



JOHNS HOPKINS

BLOOMBERG SCHOOL  
*of* PUBLIC HEALTH

# The Health Belief Model and Prevention Behavior during the COVID-19 Pandemic

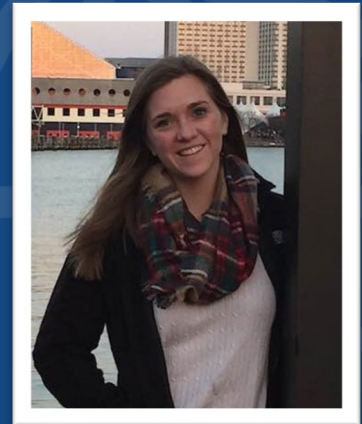
---

**Emily Smail, PhD Candidate**

Department of Mental Health

Johns Hopkins Bloomberg School of Public Health

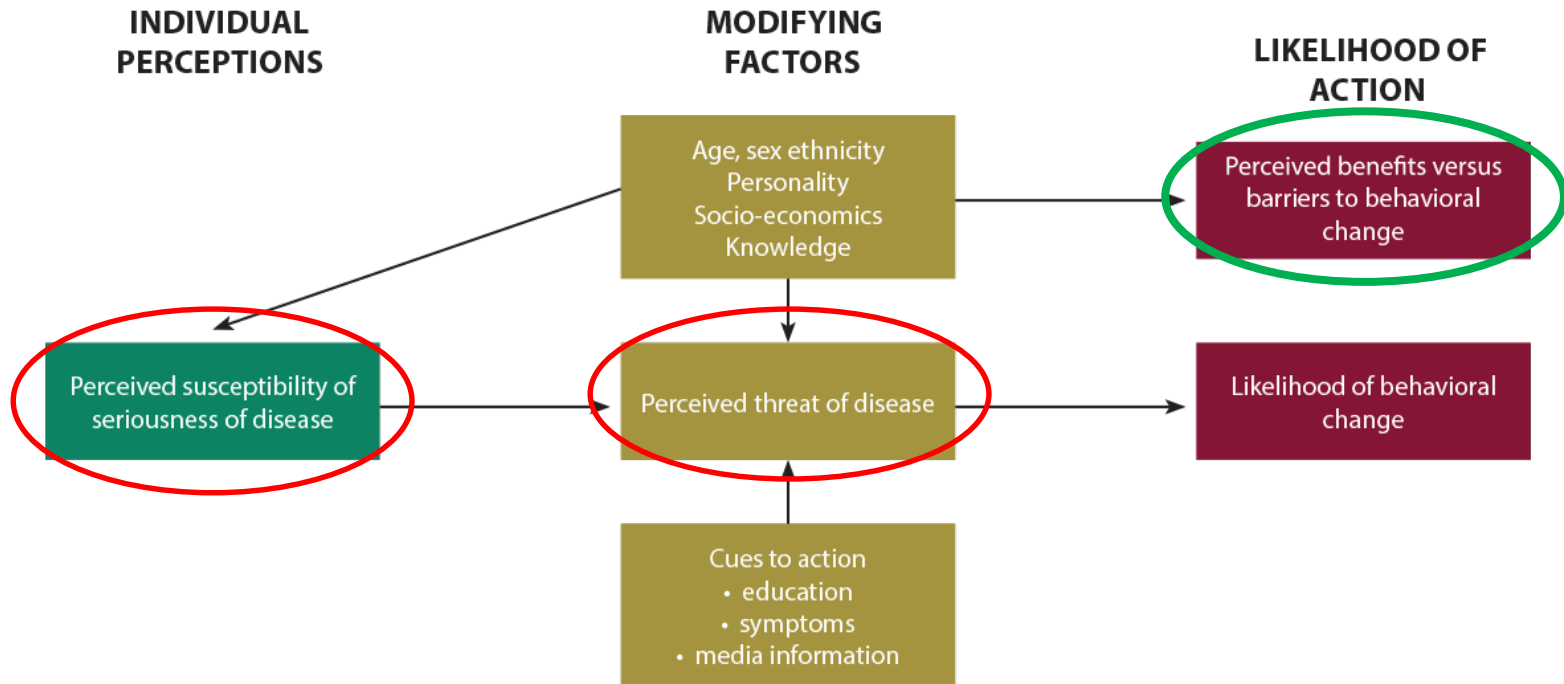
Adviser: Brion Maher, PhD



## Context: the COVID-19 Pandemic in the U.S.

- ▶ Several prevention behaviors have been recommended by top health organizations to prevent the spread of the virus (CDC, 2020).
- ▶ Compliance with these recommendations is inconsistent (Wise, 2020; Grossman, 2020).
- ▶ Understanding the psychosocial determinants of COVID-related prevention behaviors could inform health programming to help reduce the spread of COVID-19 and future pandemics.

# The Health Belief Model and Preventive Behavior



# Purpose

- ▶ (1) Characterize patterns of prevention behaviors during the COVID-19 pandemic 3 months after it was declared a national emergency in the US;
- ▶ (2) identify differences in prevention behaviors by demographic characteristics; and
- ▶ (3) determine how those patterns are associated with health beliefs, such as perceptions about susceptibility, severity, and effectiveness of recommended behaviors.

# Methods: Data Source

- ▶ **Understanding America Study**
  - ▶ Recruits using Address Based Sampling
  - ▶ Survey weights align with key demographic characteristics of the US
  - ▶ Current analysis uses two waves:
    - UAS 230 – March 10<sup>th</sup> to March 31<sup>st</sup>
    - UAS 246 – May 27<sup>th</sup> to June 23<sup>rd</sup>



# Conceptual Framework and Measurement

UAS 230: March 10<sup>th</sup> – March 31<sup>st</sup>

## Health Beliefs

### Susceptibility

Perceived risk of infection  
(None: 0%; Low: 0.1%-20%, High: >20%)

### Severity

Perceived risk of death  
(None: 0%; Low: 0.1%-20%, High: >20%)

### Effectiveness

Cumulative rating of effectiveness of top 3 recommendations  
(hand-washing, social distancing, and wearing a mask)



UAS 246: May 27<sup>th</sup> – June 23<sup>rd</sup>

## Latent Class Membership

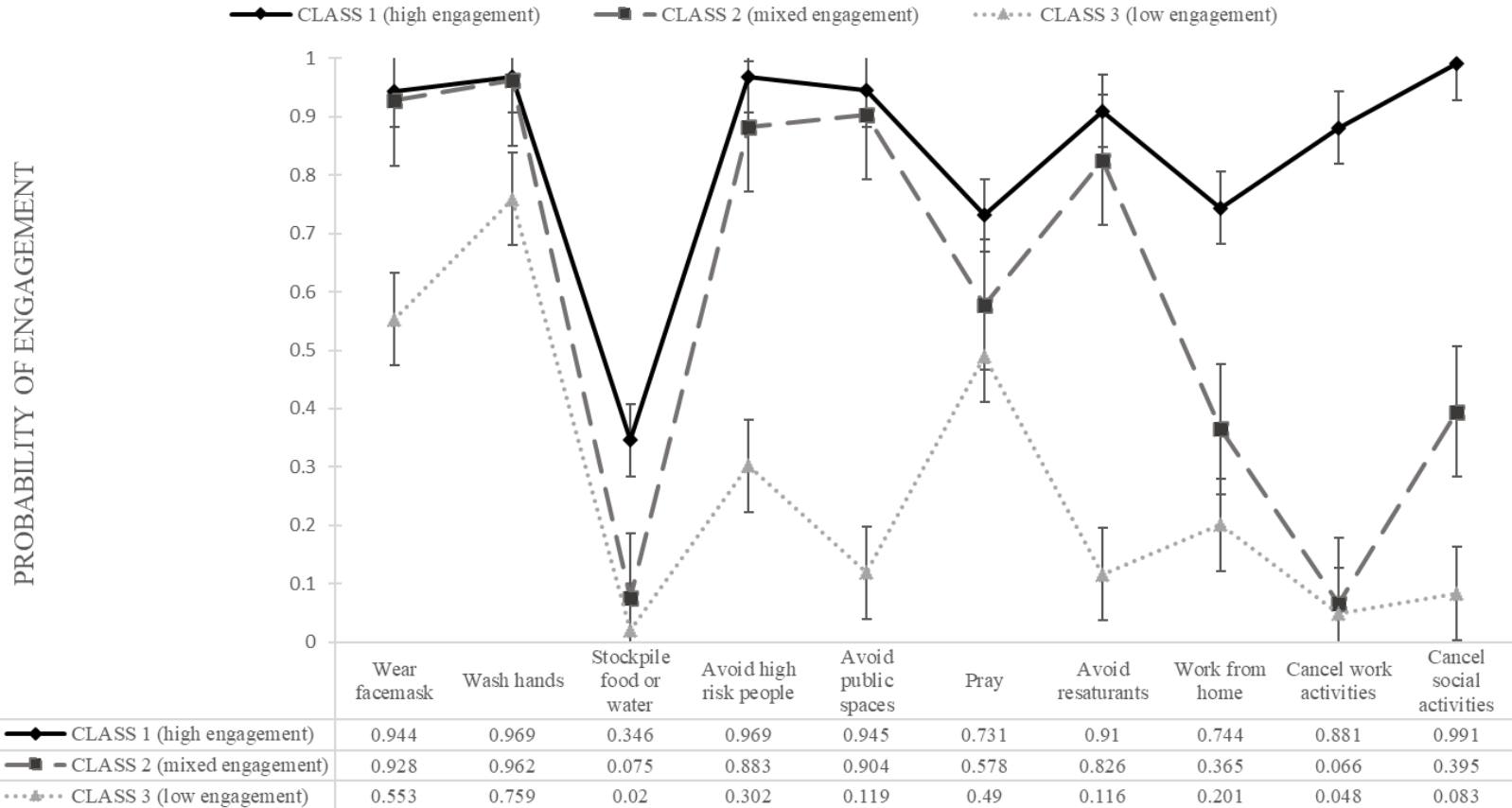
Endorsement of 10 health behaviors (including, among others, wearing a facemask, washing hands, and avoiding high-risk individuals)

All analyses are adjusted for the following covariates: race, age, sex, years of education, likelihood of getting a vaccine, number in social network, and mental distress

# Results: Demographic Characteristics

<b>Variable</b>	<b>Level</b>	<b>N (%)</b>
Age Category	18-29	513 (11.5%)
	30-39	1048 (23.6%)
	40-49	688 (15.5%)
	50-59	794 (17.9%)
	60+	1402 (31.5%)
Sex	Female	2227 (50.1%)
	Male	2218 (49.9%)
Race	White, non-Hispanic	2925 (65.8%)
	Black, non-Hispanic	452 (10.2%)
	Hispanic/Latino	630 (14.2%)
	Other, non-Hispanic	434 (9.8%)
Education Level	High school or less	1491 (33.6%)
	Some college/Associate's degree	1250 (28.1%)
	Bachelor's degree	921 (20.7%)
	Graduate degree	782 (17.6%)

# Results: Class Membership





# Results: Links Between Demographic Characteristics and Class Membership

		Low Engagement		High Engagement	
		OR	CI	OR	CI
Age category (ref: 18-29)					
	30-39	0.663	(0.427, 1.03)	0.939	(0.59, 1.494)
	40-49	0.736	(0.472, 1.147)	0.964	(0.597, 1.555)
	50-59	0.513	(0.33, 0.798)	0.777	(0.485, 1.245)
	60+	0.226	(0.146, 0.35)	0.434	(0.28, 0.673)
Sex (ref: female)					
	Male	1.211	(0.957, 1.533)	0.681	(0.538, 0.861)
Race (ref: white, non-Hispanic)					
	Black, non-Hispanic	0.618	(0.355, 1.073)	3.114	(2.138, 4.534)
	Hispanic/Latino	1.162	(0.751, 1.798)	3.184	(2.198, 4.613)
	Other	0.763	(0.46, 1.265)	2.535	(1.697, 3.786)
Education Level (ref: high school or less)					
	Some college/Associate's	0.876	(0.657, 1.168)	1.039	(0.758, 1.422)
	Bachelor's degree	0.493	(0.354, 0.686)	0.756	(0.539, 1.058)
	Graduate degree	0.349	(0.228, 0.535)	1.487	(1.062, 2.083)
Willingness to get vaccine (ref: not willing)					
	Willing (more than 90% likely)	0.328	(0.256, 0.420)	0.961	(0.750, 1.231)
Number of people in social network		0.994	(0.990, 0.999)	1.002	(0.998, 1.007)
PHQ4_score		1.006	(0.959, 1.055)	1.030	(0.988, 1.073)

# Results: Links Between Health Beliefs and Class Membership

	Low Engagement in Prevention Behaviors		High Engagement in Prevention Behaviors	
	Unadjusted OR [CI]	Adjusted OR [CI]	Unadjusted OR [CI]	Adjusted OR [CI]
Perceived risk of infection (ref: none)				
Low Risk	0.509 (0.366, 0.709)	0.485 (0.336, 0.700)	0.571 (0.408, 0.799)	0.662 (0.461, 0.951)
High Risk	0.581 (0.415, 0.814)	0.586 (0.403, 0.852)	0.734 (0.524, 1.028)	0.813 (0.562, 1.176)
Perceived risk of death (ref: none)				
Low Risk	0.605 (0.453, 0.807)	0.683 (0.495, 0.942)	0.861 (0.634, 1.171)	0.869 (0.626, 1.207)
High Risk	0.536 (0.373, 0.771)	0.624 (0.415, 0.938)	0.951 (0.668, 1.354)	1.01 (0.686, 1.485)
Effectiveness of top CDC recommendations				
1-point increase	0.887 (0.832, 0.945)	1.105 (1.031, 1.184)	1.038 (0.956, 1.127)	1.112 (1.018, 1.215)

- ▶ The odds of being in the low engagement class, relative to the mixed engagement class, were significantly lower for both those in the “low risk” and “high risk” categories relative to the “no risk” category of perceived risk of infection. Similarly, the odds of being in the high engagement class were significantly lower for the “low risk” relative to “no risk” group.

# Conclusion & Statement of Significance

- ▶ This nationally representative dataset highlighted 3 latent classes of prevention behaviors in late May to late June.
- ▶ Several demographic characteristics and health beliefs are associated with the odds of class membership.
- ▶ Our findings highlight the potential utility of using the health belief model to inform health communication campaigns and other prevention efforts to reduce the spread of COVID-19 and future pandemics.

# Acknowledgements

## Co-authors

Stephanie DeLong, PhD

Kristin Schneider, PhD

Kalai Willis

Renata Arrington-Sanders, MD, MPH, ScM

Cui Yang, PhD

Kamila Alexander, PhD, MPH, RN

Renee M. Johnson, PhD, MPH

## Funding Source

T32 AG000247;

Epidemiology and Biostatistics of Aging

## Faculty Adviser

Brion Maher, PhD

# References

CDC. <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html>

Accessed September 28, 2020.

Grossman. Political partisanship influences behavioral responses to governors' recommendations for COVID-19 prevention in the United States. [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3578695](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3578695).

Rosenstock, I. M. (1974). Historical origins of the health belief model. *Health Education Monographs*, 2, 328–335.

Wise. Changes in risk perception and protective behavior during the first week of the COVID-19 pandemic in the United States. <https://psyarxiv.com/dz428/>. Accessed September 28, 2020.



JOHNS HOPKINS

BLOOMBERG SCHOOL  
*of* PUBLIC HEALTH

Thank you!

---



# Supplemental Slide

Likelihood of Getting Vaccine	Not likely (<90%)	1741 (39.2%)
	Likely (90-100%)	2704 (60.8%)
Perceived Risk of Infection	No risk (0%)	786 (17.7%)
	Low risk (0.1-20%)	1904 (42.8%)
	High risk (20.1-100%)	1754 (39.5%)
Perceived Risk of Death from Infection	No risk (0%)	921 (20.7%)
	Low risk (0.1-20%)	2471 (55.6%)
	High risk (20.1-100%)	1053 (23.7%)
<b>Variable (range)</b>		<b>Mean (S.E.)</b>
Perceived Effectiveness of CDC Recommendations (range: 3-12)		9.68 (0.036)
Number of close family or friends (range: 0-100)		27.18 (0.594)
PHQ4 Score (Mental Distress) (range: 0-12)		1.84 (0.058)