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).
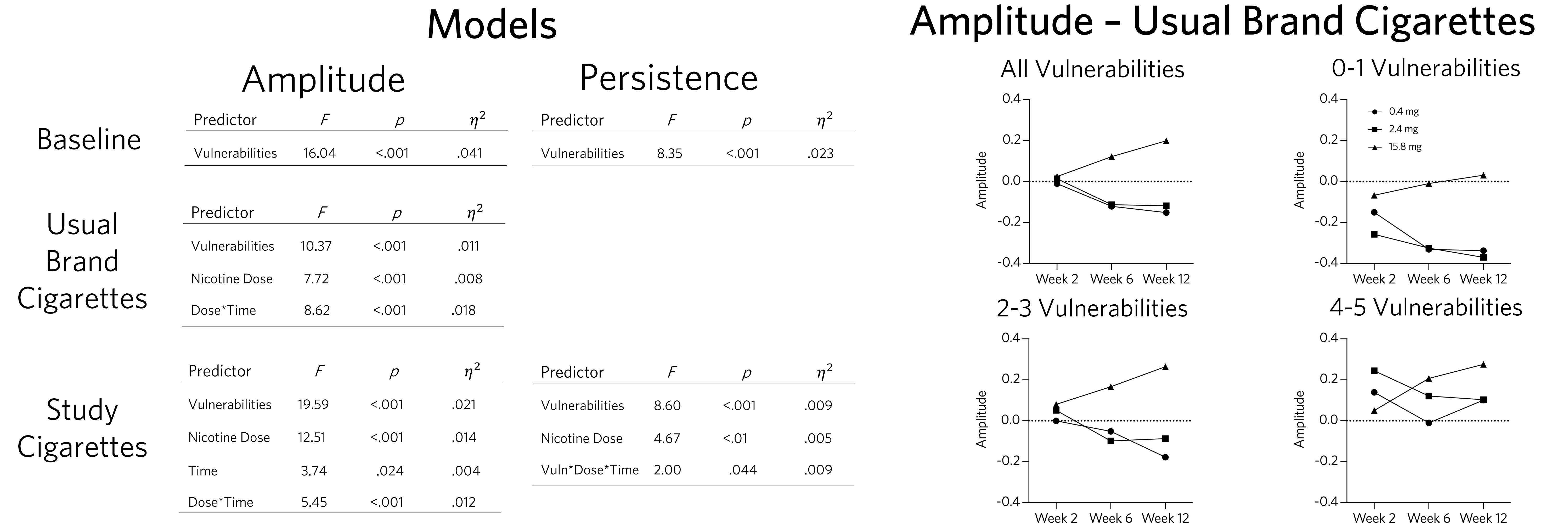
- Participants were randomly assigned to smoke one of the three research cigarettes for 12 weeks under double-blind conditions in a parallel-groups research design.
- Participants were categorized as having 0-1 (low), 2-3 (moderate), or 4-5 (high) cumulative vulnerabilities.
- Vulnerabilities included 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.
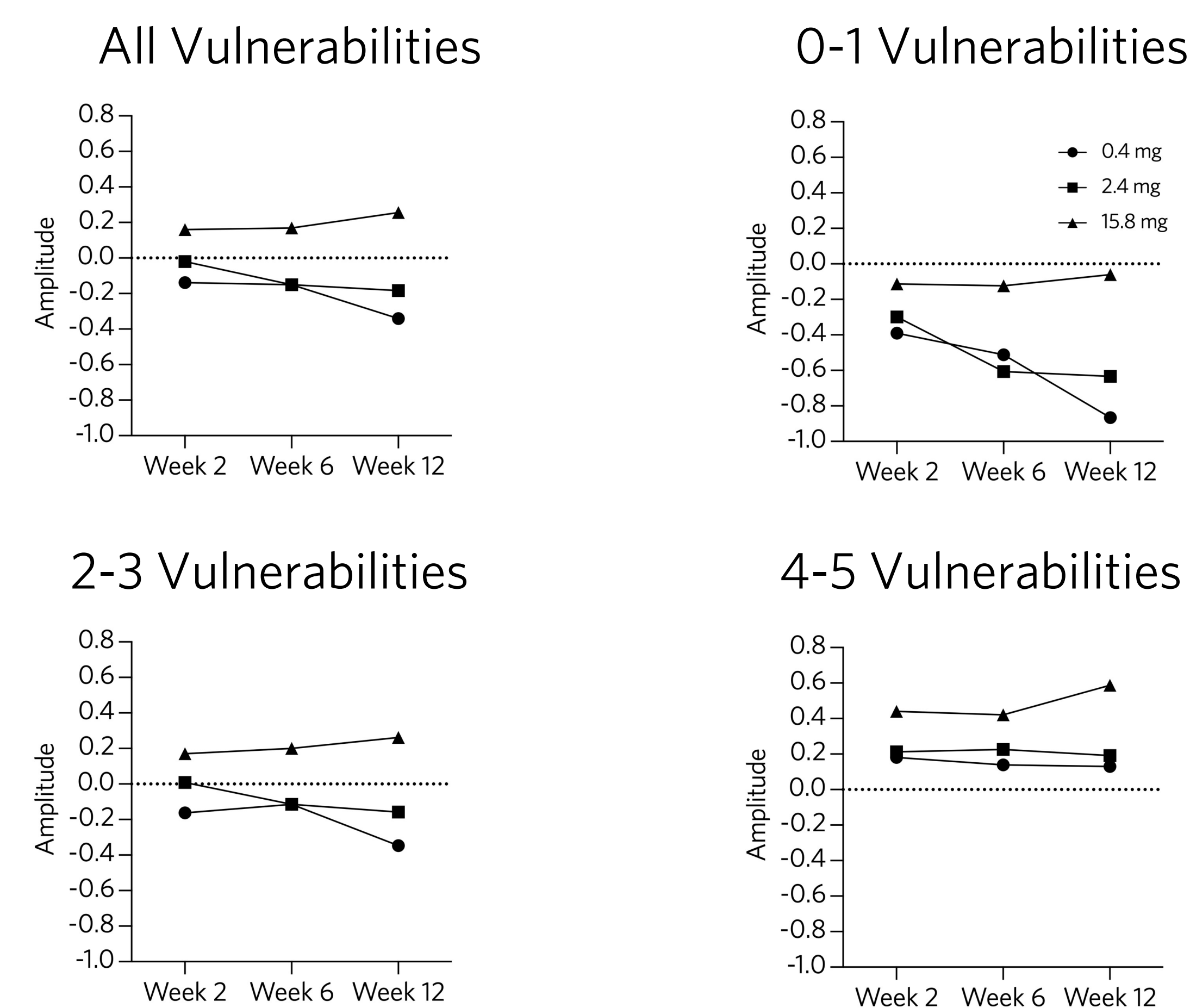
- The CPT is a valid behavioral-economic measure in which participants estimate how much they would smoke (demand) in a 24-hr period under escalating constraints on cigarettes (i.e., price).

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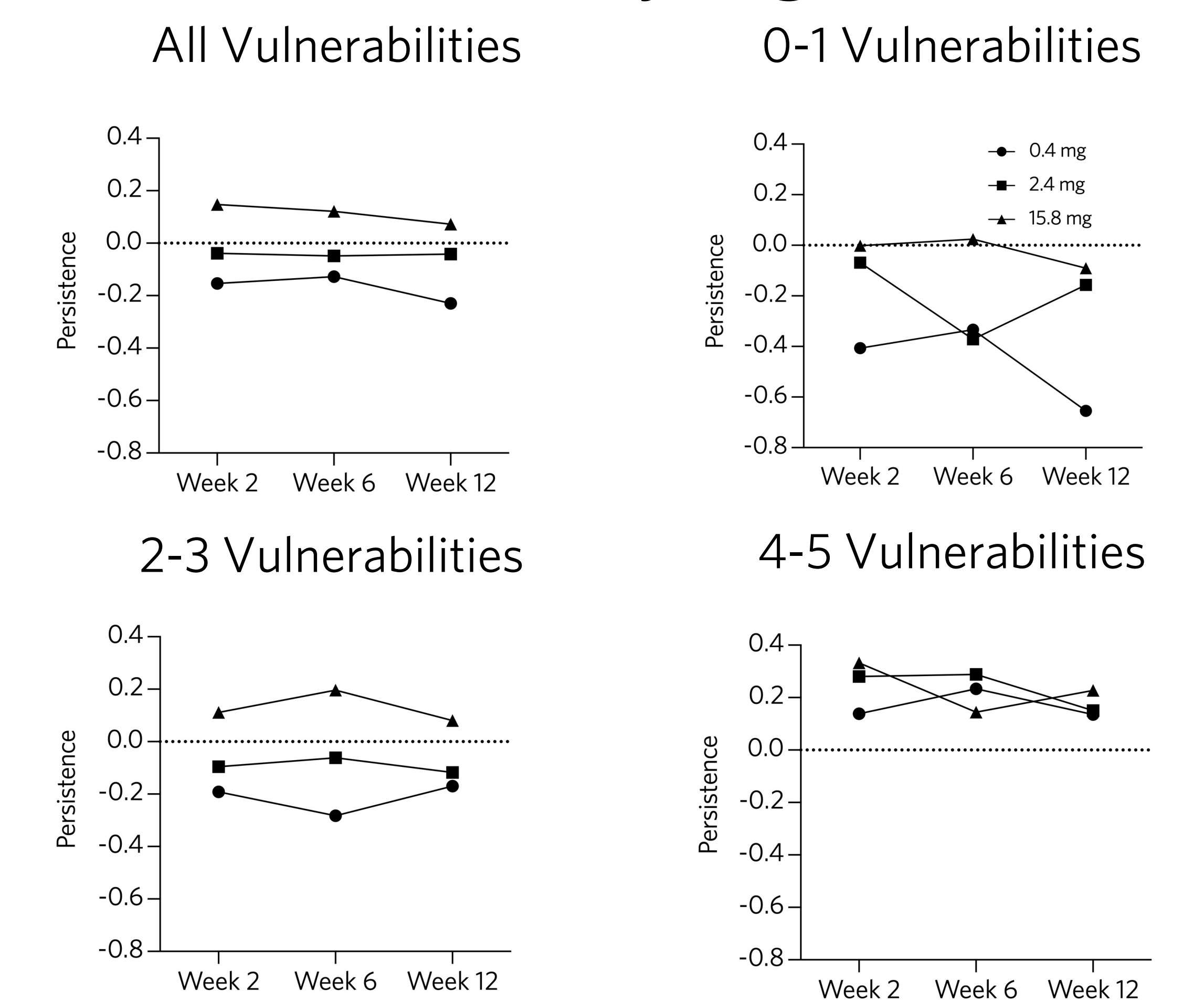
Results

Models

Amplitude

	Predictor	F	p	η^2
Baseline	Vulnerabilities	16.04	<.001	.041
Usual Brand Cigarettes	Vulnerabilities	10.37	<.001	.011
	Nicotine Dose	7.72	<.001	.008
	Dose*Time	8.62	<.001	.018
Study Cigarettes	Vulnerabilities	19.59	<.001	.021
	Nicotine Dose	12.51	<.001	.014
	Time	3.74	.024	.004
	Dose*Time	5.45	<.001	.012

Persistence

	Predictor	F	p	η^2
Baseline	Vulnerabilities	8.35	<.001	.023
Study Cigarettes	Vulnerabilities	8.60	<.001	.009
	Nicotine Dose	4.67	<.01	.005
	Vuln*Dose*Time	2.00	.044	.009

Amplitude – Usual Brand Cigarettes

Amplitude – Study Cigarettes

Persistence – Study Cigarettes

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.