Examining The Effects Of Smoking During Pregnancy (SDP) And Environmental Tobacco Smoke (ETS) On Adolescent Self-regulation, Externalizing Behavior, And Substance Use

PHP 2550 FALL23 Practical Data Analysis
Project 1: Exploratory Data Analysis

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Overview

We conducted an exploratory analysis of the data from Dr. Lauren Micalizzi's research, aiming to examine the association between smoking during pregnancy (SDP) and environmental tobacco smoke (ETS) and adolescent self-regulation, externalizing behavior and substance use.

Introduction

- Smoking during pregnancy (SDP) is one of the major public health concern with multiple negative outcomes for babies [1]: higher risks of attention-deficit/hyperactivity disorder (ADHD) [2], conduct disorder [3], substance use issue, and self-regulatory problems.
- Scientists have identified a significant inverse association between environmental tobacco smoke (ETS) exposure and children's self-regulation and educational achievement [4].

Data Description and Analysis Plan

- Dataset is provided by Dr. Lauren Micalizzi, and the mothers involved in this study were randomly selected from participants in a previous study, "*A Tailored Video Intervention to Reduce Smoking and Environmental Tobacco Exposure During and After Pregnancy: Rationale, Design and Methods of Baby's Breath*" [5].
- In the original study, participants received newsletters containing content aimed at smoking cessation and avoidance, in addition to videos individually tailored on behavioral theory-based survey questions. The outcomes included salivary cotinine of both mother and baby (32 weeks gestation and 6 months postpartum), and self-reported ETS exposure and avoidance behaviors.
- In the current study, a subset of 100 mothers and their children, who were carried by the mothers when they participated the previous study, are randomly selected for recruitment.
- We'll create prenatal/postnatal exposure indicator variables and the corresponding intensity variables, so that we're able to incorporate both timing and dosage effects of SDP and ETS.

1. Quality check and data evaluation

   Characteristics of data, outliers, missing data, etc.

2. Univariate analysis
3. Bivariate analysis

Results

	No Smoke Exposure in 0-6 Months	Smoke Exposure in 0- 6 Months
Baby's Urine Cotinine < 1	12	1
Baby's Urine Cotinine >= 1	12	6

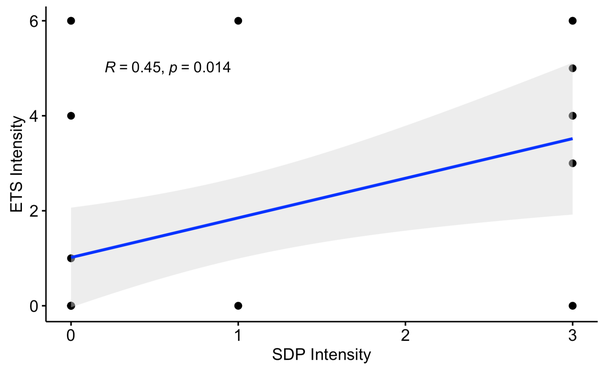

Figure 1: Interrelatedness between prenatal and postnatal exposure

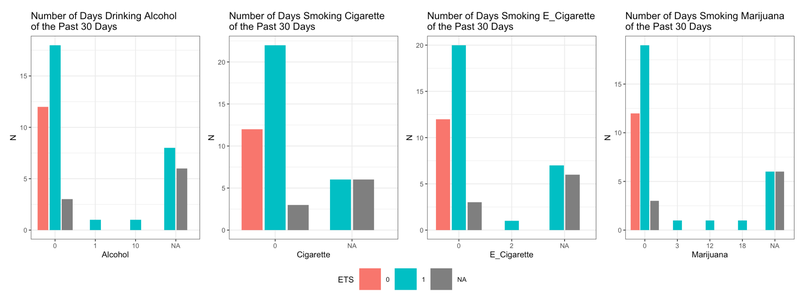

Figure 2: Dosage of Substance Use in Children With Respect to ETS

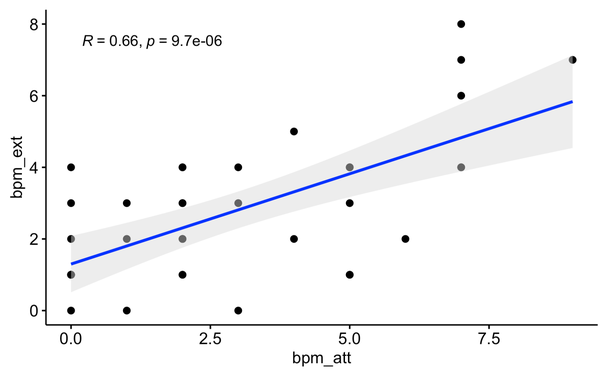

Figure 3: Intercorrelation between self-regulation variables, bpm_att and bmp_ext

Variables	No ETS	ETS	P value
bpm_att_p	1 (0,1)	3 (1,5)	0.007
bpm_ext_p	0 (0,0)	3 (1,4)	0.001

Discussion

- Smoking exposure at early age is associated with self-regulation, externalizing behavior and substance use, respectively.
- Prenatal and postnatal smoke exposures are positively correlated ($\rho = 0.45$).
- Variables regarding self-regulation, externalizing behavior and substance use are also intercorrelated.

Limitations

- Self-report bias → data quality
- Small sample size (49 observations at baseline)
  - High bias among results
  - Low statistical power
- Great proportion of missing (63 out of 77 variables have missing values)

References

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5. Risica PM, Parker DR, Gavarkovs A. 2017. "A Tailored Video Intervention to Reduce Smoking and Environmental Tobacco Exposure During and After Pregnancy: Rationale, Design and Methods of Baby's Breath." *Contemp Clin Trials.* 52: 1–9. https://doi.org/10.1016/j.cct.2016.10.010.