A Behavioral-Economic Examination of Differences in the Relative Reinforcing Value Of Cigarette Smoking Among those with Cumulative Vulnerabilities

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**Introduction**

- Populations with co-occurring socioeconomic or health-related disadvantages are at an increased risk for smoking.
- Research suggests the risk for smoking varies in an orderly, cumulative manner in association with the presence of co-occurring vulnerabilities (i.e., cumulative vulnerability).
- Reinforcement is widely recognized to be the behavioral process underpinning chronic smoking.

**Purpose**

To examine whether cumulative vulnerability moderates the effects of reduced nicotine content cigarettes on the relative reinforcing value of smoking.

**Method**

- Participants: 775 adult, daily smokers who participated in a 12-week multisite controlled trial evaluating the addiction potential of Spectrum research cigarettes varying in nicotine content (0.4 mg, 2.4 mg, 15.8 mg nicotine/g tobacco).
- Participants were randomly assigned to smoke one of the three research cigarettes for 12 weeks under double-blind conditions in a parallel-groups research design.
- Participants were categorized as having 0-1 (low), 2-3 (moderate), or 4-5 (high) cumulative vulnerabilities.
- Vulnerabilities included rural residence, current substance use disorder, current affective disorder, low educational attainment, poverty, unemployment, and physical disability.

**Procedure:** Participants in each nicotine dose condition completed the hypothetical Cigarette Purchase Task (CPT) at baseline and study weeks 2, 6, and 12 to assess the relative reinforcing value of smoking their (a) assigned study cigarette and (b) usual-brand cigarette.
- The CPT is a valid behavioral-economic measure in which participants estimate how much they would smoke (demand) in a 24-hr period under escalating constraints on cigarettes (i.e., price).

**Outcomes:** Demand was characterized using two latent factors: Amplitude (intensity of demand under minimal cost) and Persistence (sensitivity of demand to increasing price).

**Results**

**Amplitude - Usual Brand Cigarettes**

<table>
<thead>
<tr>
<th>Vulnerabilities</th>
<th>Predictor F</th>
<th>p</th>
<th>( \eta^2 )</th>
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<tbody>
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<td>Baseline</td>
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<td>Usual Brand</td>
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<td>Study Cigarettes</td>
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**Amplitude - Study Cigarettes**

<table>
<thead>
<tr>
<th>Vulnerabilities</th>
<th>Predictor F</th>
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<tbody>
<tr>
<td>All Vulnerabilities</td>
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<td>0-1 Vulnerabilities</td>
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**Discussion**

- Cumulative vulnerability was positively associated with greater demand for smoking, especially demand Amplitude.
- These results suggest that a nicotine standard reducing the nicotine content in cigarettes to minimally addictive levels would decrease demand Amplitude independent of cumulative vulnerability severity, but have a more graded impact in reducing demand Persistence with the largest reductions seen among those with low cumulative vulnerability.
- Demand Amplitude may be an important clinical target for reducing smoking in vulnerable populations.