Examining the Factor Loading Pattern of a Hypothetical Cigarette Purchase Task.

Carolyn G. Evemy[1,3], MA., Allison N. Kurti[1-3], PhD., Joan M. Skelly[1,4], MS., Norman Medina[1,2], BA., Stephen T. Higgins[1-3], PhD.

Vermont Center on Behavior and Health[1], Departments of Psychiatry[2] Psychological Science[3], Medical Biostatistics[4], University of Vermont

INTRODUCTION

The purpose of this study was to use a latent-factor approach to a hypothetical Cigarette Purchase Task (CPT) to explore a more parsimonious representation of cigarette demand among pregnant smokers. We hypothesized that the five CPT indices would be accounted for by a two-factor solution supporting the generality of that observation from the general population of adult smokers to pregnant women.

METHODS

Participants

- N = 665 pregnant women who completed an intake assessment to assess eligibility for a smoking cessation trial.

Hypothetical Cigarette Purchase Task

- 19 item self administered behavioral economic demand measure adapted from Mackillop et al. (2008).
- Assesses hypothetical demand for cigarettes across a range of increasing prices using 5 indices.
  1. Intensity (Q0): Consumption at little or no cost.
  2. Omax: Highest amount willing to pay for smoking.
  3. Pmax: Financial price per cig of Omax.
  4. Breakpoint (BP): Price where participants indicate they would quit rather than incur the cost..
  5. Alpha (α): Elasticity across the demand curve.

DATA ANALYSIS PLAN

CPT data were first examined to identify those participants who provided unsystematic data which was excluded from subsequent data analysis (N = 53, 8%).

Principle component analysis (PCA) with oblique rotation method was used to determine whether the five conventional demand indices were accounted for by a specified two latent-factor solution.

A standardized regression coefficient of >0.40 was used as a benchmark for inclusion of any index on any particular factor.

RESULTS

Table 1: Participant demographics and smoking history variables. Mean and standard deviation reported for age and age at smoking initiation.

Demographics:

Age at smoking initiation (years)		29.9 ± 5.9
Education		
	% < 12 years	10
	% = 12 years	55
	% > 12 years	35
% Married		27
% Private Insurance		29
Race / Ethnicity		
	% Non-Hispanic White	75
	% Non-Hispanic Black	14
	% Hispanic	4
	% Other	7
% Employed outside the home		47

Smoking History Variables:

Age at smoking initiation (years)		16.1 ± 3.5
Cigarettes per day prior to pregnancy		
	% ≤ 10 per day	12
	% > 10 per day	88
Cigarettes per day during pregnancy		
	% ≤ 10 per day	44
	% > 10 per day	56
Time to first cigarette prior to pregnancy		
	% ≤ 5 minutes	41
	% > 5 minutes	59
Time to first cigarette during pregnancy		
	% ≤ 5 minutes	19
	% > 5 minutes	81
% Smoking menthol cigarettes		56

RESULTS

Table 2: Lower diagonal correlation matrix with all 5 CPT indices.

	α	Q0	Pmax	Omax	BP
α	—				
Q0	-.335*	—			
Pmax	-.094*	-.733*	—		
Omax	.527*	-.847*	.614*	—	
BP	.072	-.927*	.789*	.649*	—

Table 3: Mean index scores and rotated factor loading pattern matrix from a principal component analysis.

Index scores	Mean	SD	Rotated latent factor loadings	
			Amplitude	Persistence
			EV = 1.11	EV = 3.26
			Var = 22%	Var = 65%
α	.18	.08	-.90	-.33
Q0	3.84	1.22	-.00	.98
Pmax	-.11	.53	.96	-.03
Omax	.82	.43	.80	.35
BP	.11	.49	.98	-.11

DISCUSSION

Consistent with prior studies in the general population of smokers, all CPT indices loaded onto the latent factors referred to as Amplitude and Persistence.

That is, Intensity and Omax loaded on Amplitude and Omax, Pmax, Breakpoint, and Alpha (Elasticity) loaded on Persistence, thereby supporting the generality of the two-factor CPT solution to pregnant women.

In the current sample, 87% of the variance in the 5 index CPT could be accounted for by the Amplitude and Persistence factors.