cigarette smokers ages 14 and up |
| **Personnel and Training Required:** | None |
| **Equipment Needs:** | None |
| **Standards** |  |
| **General References:** | Chase, H. W., MacKillop, J., & Hogarth, L. (2013). Isolating behavioral economic indices of demand in relation to nicotine dependence. *Psychopharmacology, 226*, 371-380.Jacobs, E. A., & Bickel, W. K. (1999). Modeling drug consumption in the clinic using simulation procedures: Demand for heroin and cigarettes in opioid-dependent outpatients. *Experimental and Clinical Psychopharmacology*. *7*, 412-426. doi:10.1037/1064-1297.7.4.412. Liao, W., Luo, X., Le, C. T., Chu, H., Epstein, L. H., Yu, J., Ahluwalia, J. S., & Thomas, S. L. (2013). Analysis of cigarette purchase task instrument data with a left-censored mixed effects model. *Experimental and Clinical Psychopharmacology, 21*, 124-132.MacKillop, J., Brown, C. L., Stojek, M. K, Murphy, C. M., Sweet, L, & Niaura, R. (2012). Behavioral economic analysis of withdrawal- and cue-elicited craving for tobacco: An initial investigation. *Nicotine & Tobacco Research, 12*, 1426-1434. |
| **Mode of Administration:** | Self-administered questionnaire  |
| **Derived Variables:** | None |
| **Requirements:** |

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| **Requirement Category** | **Required (Yes/No)** |
| **Major equipment** | No |
| **Specialized training** | No |
| **Specialized requirements for biospecimen collection** | No |
| **Average time of greater than 15 minutes in an unaffected individual** | No |

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| **Annotations for Specific Conditions:** | None |
| **Process and Review:** | Not applicable.  |