

1 **Perceived vulnerability to COVID-19 infection from event**
2 **attendance: Results from Louisiana, USA, two weeks preceding the**
3 **national emergency declaration**

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17 **Abstract**

18 In response to the mounting threat of COVID-19, we added questions to an ongoing food
19 preference study held at Louisiana State University from March 3-12 of 2020. We asked 356
20 participants: (1) In your opinion, how likely is it that the spread of COVID-19 (the coronavirus)
21 will cause a public health crisis in the United States? (2) How concerned are you that you will
22 contract COVID-19 by attending events on campus? Participants' estimates of an impending
23 national health crisis increased significantly during the study's second week (March 9-12) while
24 concern about personally contracting COVID-19 from attending campus events increased only
25 marginally during the study's final days. We find those expressing a higher likelihood of an
26 impending national crisis were more concerned about contracting COVID-19 by attending
27 campus events, suggesting a possible transmission from perceptions of national-level events to
28 perceived personal vulnerability via local exposure. However, about 30% of participants
29 perceived that COVID-19 would likely cause a public health crisis yet did not express concern
30 about contracting COVID-19 from event attendance. These participants were significantly more
31 likely to be younger students who agreed to participate in response to recruitment using same-
32 day flyer distribution. Women expressed a higher likelihood of an emerging national health
33 crisis, although they were not more concerned than men that attending campus events would
34 result in virus contraction. Other groups (e.g., white, students younger than 25, highest income
35 group) displayed similar concern about a national-level crisis, yet were significantly less
36 concerned about contracting COVID-19 from attending campus events than others. Also,
37 participants randomly assigned to information emphasizing the national impacts of food waste
38 expressed significantly greater concern of contracting COVID-19 by attending campus events.
39 These results provide some initial insight about how people perceived national and personal risks
40 in the early stages of the COVID-19 crisis in Louisiana.

41

42 **Introduction**

43 Individual perceptions of personal and national threats posed by the transmission of SARS CoV-
44 2 and its sequelae (COVID-19) have undoubtedly shaped the public's initial response to and
45 ultimately the speed and geographical diffusion of the most disruptive public health crises in the
46 past century[1]. Cowper[2], responding to unfolding events in the United Kingdom, notes that
47 public reaction to national level communications will critically impact how the pandemic
48 unfolds. Bagnoli, Lio and Sguanci [3] showed that individual perception of infection risk is a
49 critical parameter for predicting the spread of epidemics and argued for inclusion of such
50 perceptions in epidemiological models. Zhang, Deng and Zhang [4] analyzed minor differences
51 in COVID response times across Chinese provinces during early 2020 and found that a single-
52 day delay in provincial response significantly increased the newly confirmed case rate by 2.2%
53 which translates to on average of 497 more confirmed cases per 10,000 population per square
54 kilometer. Rapid response ultimately relies upon broad-based compliance by the population,
55 which stems from the perceived risk of the evolving phenomenon from each individual.

56 Previous research has documented several empirical regularities in human response
57 during epidemics. For example, Moran and Del Valle's [5] meta-analysis revealed that women
58 were about 50% more likely to adopt non-pharmaceutical protective responses (e.g., mask
59 wearing, hand washing) during respiratory epidemics. de Zwart et al. [6] studied results from
60 surveys during the Avian Influenza (AI) epidemic and found Dutch participants were more likely
61 to undertake preventative actions among those who were older, had less formal education, had
62 obtained a flu vaccine, perceived higher severity of AI, perceive greater vulnerability to AI, and
63 thought more about AI. During the H1N1 influenza epidemic in Korea, Park et al. [7] found

64 female students reported higher perceptions of illness severity and of personal susceptibility to
65 infection than men.

66 However, little is currently known about how individuals assess the national and personal
67 risks associated with the COVID-19 pandemic during critical communications windows. To our
68 knowledge, the only study that examines perceptions of the COVID-19 threat come from surveys
69 in China documenting demographic correlates of psychological impacts caused by the COVID
70 crisis [8]. These authors find that women, students, those reporting specific physical symptoms
71 and those with unfavorable self-rated health reported significantly greater psychological impacts
72 of COVID-19.

73 In this article, we share results from responses gathered during a study conducted on the
74 campus of Louisiana State University from March 3 to March 12, 2020, a period closely
75 preceding the closure of in-person classes and events on its Baton Rouge campus. In response to
76 the mounting threat of COVID-19 in the United States, we added two exit questions to an
77 ongoing in-person food preference study being held on campus. We asked 356 participants: (1)
78 In your opinion, how likely is it that the spread of COVID-19 (the coronavirus) will cause a
79 public health crisis in the United States? and (2) How concerned are you that you will contract
80 COVID-19 by attending events on campus? We juxtapose the evolution of responses to these
81 questions with official government pronouncements concerning COVID-19. We also use
82 regression analyses and classification tree analyses to explore associations between responses to
83 these questions and participant demographic characteristics as well as experimental treatments
84 randomly assigned to participants as part of the ongoing study.

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87 **Methods**

88 **Measurement**

89 Data were collected from participants in an ongoing study focused on understanding consumer
90 food choice and consumption behavior during midday meals (11:00 AM – 2:00 PM). Students,
91 staff and faculty of Louisiana State University (LSU) were recruited to participate in a study held
92 at the campus's Food Sensory Services Lab in which they would be offered a choice among
93 several commercially prepared lunch options. They were provided a fixed budget for lunch and
94 kept any unspent budget as cash compensation. After providing informed consent, participants
95 moved to isolated, individual kiosks with a computer to answer an online survey in which
96 information treatments were randomly assigned and subjects chose among a series of competing
97 lunch options. One of the participant's preferred lunch options was delivered by staff to the
98 kiosk. Upon completing the meal, staff removed the food tray and the participant completed an
99 online exit survey via the kiosk computer that focused on satisfaction with the provided meal and
100 personal information.

101 The food preference study initially began on February 17, 2020. In late February, as
102 concerns about the spread of COVID-19 in the United States increased, we added questions to
103 the exit survey (S1 Appendix) to understand if these events were altering the profile of
104 individuals who chose to participate in the study. Two questions were added: (1) In your
105 opinion, how likely is it that the spread of COVID-19 (the coronavirus) will cause a public health
106 crisis in the United States? (*National Likelihood*); and (2) How concerned are you that you will

107 contract COVID-19 by attending events on campus (*Local Vulnerability*)? Participants answered
108 these questions in sessions from March 3 to March 12, 2020, the final day of the study. LSU
109 continued all in-person classes and food service operations through March 13, 2020, and no
110 official announcements were made regarding the cancellations of any on-campus activities
111 before the end of our last study session (2: 00 PM March 12th) [9]. At 4:00 PM on March 12th,
112 2020, LSU's official communications regarding COVID-19 first mentioned the cancellation of
113 on-campus classes starting from the week of March 16th [10], and then announced the
114 cancellation of non-class activities involving 30 people or more immediately at 11:30 AM on
115 March 13, 2020 [11]. For reference, a national emergency was declared in response to COVID-
116 19 the afternoon of March 13, 2020 [12].

117 **Sampling**

118 The sample includes the 356 participants enrolled from March 3 through March 12, 2020.
119 Individuals were recruited via pre-existing email recruitment lists, flyers circulated on campus,
120 advertising announcements on classes, and advertisements in university locations. Inclusion
121 criteria included age 18 years or older with no dietary restrictions to beef products.

122 **Analysis**

123 Results are analyzed in Stata (version 16). The focal variables relating to COVID-19
124 were captured using a 5-point Likert scale. When more convenient for exposition or analysis,
125 these responses are simplified into binary variables (very or moderately likely/concerned = 1; all
126 other responses = 0). We also define the variable *National, Not Local* to equal one when
127 participants think a national crisis is very or moderately likely but are neither very nor
128 moderately concerned about contracting the virus by attending campus events. Personal
129 characteristics included in the analyses include sex, age, student status (=1 if enrolled in

130 University classes, =0 otherwise), household income, race, health insurance status, recycling
131 frequency, experience with food composting, previous knowledge of food waste as an issue,
132 whether they are trying to eat healthier, and whether they attended the session in response to in-
133 person flyer distribution on the experiment date (as opposed to alternative recruitment such as
134 emails or class announcements). Randomly assigned between-subjects experimental elements
135 included in the analyses include whether participants received information about food waste (vs.
136 screen time, *Food Waste Info*); received information about improving nutrition (vs. financial
137 literacy, *Nutrition Info*); received meals with more vegetables (vs. fewer, *Vegetable Group*);
138 received meals on a large plate (vs. smaller, *Large Plate*); received meals on a compostable plate
139 (vs. plastic, *Compostable Plate*); and received menus where the vegetable was listed at the top in
140 the description of the offering (vs. lower, *Veg Top of Menu*). More detail and context concerning
141 the experimental elements are included in the Supporting Information (S2 appendix). The day of
142 the study (e.g., March 3, March 4, etc.) is also controlled in all analyses. Descriptive statistics
143 for the variables appear in Table 1.

144 To model the Likert-scale response to the two COVID-19 perception questions, an
145 ordered logit regression model is estimated with the aforementioned explanatory variables. The
146 *National, not Local* response pattern model is estimated with a logit regression. Classification
147 tree analysis is conducted for the binary version of the *Local Vulnerability*, where the Gini
148 improvement measure is used as the splitting criteria [13]. Three participants are omitted from
149 several analyses because of item non-response on at least one variable, leaving an effective
150 sample size of 353. Statistical significance was set at the 5% level with results at the 10% level
151 deemed marginally significant.

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155 Table 1. Sample Descriptive Statistics

VARIABLES	Mean or %
Dependent Variables:	
National Likelihood (Likert scale, 1-5)	3.89
National Likelihood (converted to binary)	0.74
Local Vulnerability (Likert scale, 1-5)	3.22
Local Vulnerability (converted to binary)	0.51
National, not Local (converted to binary)	0.29
Female	58.4%
Age × Education:	
18-24 × Non-student	24.3%
18-24 × Student	57.8%
25+ × Non-student	7.4%
25+ × Student	10.5%
Household income per year:	
Less than \$15,000	17.3%
\$15,000-\$49,999	26.9%
\$50,000 - \$99,999	14.7%
\$100,000 and above	14.5%
Prefer not to answer	26.6%
Race/Ethnicity	
White	52.7%
Black	21.5%
Other	25.8%
Hispanic or Latino	8.8%
Asian	12.5%
All other responses	4.5%
Health insurance = yes	88.1%
Recycle (sometime, about ½ the time, most of the time, or whenever possible)	89.2%
Ever lived in a household that composts food	28.6%
Heard about food waste	46.7%
Attempt to eat a healthy diet (agree)	80.2%
In-person recruitment	40.2%
Randomly Assigned Experimental Elements	
Food Waste Info	50%
Nutrition Info	50%
Vegetable Group	32%
Large Plate	63%
Compostable Plate	49%
Veg Top of Menu	45%

Study Date	
Mar 3 rd	17.0%
Mar 4 th	13.0%
Mar 5 th	10.2%
Mar 9 th	14.2%
Mar 10 th	12.8%
Mar 11 th	17.0%
Mar 12 th	15.9%
# of Observations	353

156 *Notes:* See supporting information for question wording and response options and for
157 experimental element descriptions (S1 appendix and S2 appendix).

158

159 **Ethics Statement**

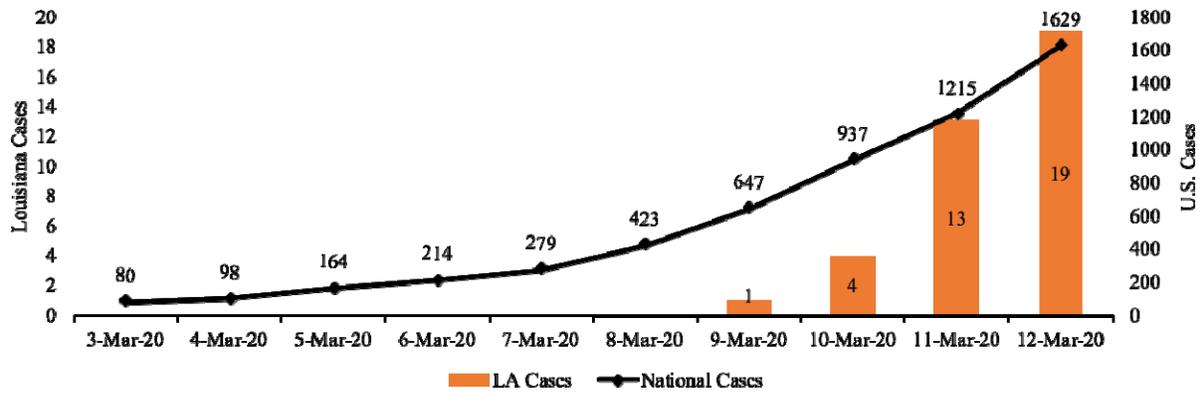
160 This study was approved by the Louisiana State University AgCenter and Ohio State
161 University Institutional Review Boards. All participants signed informed consent forms after
162 being briefed on the study and having any questions answered by research staff. The two
163 questions added on March 3, 2020, were granted post-hoc IRB approval.

164

165 **Results**

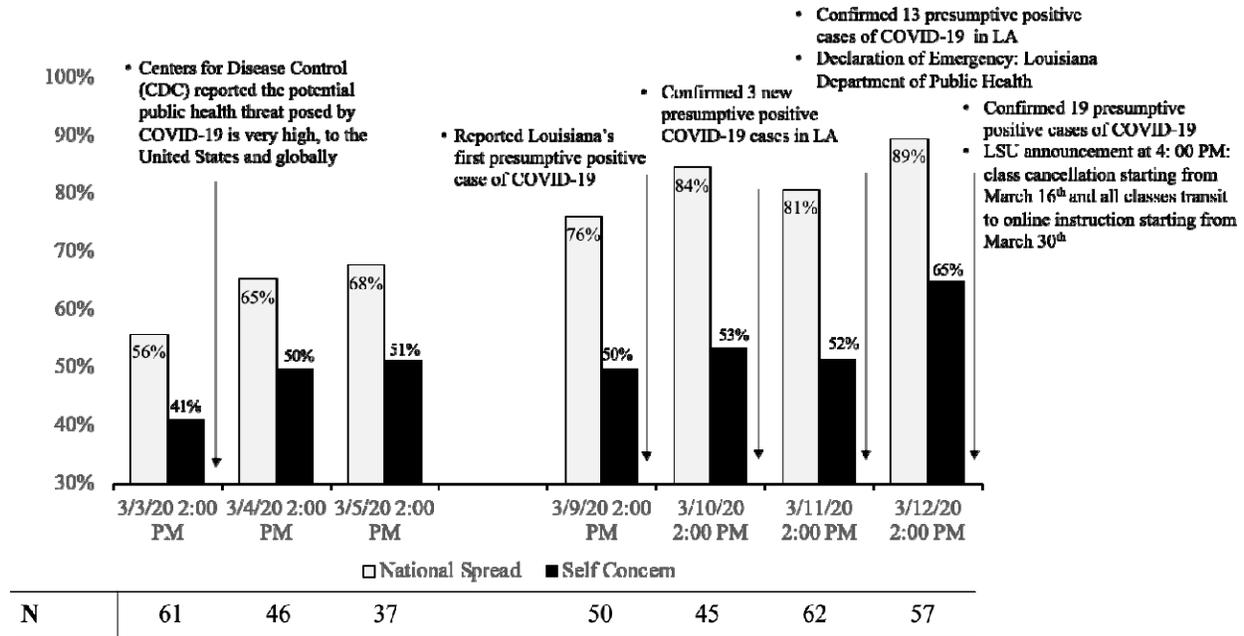
166 Figure 1 depicts the number of presumptive positive COVID-19 cases reported both
167 nationally (line graph, right axis) and in Louisiana (bar graph, left axis) for the study period,
168 while Figure 2 traces the daily averages among study participants for the two COVID-19
169 questions, while highlighting key events in the evolution of COVID-19 timeline for Louisiana.
170 Specifically, the gray bar depicts the percent who responded that COVID-19 was likely
171 (moderately or very) to cause a national public health crisis while the black bars capture the
172 percent that were concerned (moderately or very) that attendance at campus events would cause
173 them to contract COVID-19.

174 Figure 1 shows the national case count went from less than 100 on the first day of the
175 study (March 3) to more than 1600 cases by the last day of the study (black line). Figure 2
176 juxtaposes the daily responses to the COVID-19 questions with key events in the national and
177 Louisiana crisis timeline. No cases were identified and reported in Louisiana until the second
178 week of the study (bars, Fig 1) and LSU communications stated that no cases had been identified
179 on campus [9]. However, a lack of testing in the United States and in Louisiana likely
180 underrepresented the prevalence of COVID-19 at the time [19].



181 Fig 1. Confirmed Presumptive Positive COVID-19 Cases Reported During Study Period:
182 Louisiana and Nationally. Data source: Centers for Disease Control and Prevention (CDC)[14],
183 State of Louisiana: Office of the Governor[15-18]
184

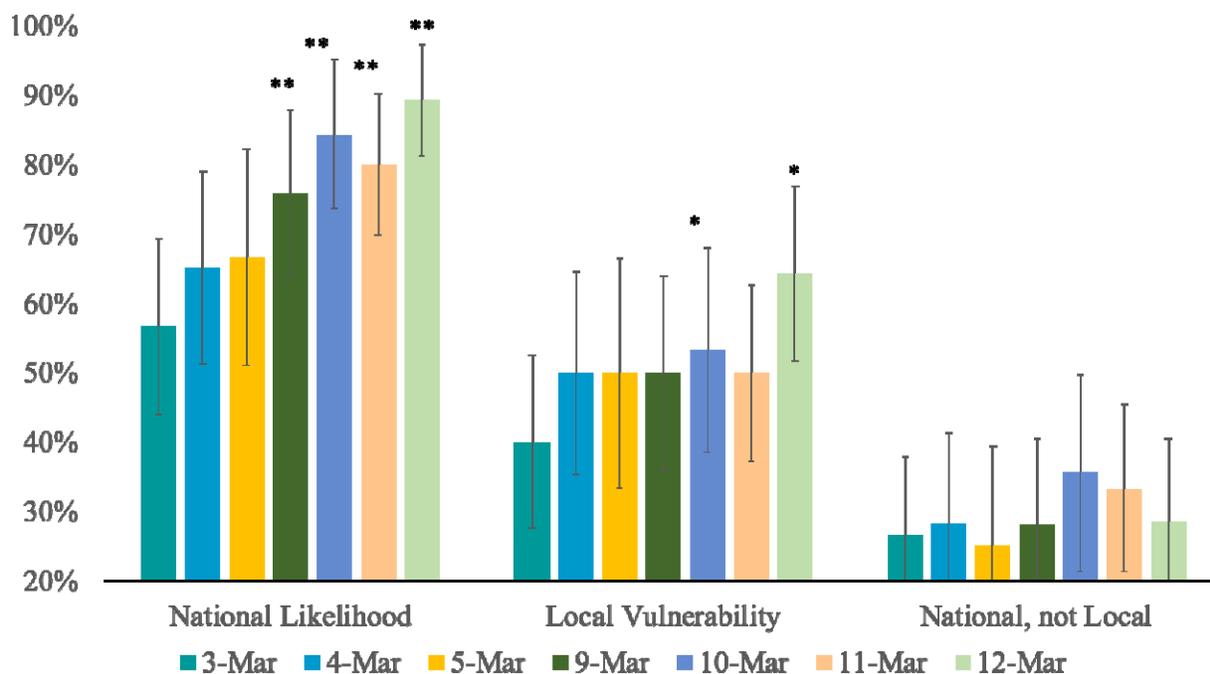
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186

187 Fig 2. Responses to COVID-19 Questions by Study Day. *Note:* Gray bars depict percent who
 188 respond moderately or very likely that COVID-19 will cause a national public health crisis and
 189 black bars are the percent who respond moderately or very concerned that about contracting
 190 COVID-19 from attending campus events. Public announcements occurred after daily study
 191 hours, which ended by 2 PM central. Information sources: Centers for Disease Control and
 192 Prevention (CDC)[19], State of Louisiana: Office of the Governor[15-18], Louisiana Department
 193 of Health, LSU Coronavirus Updates & Information[10-11].

194 Figure 3 shows the mean of *National Likelihood* (binary version), *Local Vulnerability*
 195 (binary version), and *National, not Local* over the experimental timeframe. *National Likelihood*
 196 increased steadily through the study period, though even on the final day of the study, more than
 197 10% of participants did not agree that a national crisis was likely. *National Likelihood* was
 198 statistically greater than the first day of the study from March 9 to March 12, i.e., the entire
 199 second week of the study period. Statistical significance was determined from the regression
 200 model (Table 2) which controls for personal characteristics and experimental conditions
 201 randomly assigned as part of the study.



202

203 Fig 3. Daily Sample Means and 95% Confidence Intervals for Responses to COVID-19
 204 Questions: (1) moderately or very likely that COVID-19 will cause a national public health crisis
 205 and (2) moderately or very concerned about contracting COVID-19 from attending campus
 206 events. The third group is the percent of participants who answered moderately/very likely and
 207 did not answer moderately/very concerned. 95% confidence interval bars do not control for
 208 covariates. **, * denotes a statistical difference of the value on this date from the value for the
 209 same variable on the first day of the study at the 5% and 10% level as determined by regression
 210 (Table 2) that controls for personal and experimental factors.

211

212 *Local Vulnerability* increased 10 percent points on March 4th, the day after Centers for
 213 Disease Control reported the potential public health threat posed by COVID-19 is very high to
 214 the United State and globally and expected more cases to be detected across the country,
 215 including more instances of person-to-person spread in more states [20]. *Local Vulnerability*
 216 remained relatively stable from March 4th to March 11th, a timeframe during which COVID-19
 217 cases increased more than 7-fold across the United States and participants' perceived *National*
 218 *Likelihood* increased about 20 percent points. *Local Vulnerability* featured marginally significant
 219 increases on March 10, the day after the first presumptive positive case in Louisiana was
 220 announced [15], and on March 12, the day after the Governor of Louisiana declared a statewide

221 public health emergency [17]. The percent of participants in the *National, not Local* response
222 pattern (agreeing a national crisis was likely but not expressing concern about attending campus
223 events) stayed relatively constant over the period and featured no significant differences from the
224 first day of the study.

225

226 **Associations with COVID-19 Question Responses**

227 Table 2 displays the estimated ordered logit results for *National Likelihood* and *Local*
228 *Vulnerability* variables in their Likert scale form (1 = very unlikely/unconcerned, ..., 5 = very
229 likely/concerned) and binary logit model was estimated for the *National, not Local* variable.

230

231 Table 2. Regression models of COVID-19 question responses.

VARIABLES	(1) Ordered Logit	(2) Ordered Logit	(3) Logit
	National Likelihood	Local Vulnerability with National Likelihood controlled	National Likelihood, Not Local Vulnerability
National Likelihood		1.476** (0.247)	
Personal Characteristics:			
Female	0.531** (0.218)	-0.091 (0.217)	0.195 (0.267)
Age × Education: (Base: 18-24 × Student)	<i>Joint p=0.097*</i>	<i>Joint p=0.006**</i>	<i>Joint p=0.096*</i>
18-24 × Non-student	0.401 (0.259)	0.229 (0.248)	0.168 (0.297)
25+ × Non-student	-0.643 (0.433)	1.213** (0.414)	-1.803** (0.779)
25-44 × Student	0.351 (0.384)	0.987** (0.381)	-0.365 (0.493)
HH Income: (Base: < \$15,000 or less per year)	<i>Joint p=0.122</i>	<i>Joint p=0.155</i>	<i>Joint p=0.323</i>
\$15,000-\$49,999 per year	0.099 (0.339)	-0.418 (0.324)	0.325 (0.412)
\$50,000 - \$99,999 per year	-0.684* (0.381)	-0.105 (0.365)	-0.131 (0.470)
\$100,000 or more per year	-0.435 (0.375)	-0.848** (0.359)	0.728* (0.442)
Prefer not to answer	-0.535 (0.327)	-0.285 (0.314)	0.090 (0.398)
Race: (Base: White)	<i>Joint p=0.651</i>	<i>Joint p=0.021**</i>	<i>Joint p=0.240</i>
Black	0.142 (0.300)	0.458 (0.286)	-0.586 (0.359)
Others	-0.153 (0.263)	0.693** (0.261)	-0.308 (0.336)
Health Insurance	-0.073 (0.340)	0.206 (0.319)	0.196 (0.432)
Recycle	0.443 (0.380)	0.436 (0.333)	0.107 (0.429)
Compost	0.072 (0.236)	0.095 (0.232)	-0.074 (0.289)
Heard about Food Waste	-0.141 (0.218)	0.013 (0.211)	0.005 (0.263)
Eat a Healthy Diet	-0.591** (0.273)	-0.249 (0.260)	-0.005 (0.337)
In-Person Recruitment	0.107	-0.330	0.732**

VARIABLES	(1) Ordered Logit	(2) Ordered Logit	(3) Logit
	National Likelihood (0.231)	Local Vulnerability with National Likelihood controlled (0.219)	National Likelihood, Not Local Vulnerability (0.276)
Randomly Assigned Experimental Elements:			
Food Waste Info	0.373* (0.206)	0.494** (0.205)	-0.214 (0.253)
Nutrition Info	0.188 (0.207)	-0.124 (0.202)	0.315 (0.251)
Vegetable Group	-0.263 (0.421)	0.266 (0.397)	-0.522 (0.499)
Large Plate	0.434 (0.342)	-0.194 (0.329)	0.170 (0.408)
Compostable Plate	0.723* (0.404)	0.461 (0.393)	-0.279 (0.479)
Veg Top of Menu	0.079 (0.215)	-0.173 (0.208)	0.241 (0.260)
Study Date: (Base: March 3 rd)	<i>Joint p=0.001**</i>	<i>Joint p=0.151</i>	<i>Joint p=0.933</i>
Mar 4 th	0.160 (0.572)	0.088 (0.555)	0.606 (0.694)
Mar 5 th	1.082 (0.712)	0.954 (0.680)	-0.509 (0.857)
Mar 9 th	1.246** (0.613)	0.691 (0.592)	-0.448 (0.724)
Mar 10 th	1.672** (0.567)	1.062* (0.549)	-0.145 (0.665)
Mar 11 th	1.467** (0.607)	0.268 (0.585)	0.347 (0.711)
Mar 12 th	1.870** (0.545)	1.007* (0.521)	0.118 (0.620)
Constant			-1.435 (0.995)
Observations	353	353	353
R-squared	0.067	0.088	0.076

232 **, * denotes a statistical difference at the 5% and 10% level

233

234 The only personal characteristics that were significantly associated with *National*
235 *Likelihood* were sex and diet. Men and those trying to eat a healthier diet provided lower
236 likelihood ratings. The variables capturing the day of the study were jointly significant ($p <$
237 0.001) with each day during the second week significantly greater than the base (omitted) first

238 day of the study. No randomly assigned experimental elements were significant, though several
239 (food waste information, provision of compostable plates) were marginally significant.

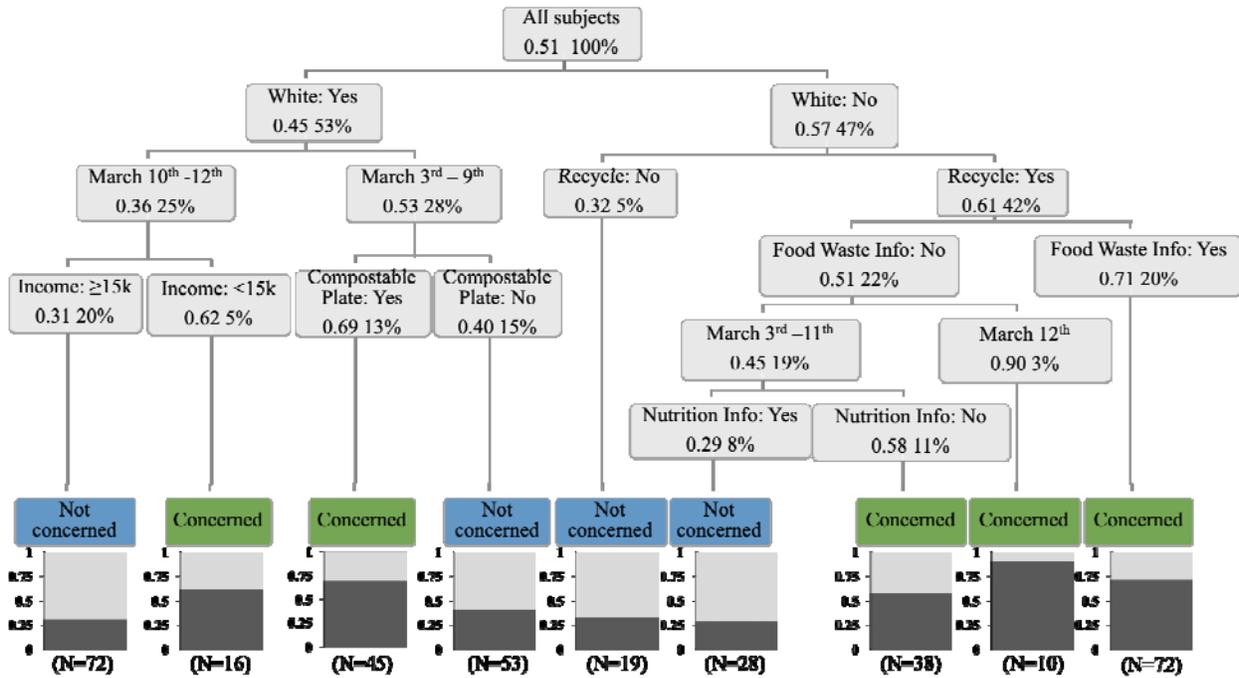
240 *Local Vulnerability* was significantly and positively associated with *National Likelihood*
241 such that a participant's concern with contracting COVID-19 from attending campus events was
242 greater as the individual participant's likelihood of a national public health crisis increased. We
243 modelled *National Likelihood* as an explanatory variable for *Local Vulnerability* because the
244 *Local Vulnerability* question was asked immediately after the *National Likelihood* question.
245 Personal characteristics that are positively associated with *Local Vulnerability* include being 25
246 years or older (regardless of student status) and identifying with a race other than white or black.
247 Those in the highest income category (\$100,000 or more) displayed significantly lower *Local*
248 *Vulnerability* than those earning less than \$15,000 per year. Participants that were randomly
249 assigned the food waste information treatment (rather than the screen time information
250 treatment) also reported significantly higher *Local Vulnerability*. The variables capturing the
251 day of the study were not jointly significant, and only March 10 and 12 were individually
252 marginally significantly different from the omitted first day of the study.

253 Only two variables were significant in the regression model for *National, Not Local*.
254 Older (≥ 25 years), non-students were less likely to feature this response pattern than younger
255 students while those who attended the experiment in response to in-person flyers were more
256 likely to feature this response pattern. No experimental treatments were significant, nor were
257 there any significant differences by the day of the study.

258 **Classification Trees**

259 Rather than making predictions based on *ceteris paribus* regression coefficients, the
 260 classification tree categorizes subjects based on splits from various predictor variables [21].

261 Figure



262

263 Fig 4. Classification Tree for *Local Vulnerability*. Note: Figures in each box are the proportion of
 264 participants in the regression tree branch that were very or moderately concerned about *Local*
 265 *Vulnerability* and the percent of participants falling into the branch. The bottom row features a
 266 bar graph of the proportion in that branch that were very or moderately concerned about *Local*
 267 *Vulnerability* and the number of participants in that branch. For example, 20% of participants
 268 (N=72) identified as white, responded on March 10th - March 12th and reported income
 269 ≥\$15,000, and the proportion of this group reported being very or moderately concerned about
 270 contracting COVID-19 from attending campus events was 0.31.

271

272 4 shows the pruned classification tree with a misclassification rate of 41% (i.e., 59% prediction
 273 accuracy). The first split is between those identifying as white versus other racial and ethnic
 274 identities, which represents the first determinant of expressing *Local Vulnerability*. Among
 275 those identifying as white and non-Hispanic, the study week in which they participated is the

276 next branching variable, with those participating on March 10th – 12th being sorted based on
277 whether they reported income less than \$15,000 with the proportion in that lowest income group
278 expressing *Local Vulnerability* being twice as high. For those attending March 9 or earlier, those
279 randomly assigned to receive compostable plates were 72% more likely to express *Local*
280 *Vulnerability* than those randomly assigned to other treatments.

281 Among those identifying with groups other than white, non-Hispanic, self-reported
282 recycling frequency was the next classification variable, with those reporting that they never
283 recycle expressing less *Local Vulnerability* than most other branches. Those randomly receiving
284 food waste information on any date were also in a branch with high *Local Vulnerability* as were
285 those not receiving food waste information so long as it was on March 12th, the final day of the
286 study.

287

288 **Discussion**

289 As Poletti et al. [22] noted, the spread of epidemics can be dramatically delayed or
290 mitigated if individual perception of the risk of the epidemic is sufficiently large and leads to
291 reduced community contact. The authors emphasize that earlier public warnings about the
292 epidemic can lead to dramatic reductions in peak prevalence and the final size of the infected
293 population. Our analysis suggests that for LSU students, staff and faculty participating in a
294 standard campus-based study unrelated to the topic of infectious disease, a majority of
295 participants thought a national public health crisis from COVID-19 was moderately or very
296 likely even on March 3, the first day of our data collection, a date upon which the number of
297 cases nationally was reported to be 80 [14]. Nine days later, when the number of reported
298 national cases exceeded 1600 [14], nearly 90% of participants displayed *National Likelihood*,

299 with a significant jump in this perception compared to the first study day occurring at the
300 beginning of the second week of the study (March 9).

301 Regression analysis reveals some personal characteristics significantly associated with
302 *National Likelihood* that align with the previous literature, e.g., women perceive a national
303 public health crisis as more likely than men [23-24]. Other significant associations have no
304 precedent in the extant literature, e.g., participants who are trying to eat a healthier diet are
305 significantly negatively associated with *National Likelihood*. This result may simply be
306 spurious, or it may reflect a more nuanced relationship between dietary and health aspirations
307 and national public health perceptions that we are unable to disentangle given the *post-hoc* nature
308 of this analysis *vis a vis* the COVID-19 questions. For example, the result might reflect that
309 those desiring to eat healthier have been exposed to wide-spread nutrition misinformation in the
310 media, which has recently included unfounded claims that healthy eating or certain supplements
311 reduce the likelihood of developing COVID-19. Indeed, the proliferation of dubious nutritional
312 products has resulted in federal warnings to several companies promoting unproven nutrition-
313 based remedies and preventatives for COVID-19 [25]. This might indicate reduced perceived
314 risk of acquiring infectious disease among healthy eaters in our sample, based on these factors,
315 although further investigation is required.

316 In Poletti et al.'s [22] model of epidemics, the spread is highly sensitive to the translation
317 of risk perception to self-prophylaxis measures, such as social distancing, which slows
318 community spread. While we did not elicit explicit measures of such behaviors, we did assess
319 participants' perceived vulnerability to contracting COVID-19 from attending campus events,
320 (*Local Vulnerability*), which may signal a willingness to undertake social distancing and other
321 beneficial behaviors and be a behavioral precursor. The first insight from observing the raw data

322 plot in Figure 2 is that *Local Vulnerability* persistently lags *National Likelihood*, and does not
323 significantly exceed the 50% mark until the last day of the study, which is the first day after the
324 state of Louisiana had declared a public health emergency, but before LSU had cancelled classes
325 or campus events.

326 Regression analysis confirms that national level perceptions are associated with perceived
327 local vulnerability, as the *National Likelihood* variable in the *Local Vulnerability* regression
328 features a large, significant and positive coefficient. In addition, participants 25 or older and
329 those identifying with races other than white and black are more likely to express *Local*
330 *Vulnerability*, while those in the highest income category expressed lower *Local Vulnerability*
331 than those in the lowest income bracket. These results largely align with other findings from the
332 literature. For example, Rhodes and Pivik [26] found drivers 25 and older perceived
333 significantly higher risk from aggressive driving tactics than did younger drivers, while Lo [27]
334 found that higher income respondents expressed less concern about environmental risks, which
335 he hypothesized to stem from a heightened sense of material risk faced by those with lower
336 incomes. Flynn, Slovic and Mertz [28] found respondents identifying as white, particularly
337 white men, registered significantly lower environmental risk perceptions, hypothesizing that
338 socio-political factors including power and status may influence risk perceptions.

339 Other characteristics typically identified in the literature (e.g., sex) are not significantly
340 associated with expressed *Local Vulnerability*. Interestingly, participants randomly assigned an
341 information treatment focused on the social and financial costs of food waste were significantly
342 more likely to express *Local Vulnerability* and marginally higher on *National Likelihood*. While
343 we cannot provide a definitive explanation of this relationship given *post-hoc* design constraints,
344 we note the food waste information treatment was the only information treatment to emphasize

345 national level and household level implications of individual behavior (e.g., food waste causing
346 \$161 billion of losses at the national level and \$1500 of losses in an average household). Further,
347 the classification tree finds that, similar to the randomly assigned information about food waste,
348 participants who were randomly assigned compostable paper plates and the participant's
349 recycling habits also work as significant determinants of *Local Vulnerability*. One conjecture is
350 that participants who link the implications of individual behaviors to issues of sustainability may
351 reflect more critically on the implications of personal actions during a public health crisis, which
352 could help increase compliance with social distancing and other preventative behaviors.

353 There is a persistent group consisting of about 30% of participants who, for the entire
354 study period, including the final day, do not translate their perceived likelihood of a national
355 public health crisis into personal vulnerability from attending campus events (*National, not*
356 *Local*). These are likely a critical group in terms of modeling diffusion of COVID-19, as Poletti
357 et al. [22] emphasize the role of translating perceived risk into preventative behaviors such as
358 social distancing.

359 However, our analysis provides few insights into the characteristics associated with
360 *National, not Local* group. Regression analysis finds few significant associations other than the
361 fact that older non-students are less likely to feature this response pattern and that those who
362 spontaneously attended the study in response to same-day receipt of flyers were more likely.
363 The former suggests that younger people in academic settings may be diagnostic for predicting
364 this response pattern while the latter may be suggestive that certain personality traits have
365 predictive power.

366 This lack of insight into the *National, not Local* group is likely due to the post-hoc nature
367 of the analysis, one of several study limitations. Specifically, the study was originally designed

368 to investigate a topic other than COVID-19 perceptions, hence logical experimental treatments
369 and additional questions about personal perceptions and behaviors relevant to understanding and
370 predicting the spread of COVID-19 were not included and the questions that were posed were
371 not motivated by theory. Another study limitation is that the sample is drawn from a single
372 academic institution, limiting the representativeness of the data geographically, demographically,
373 and socioeconomically. Finally, the data were acquired prior to the declaration of a national
374 emergency, and we would expect further evolution in how people in this location might respond
375 to these questions in the face of more dire national promulgations concerning the pandemic.

376

377 **Conclusions**

378 By integrating questions focused on COVID-19 into an ongoing in-person experiment during the
379 two weeks prior to the major disruption in public activities in Louisiana and much of the country,
380 we provide some insights into how participants drawn from one community in Louisiana were
381 perceiving the national and local implications of the public health crisis that was unfolding
382 during the study period. Understanding perceptions related to risk can help to tailor national or
383 local responses to curb transmission of infectious disease.

384 We find that perceptions during this critical time increased steadily and rapidly such that
385 nearly 90 percent of participants agreed that it was likely that COVID-19 would become a
386 national public health crisis by the final day of our study, which corresponded with the day that
387 Louisiana declared a public health emergency. However, participants' views of their personal
388 vulnerability to contracting the virus from attending local events increased more slowly and, only

389 on the day after Louisiana’s emergency declaration, did a majority of participants agree that
390 public event attendance increased their odds of contracting the virus.

391 While some characteristics that were significantly associated with a lower perceived local
392 vulnerability to contracting COVID-19 have precedent from previous risk perception research
393 (e.g., younger than 25, white, higher incomes), others are novel and suggest the need for more
394 investigation. For example, our finding of significantly lower perceived local vulnerability
395 among participants expressing a strong interest in eating healthier may support aggressive
396 information and enforcement campaigns against dietary schemes promoting themselves as
397 COVID-19 preventatives or remedies or broadly touting certain foods as immunity-boosting
398 [25]. Also, our finding that participants who were randomly assigned an information treatment
399 that emphasized the national implications of food waste expressed significantly higher
400 perceptions of local vulnerability may suggest that information campaigns emphasizing the
401 national implications of individual behaviors could help increase compliance with social
402 distancing and other preventative behaviors.

403 Throughout the study period, including the day after the emergency declaration, and
404 about 30% of participants did not convert national perceptions of a likely public health crisis into
405 perceived vulnerability from local event attendance. This could be a key group to target as
406 localities and states implement social distancing policies and procedures. The significant
407 characteristics associated with this group are limited, but do include age, with students less than
408 25 years of age more likely to fall into this group than older, non-students. This provides
409 evidence to support strategies that tailor communications efforts to younger cohorts that
410 encourage social distancing and other prevention behaviors (e.g., WHO 2020 [29]).

411

412

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417

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420 **Supporting Information**

421 **S1 appendix. Exit survey.**

422 **S2 appendix. Information and experimental treatments.**