

## Introduction

### Background:

- The psychosocial pathways connecting our physical and mental health have become an increasingly important topic of study. In both youth and adult populations, facets of psychological functioning such as mood and depression have been linked with physical health outcomes.
- In an adult sample, Cohen and colleagues (2007) demonstrated that positive mood, but not negative mood, was associated with experimentally induced sickness. Unfortunately, much less is known about the effect of mood on health outcomes in children.
- In a sample of children, greater self-reported depression was associated with decreased salivary immune parameters (Kellar et al., 2010). However, the impact of depressive symptoms on clinically relevant health outcomes in children is less well-understood.
- While both changes in daily mood and more stable levels of depression have been shown to affect physical health independently, we know much less about the interaction between these two variables in predicting physical health outcomes among children.
- Upper respiratory tract infections (URIs) are a particularly relevant health outcome to explore, as they are the most common and costly types of infectious diseases among children, resulting in an estimated 22 to 189 million school days missed annually (Prevention CfDca, 2004).
- In a naturalistic environment, how do day-to-day fluctuations in children's mood affect physical health? How might this relationship be affected by individual differences in stable depressive symptomatology?
- The goal of the current study is to utilize a daily-diary methodology to explore the link between self-reported mood and URI symptoms across 8 weeks among a sample of 8-13 year old children.**
- The role of depressive symptoms as a potential moderator of the relationship between mood and URI symptoms will also be examined.**

### Research Questions:

- What is the effect of mood on self-reported URI symptoms? Will the impact of positive mood differ from that of negative mood?
- Do stable levels of depressive symptoms impact the relationship between reports of daily mood and URI symptoms?

### Hypotheses:

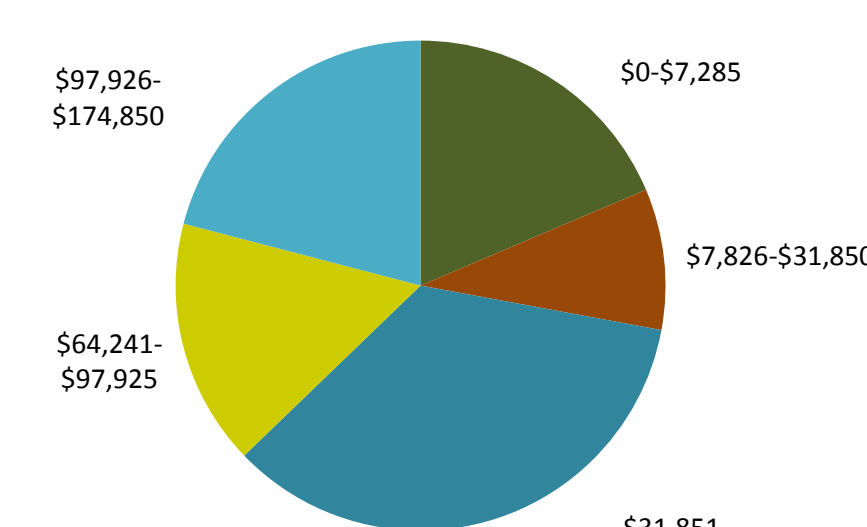
- Children will report more URI symptoms on days that they report less positive mood, and this association will remain significant even after controlling prior-day mood and URI symptoms.
- Children with higher levels of stable depressive symptoms will experience a more pronounced increase in URI symptoms on days when they report less positive mood.

## Methods

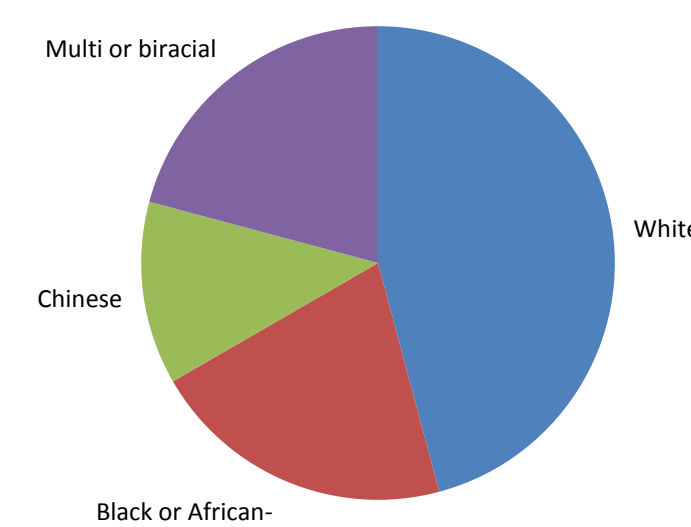
### Participants:

A total of 24 children between the ages of 8-13 years (mean age = 11.13 years; 50% female) comprise the current sample. Children and their families were recruited from the greater Los Angeles area to take part in a daily-diary study on families and health.

### Annual parental income



### Child Ethnic Background



### Procedure:

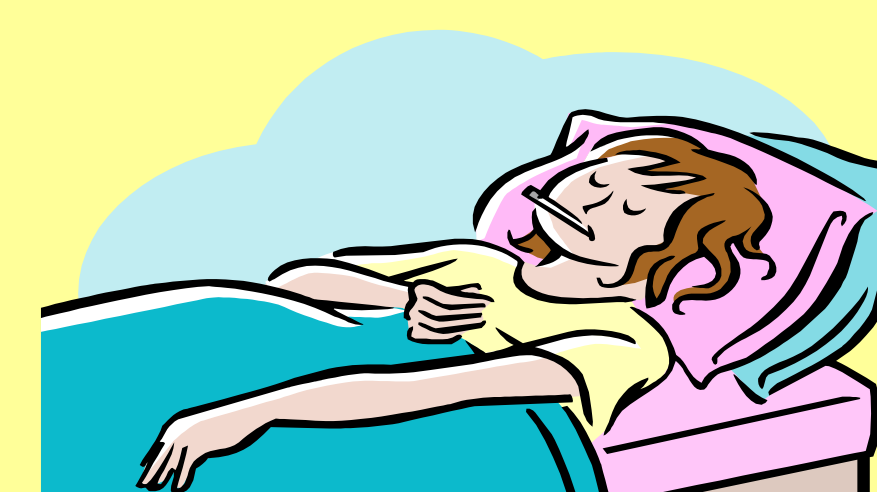
As part of an ongoing study of family characteristics, daily stressors, and upper respiratory symptoms, data were collected between the months of October and May ("cold season") across two consecutive years. Questionnaires were administered to children via the study's web portal at baseline, which was followed by a daily-diary phase during which children completed online surveys each night for 8 weeks.

### Measures:

**URI Symptoms:** A checklist was used to assess daily experiences of upper-respiratory symptoms such as plugged nose, cough, and sore throat (8 items; 1 = yes, 0 = no).

**Mood:** A 14-item measure (Cohen et al., 2006) assessed daily experience of positive mood (8 items; e.g. "happy", "cheerful") and negative mood (8 items; e.g. "sad", "worried") on a 4-point scale (1 = not at all today; 4 = all day today).

**Depressive Symptoms:** The short form of Children's Depression Inventory (Kovacs, 1992) was used to assess childhood depression over the past two weeks on a 3-point scale (10 items; 0 = not depressed, 2 = depressed).



## Data Analysis Plan

Hypotheses were tested in a series of multilevel models using the HLM statistical program. Daily endorsement of URI symptoms served as the outcome in each model and daily reports of positive and negative mood served as the primary predictors. Control variables included study day (with the first day coded as zero), prior-day URI symptoms, and prior-day positive and negative mood.

Average child-reported depressive symptoms on the CDI were modeled as a level 2 (between-person) predictor on the intercept and the slope associated with each predictor and control variable. The intercept was modeled as random and slopes were modeled as fixed effects.

A significant negative coefficient associated with positive mood would lend support to hypothesis 1 (i.e., on days when children report less positive mood, they also endorse more URI symptoms).

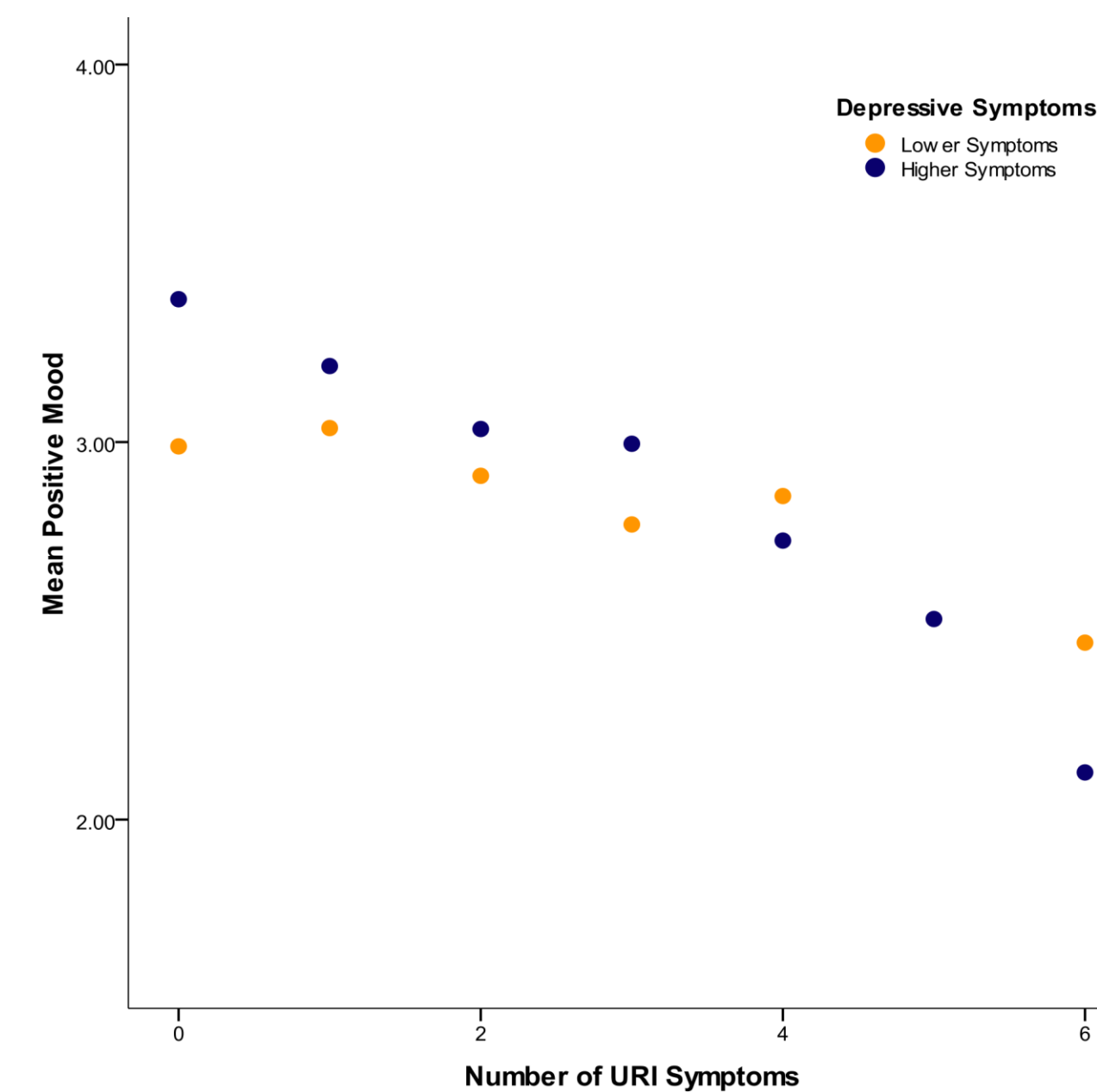
A significant effect of stable depressive symptoms on the slope associated with positive mood would support hypothesis 2 (i.e., that the relationship between daily reports of positive mood and daily endorsement of URI symptoms is stronger for those children who are characterized by more stable depressive features).

## Discussion

- The current study is the first to replicate adult experimental findings in a sample of children assessed daily in their natural environment. It is also one of the first to examine day-to-day mood (across 56 days) in concert with overall levels of depressive symptoms in children.
- Consistent with our hypotheses, children did report more URI symptoms on days when they reported less positive mood. There was no significant effect of negative mood on endorsement of URI symptoms.
- Also consistent with our hypotheses, the negative correlation between positive mood and URI symptoms was stronger in children who reported higher levels of depressive symptoms.
- As somatization has been associated with higher rates of internalizing symptoms (e.g. Shannon et al., 2010) it is plausible that in children who report higher levels of depressive symptoms, dips in positive mood may manifest physically in the form of increased endorsement of URI symptoms.
- Controlling for negative affect allowed us to examine the unique effects of positive affect. While a great deal of research has focused on the detrimental effects of negative affect, these findings illuminate the important role that positive affect plays in physical health. The psychological nature of this pathway to illness suggests that a child's mood should not be ignored when assessing how best to avoid frequent illness and consequent school absences.

## Results

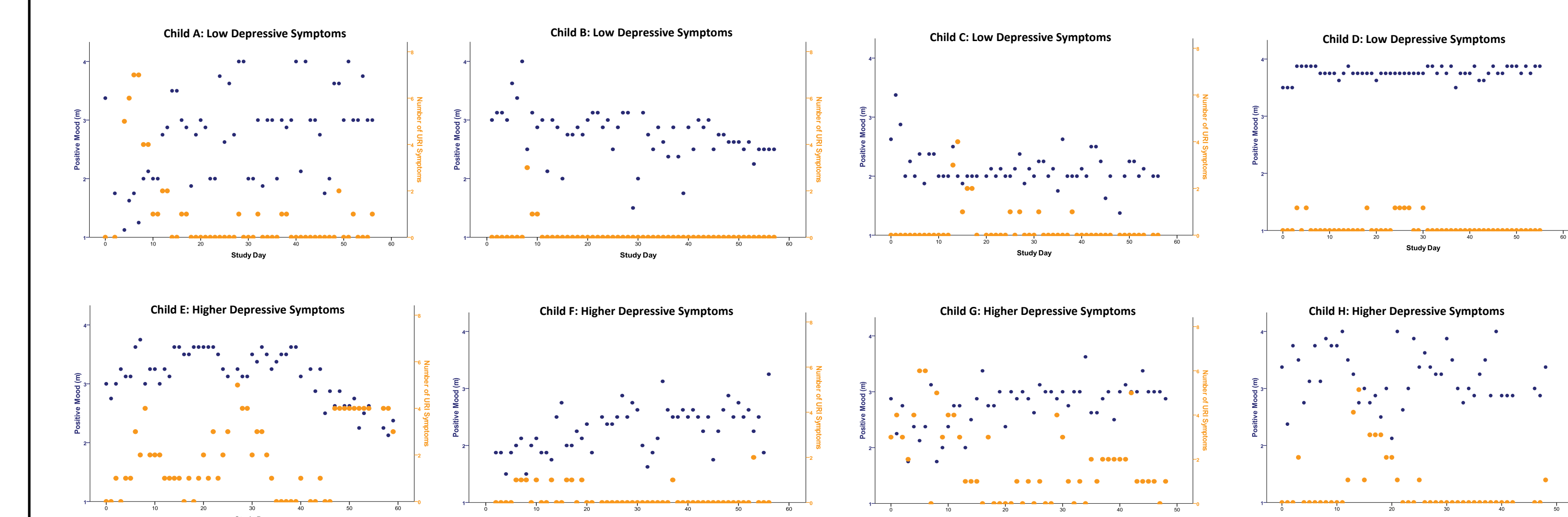
Daily URI Symptoms and Daily Positive Mood for Children High and Low in Depressive Symptoms



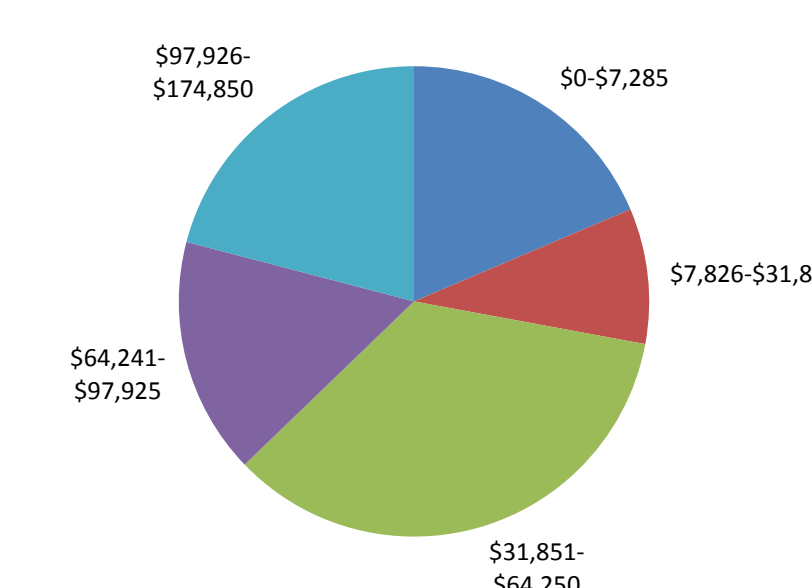
CDI scores moderate the relationship between current day URI symptoms and current day positive mood, controlling for current day negative mood.

	Coefficient	S.E.	T-ratio	df	P-value
Intercept	0.355475	0.097103	3.661	21	0.002
CDI	-0.037497	0.553655	-0.068	21	0.947
Study day	-0.002346	0.001527	-1.536	1026	0.125
CDI	0.021060	0.010708	1.967	1026	0.049
Current day positive mood	-0.399983	0.077678	-5.149	1026	0.000
CDI	-1.816213	0.438051	-4.146	1026	0.000
Current day negative mood	-0.041970	0.095918	-0.438	1026	0.661
CDI	0.236870	0.495126	0.478	1026	0.632
Prior day URI symptoms	0.577907	0.025376	22.774	1026	0.000
CDI	-0.341520	0.132690	-2.574	1026	0.011
Prior day positive mood	-0.078353	0.076711	-1.021	1026	0.308
CDI	1.001669	0.464239	2.158	1026	0.031
Prior day negative mood	-0.054145	0.093824	-0.577	1026	0.564
CDI	0.820980	0.508163	1.616	1026	0.106

Daily URI symptoms and peer problems among children rated as higher or lower in depressive symptoms.



Number of Daily Diaries Completed



Changes in current day positive mood, but not current day negative mood, were associated with changes in current day URI symptoms, such that less positive mood was associated with endorsement of more URI symptoms.

Compared to children with lower levels of depressive symptoms, children with higher levels of depressive symptoms experienced a greater increase in URI symptoms on days when they reported less positive mood.