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Self-reported dietary changes among Los Angeles County adults during the COVID-19 pandemic

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ABSTRACT

Poor diets are historically the leading cause of morbidity and mortality in the United States (U.S.), causing over 44,000 deaths each month. Dietary patterns have likely changed during the COVID-19 pandemic due to major shifts and crises in social, economic, and food systems. This study examines self-reported dietary changes in Los Angeles (L.A.) County during COVID-19, and identifies factors associated with making healthy and unhealthy changes. Data are from the Understanding Coronavirus in America Study, an internet panel of adults representative of L.A. County households (N = 1080). Multinomial logistic regression was used to test if self-reported change in diet healthiness assessed in July 2020 was associated with socio-ecological factors known to be associated with diet, assessed between April–July 2020. More than half of L.A. County residents reported making changes to their diet: 28.3% reported eating healthier food since the beginning of the pandemic, while 24.8% reported eating less healthy food. Individuals who were significantly more likely to report healthy changes were Non-Hispanic Black or Hispanic/Latino (vs. Non-Hispanic White), had received unemployment insurance, or had larger social networks. Individuals who were significantly more likely to report unhealthy changes were younger, of mixed race, had children in their household, had transportation barriers, or had obesity. Individuals who were significantly more likely to report both healthy and unhealthy changes were Asian, had experienced food insecurity, or had challenges getting food due to store closures. The pandemic may be exacerbating diet-related disease risk in some groups, such as communities of color, and among individuals with obesity and those facing transportation barriers.

1. Introduction

The U.S. Department of Agriculture's (USDA) dietary guidelines have long recommended that adults adopt a dietary pattern comprised of nutrient-dense foods including vegetables, fruits and whole grains, with limited added sugar, sodium, and saturated fat (USDA, 2021). Yet, poor diets are historically the leading cause of death in the United States (U.S.), causing over 44,000 deaths each month, largely due to cardiovascular diseases and diabetes (Mokdad et al., 2018; U.S. Burden of Disease Collaborators, 2018). As the COVID-19 pandemic has led to disruptions in many social, economic, and food systems (Gostin & Wiley, 2020; Pew Research Center, 2020), the multilevel factors that influence diet (Story et al., 2008) have likely been altered, and thus dietary patterns may have changed.

Los Angeles (L.A.) County is one area in the U.S. that has been hard hit by the pandemic, with more than 1,249,000 COVID-19 cases recorded as of June 2021, and a case rate of 12,000 cases per 100,000 residents (L.A. County Department of Public Health, 2021). The County has widely enforced social distancing policies, school closures, and limited operations of many businesses (Gostin & Wiley, 2020). Though

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necessary (Wilder-Smith & Freedman, 2020), these measures have had adverse socioeconomic effects, such as high rates of unemployment and food insecurity. Food insecurity, defined as experiencing disruptions in food access and regular eating because of limited money, is linked with unhealthy diets (Leung et al., 2014; Metallinos-Katsaras et al., 2012), and has become increasingly common in L.A. County. From April to early May, 39.5% of low-income households in L.A. County experienced food insecurity, compared to the 26.8% of low-income households that experienced food insecurity at some point *over the entire year* of 2018 (de la Haye, Miller, Weber, Wilson, & Bruine de Bruin, 2020a; de la Haye et al., 2020b). In addition to food insecurity, individuals may be limited by logistical challenges in acquiring food, as public transportation and food outlets have experienced disruptions in service. Both formal and informal sources of support, such as schools, family and friends, community centers, and food banks, have been constrained, potentially creating barriers to food access and healthful eating (King, 2017; Moore et al., 2009; Nord & Romig, 2006), especially for low-income populations.

The pandemic has also created significant disruptions to peoples' daily routines, as many have been working from home, have children that are attending school virtually, and eat at home due to social distancing and food outlet restrictions. As eating is largely a habitual behavior (Wood et al., 2014), disruptions in daily routines often prompt changes in eating and diet (Brown et al., 2012; Devine et al., 1998). On the one hand, individuals who are experiencing these disruptions may have increased constraints and stressors that could lead to poorer diets. On the other hand, people who are finding themselves at home with more leisure time, and potentially more time to cook, could be eating healthier foods given that meals prepared at home tend to be healthier than those prepared at food outlets (McGuire et al., 2010). Overall, COVID-19 related disruptions are likely to have impacted many socio-ecological factors–i.e., individual, interpersonal, and community factors–that are known to influence food choice (Story et al., 2008).

Few studies have been conducted with the U.S., but there is some evidence of substantial dietary shifts. U.S. adults were found to consume more added sugar in the first weeks of the pandemic (Cummings et al., 2021), while U.S. university students participating in focus groups reported challenges with food access and increased snacking (Powell et al., 2021, p. 161). In one study of U.S. adults, over one-third reported eating healthier foods since the start of the pandemic (Zhang et al., 2021). Studies outside of the U.S., including Spain and Italy, have shown substantial dietary changes since the start of the pandemic, both towards healthier and unhealthy diets (Ammar et al., 2020; Robinson et al., 2021, p. 156; Rodríguez-Pérez et al., 2020; Scarmozzino & Visioli, 2020), and especially in areas with strict social distancing policies (Ammar et al., 2020; Górnicka et al., 2020; Scarmozzino & Visioli, 2020). However, few of these studies have been population-based, none has focused on highly impacted U.S locations such as L.A. County, and none has comprehensively reported on factors leading people towards healthy vs. unhealthy dietary pattern shifts. The aim of this study is to explore: (1) the prevalence of self-reported changes to overall dietary healthfulness during the COVID-19 pandemic among adults in L.A. County; and (2) socio-ecological factors that are associated with self-reporting healthier and unhealthier changes.

2. Methods

2.1. Participants and procedures

Data are from the Understanding Coronavirus in America Survey (UAS) (Understanding America Study, 2020), an internet panel that surveyed nationally representative households across the U.S. throughout the pandemic, with specific surveys about dietary changes focused on oversampled households representative of L.A. County. To obtain a representative sample, participants were recruited from randomly selected L.A. County addresses, sampling probabilities were adjusted for underrepresented populations, and internet-connected tablets were provided to interested individuals if needed. Post-stratification weights were used to further align the sample to L.A. County's population regarding age, gender, race/ethnicity, and education (Understanding America Study Weights, 2017).

Surveys could be completed in English or Spanish, and 98.1% of participants chose English as their preferred language. The L.A. County sample completed surveys every two weeks, beginning in March 2020, and were given $20 for every 30 min of time estimated to complete a survey. These analyses focus on one self-reported measure of diet change assessed during one wave in July (UAS survey 253), and include predictors relevant to our research questions, assessed across four waves of data in April–July (Surveys 235, 240, 242 and 253; Understanding America Study, 2020). Participants who did not complete both the July survey and at least one of the other surveys are excluded from the analytic sample (N = 1080). All statistics are computed using survey weights, so that the results remain representative of L.A. County, even after excluding participants with missing responses.

2.2. Measures

2.2.1. Self-reported dietary change

In collaboration with UAS survey experts, our study team developed a brief survey question to assess *change in the overall healthfulness* of participants' dietary patterns during the COVID-19 pandemic, compared to before the pandemic. Self-reported dietary change was assessed with the question: "Since L.A. County's stay-at-home orders started in March 2020, have you been eating different types of foods?", with the following response options: (1) Yes, I am eating healthier food than before (e.g., more fruits and vegetables, and/or less sugary and fried food); (2) Yes, I am eating less healthy food than before (e.g., less fruits and veggies, and/or more sugary or fried food); (3) No, I am not eating different types of foods. Only three participants chose not to respond to the question, indicating comprehension was not an issue. Previous studies have found that single-item measures of self-reported behaviors and dietary quality may be equivalent to multi-item measures in terms of predictive ability and validity (Bergkvist & Rossiter, 2007; Dollinger & Malmquist, 2009; Loftfield et al., 2015; Milton et al., 2011; Scott et al., 2015). For example, one study (Loftfield et al., 2015) asked participants to complete a single-item measure and a multi-item measure of dietary intake and found that the single-measure was a valid proxy for the multi-item measure and was associated with diet-related health outcomes (Loftfield et al., 2015).

2.2.2. Socio-ecological factors

Demographics and health status. Demographics were reported every three months, and the most recent report was included. We included the following demographic variables as predictors because of their known association with diet: gender, age, race and ethnicity, education level, employment status (working, unemployed, retired, disabled, other/mixed/sick leave), recent job loss (yes/no), and household characteristics (i.e., household size, number of children). Participants' reported household income and household size were used to compute the % of the Federal Poverty Level (FPL) Guidelines (U.S. Department of Health and Human Services, 2020).

In May 2020, participants indicated if they had ever been diagnosed with obesity, diabetes, heart disease, or high blood pressure, which were used as indicators of health status. These health indicators also have established associations with diet (National Center for Chronic Disease Prevention and Health Promotion, 2020).

Formal and informal support. Tangible and social support has been associated with better diet quality (Powell et al., 2015; Story et al., 2008; Umberson & Karas Montez, 2010). In July, respondents indicated (yes/no) if, in the past two weeks, they had received unemployment insurance or Supplemental Nutrition Assistance Program (SNAP) benefits (i.e., the largest federally funded food assistance program).

Social network size was assessed monthly with the question "About how many friends and family members do you have?". The July (or most recent) measure was used, and given the skewed distribution of the data this variable was log transformed in the regression models.

Food insecurity and access. Food insecurity, which has been associated with poorer diet quality and nutrition (Murthy, 2016), was measured using three items from the validated Food Insecurity Experience Survey (Cafiero et al., 2018) that assessed past week or past month behavioral markers of mild, moderate, and severe levels of food insecurity. An individual was categorized as experiencing food insecurity between April and July 2020 if they indicated moderate or severe food insecurity at any of the four survey waves.

Challenges with accessing food were assessed in multiple ways. In July, respondents were asked "Did you have difficulty getting food because food stores were closed or had limited hours?" (yes/no) and "Did you have challenges getting food because you don't have a car or personal transportation?" (yes/no). Respondents were coded as living in a "food desert", with limited financial and spatial access to grocery stores, if they lived in a census tract identified as "low-income and low food access" using 2015 data from the USDA Food Environment Atlas (USDA Economic Research Service, 2020). This variable defines a census tract as low-income and low-access if more than 20% of residents lived under the federal poverty level, and more than 33% of residents lived more than 0.5 miles from a grocery store or supermarket in urban areas and more than 10 miles in rural areas (USDA Economic Research Service, 2020).

2.3. Analysis

Analyses were conducted using SAS 9.4 (*SAS*, 2002). Aim 1 was addressed by computing the percentage of individuals who self-reported healthy dietary change, unhealthy dietary change, and no dietary change. To assess Aim 2, multinomial logistic regression was used to examine the association between the predictor variables and self-reported dietary change (referent category: no dietary change). A stepwise approach was used, with potential predictors added into the model in related groups (i.e. demographics, health indicators, formal and informal support, and food security and access). Predictors were retained when marginally significant ($p < 0.1$), in case the significance changed in final, more complete models. Variables were kept in the final model if they were significant ($p < 0.05$), except for employment status and poverty level which were not significant in the final model but retained as controls. We report unstandardized regression estimates and standard errors, chi-square tests and odds ratios with 95% confidence intervals.

3. Results

3.1. Aim 1: the prevalence of self-reported dietary changes during the COVID-19 pandemic among adults in L.A. County

Over half of the L.A. County population reported that the healthiness of their diet had changed during the pandemic, compared to their pre-pandemic diet. 28.3% reported that they were eating healthier food (i.e., eating more fruits and vegetables, and/or less sugary and fried food), while 24.8% reported eating less healthy food (i.e., less fruits and vegetables, and/or more sugary and fried foods). 46.9% of the population reported that they had not changed their diet. Descriptive statistics of these three groups are summarized in Table 1.

3.2. Aim 2: the socio-ecological factors that are associated with self-reporting healthier and unhealthier dietary changes

The results of the final regression model are summarized in Table 2. Individuals who were significantly more likely to report *healthy* dietary changes: were Non-Hispanic Black (OR = 1.97, $p = 0.04$), Hispanic (OR

Table 1
Descriptive Statistics of the full sample and diet change subgroups.

Participant Characteristic	Full Sample (N = 1070)	Healthy dietary change (n = 302)	Unhealthy dietary change (n = 265)	No dietary change (n = 501)
Gender, %(N)				
Male	50.9 (545)	52.7 (159)	57.3 (152)	46.5 (233)
Female	49.1 (526)	47.3 (143)	42.7 (113)	53.5 (268)
Poverty level, % (N)				
Under 100% FPL	21.1 (214)	22.1 (64)	23.9 (61)	18.9 (89)
100–200% FPL	19.3 (196)	24.1 (70)	19.2 (49)	16.4 (77)
201–300% FPL	14.3 (146)	17.5 (51)	12.4 (32)	13.5 (64)
Above 300% FPL	45.3 (460)	36.3 (105)	44.5 (113)	51.1 (240)
Employment Status, %(N)				
Working	47.4 (508)	44.5 (135)	55.8 (148)	44.8 (225)
Unemployed	18.6 (199)	24.3 (73)	22.2 (59)	13.3 (66)
Retired	13.2 (142)	10.2 (31)	7.0 (19)	18.4 (92)
Disabled	5.1 (55)	3.4 (10)	4.1 (11)	6.5 (33)
Other, mixed, sick leave	15.6 (167)	17.6 (53)	10.9 (29)	17.0 (85)
Age categories, % (N)				
18–30 years	20.6 (221)	23.1 (70)	26.5 (70)	15.8 (79)
31–40 years	22.6 (242)	23.6 (71)	25.3 (67)	20.4 (102)
41–50 years	15.2 (163)	18.6 (56)	15.7 (42)	12.8 (64)
51–64 years	23.7 (254)	21.4 (65)	21.8 (58)	26.2 (131)
65+ years	18.0 (192)	13.2 (40)	10.7 (28)	24.8 (124)
Race & Ethnicity, %(N)				
Non-Hispanic White	30.4 (324)	21.3 (64)	28.6 (75)	37.0 (184)
Non-Hispanic Black	8.3 (88)	9.8 (30)	6.5 (17)	8.3 (41)
Hispanic	43.1 (460)	52.2 (158)	38.5 (101)	40.0 (199)
Non-Hispanic Asian	15.5 (165)	15.6 (47)	20.8 (55)	12.8 (64)
Mixed	2.5 (192)	1.0 (3)	5.6 (15)	1.9 (9)
Household structure				
M Children in household	38.4	44.1	46.2	31.0
Health status, % (N)				
Obesity	16.5 (172)	15.3 (45)	19.8 (51)	15.5 (76)
Diabetes	11.8 (123)	11.0 (32)	11.1 (29)	12.7 (62)
Heart disease	3.7 (40)	5.1 (15)	2.1 (5)	3.8 (19)
High blood pressure	23.3 (244)	24.7 (15)	16.1 (16)	26.3 (129)
Formal and informal support				
% (N) Receiving SNAP	14.9 (159)	13.1 (39)	20.5 (54)	13.0 (65)
% (N) Unemployment insurance	13.9 (149)	20.1 (61)	11.6 (31)	11.4 (57)
M Social network size	29.6	33.8	27.5	28.3
Challenges in accessing food				
% (N) Experienced food insecurity	28.7 (307)	40.7 (123)	37.7 (100)	16.5 (83)
% (N) Challenges due to store closures	10.2 (110)	12.8 (39)	17.0 (45)	5.0 (25)
% (N) Challenges due to transportation	6.8 (72)	6.2 (19)	12.3 (33)	4.1 (21)
% (N) Low income and low food access census tract	29.3 (312)	26.0 (77)	26.6 (70)	32.8 (164)

Note: Percentages are column percentages. For example, they represent the % of the Full sample who are male and female, and subsequently the % of respondents that reported a "Healthy diet change" who are male and female.

Table 2
Odds Ratios for multinomial regression predicting self-reported dietary change.

Referent category: No change	Healthy Change			Unhealthy Change		
	OR	95% CI		OR	95% CI	
Employment (ref: working)						
Unemployed	1.32	0.80	2.17	1.09	0.64	1.84
Disabled	0.48	0.20	1.13	0.43	0.17	1.14
Retired	0.99	0.52	1.90	0.54	0.25	1.15
Other, mixed, sick leave	0.73	0.44	1.20	0.48**	0.28	0.84
Poverty level (ref: >300% FPL)						
Under 100% FPL	1.03	0.60	1.78	0.79	0.44	1.40
100–200% FPL	1.44	0.90	2.30	1.13	0.68	1.89
201–300% FPL	1.18	0.72	1.94	0.86	0.50	1.51
Age category (ref: 65+)						
Age 18-30	1.81	0.90	3.65	2.39*	1.12	5.09
Age 31-40	1.59	0.80	3.15	1.74	0.83	3.63
Age 41-50	1.58	0.78	3.20	1.73	0.80	3.71
Age 51-64	1.24	0.68	2.25	1.33	0.68	2.61
Race and ethnicity (ref: Non-Hispanic White)						
Non-Hispanic Black	1.97*	1.02	3.78	0.91	0.43	1.94
Hispanic	1.59*	1.01	2.51	0.85	0.52	1.38
Non-Hispanic Asian	1.88*	1.10	3.21	2.30**	1.36	3.89
Mixed race	0.24	0.03	1.84	3.21*	1.25	8.26
Children in household	1.11	0.76	1.63	1.65**	1.11	2.45
Diagnosed with obesity	1.01	0.64	1.59	1.72*	1.09	2.74
Unemployment insurance	1.66*	1.01	2.71	1.11	0.64	1.94
Social network size (log)	1.33**	1.13	1.57	0.96	0.81	1.14
Any food insecurity	3.02***	1.98	4.59	1.92**	1.21	3.03
Challenges getting food due to store closures/ limited hours	2.36**	1.23	4.52	2.92**	1.54	5.52
Challenges getting food due to lack of transportation	0.71	0.31	1.63	2.35*	1.07	5.18
Living in a low income and low access census tract	0.51**	0.35	0.75	0.72	0.48	1.07

*p < 0.05. **p < 0.01. ***p < 0.001.
Note: OR is the odd's ratio for the regression coefficient (B), where OR = exp(B), and the 95% CI is the confidence interval for the odd's ratio, where there is a 95% probability that the true odd's ratio lies within the confidence interval.

= 1.59, $p = 0.05$), or Asian (OR = 1.88, $p = 0.02$) (vs. non-Hispanic White); had recently received unemployment insurance (OR = 1.66, $p = 0.04$); had larger social networks (OR = 1.3, $p < 0.01$); had experienced food insecurity (OR = 3.02, $p < 0.001$); and had experienced challenges getting food due to limited store hours or store closures (OR = 2.36, $p < 0.01$). Individuals were significantly *less* likely to report healthy changes if they lived in a low income and low food access census tract (OR = 0.51, $p < 0.01$).

Individuals who were significantly more likely to report *unhealthy* dietary changes: were 18–30 years old (OR = 1.12, $p = 0.02$) (vs. 65 years or older); were Asian (OR = 2.3, $p < 0.01$) or of mixed race (OR = 3.2, $p = 0.02$) (vs. non-Hispanic White); had children in their household (OR = 1.7, $p = 0.01$); had obesity (OR = 1.7, $p = 0.02$); had experienced food insecurity (OR = 1.9, $p < 0.01$); and had challenges getting food due to a lack of transportation (OR = 2.3, $p = 0.03$) or limited store hours or store closures (OR = 2.9, $p < 0.01$). Of note, the following characteristics were associated with significantly increased odds for reporting healthy as well as unhealthy dietary changes: identifying as Asian, reporting food insecurity during the pandemic, and reporting challenges getting food due to limited store hours or store closures.

4. Discussion

Because disruptions in income, health, daily routines, and broader environmental factors can prompt changes in eating and diet (Brown et al., 2012; Devine et al., 1998; Story et al., 2008), this study examined self-reported changes to dietary healthfulness during the COVID-19 pandemic, in a representative sample of adults living in L.A. County, the most populous county in the U.S. The majority of adults in L.A. County reported that they changed their dietary patterns during the COVID-19 pandemic, similar to findings in other countries (Di Renzo et al., 2020; Górnicka et al., 2020; Scarmozzino & Visioli, 2020). This is likely due to the pandemic causing disruptions in the daily lives of many individuals, as well as in the social, economic, and structural systems that influence diet (Lally et al., 2008; Story et al., 2008; Wood et al., 2014). Though it's unclear how temporary or permanent these changes are, it's concerning that 1 in 4 adults (24.8%) self-reported making unhealthy dietary changes. It's especially concerning that this was common among (i) young adults and families with children, who may adopt unhealthy dietary habits that increase their disease risk in future, and (ii) adults with obesity, whose disease risk may be exacerbated. If these changes are enduring, L.A. County could see an increased burden of many of the diet-related diseases that are already common, such as diabetes and hypertension (L.A. County Department of Public Health, 2018).

Groups with a historically increased risk for poor health, such as racial and ethnic minorities and low-income communities, have been the hardest hit by COVID-19 (Couch et al., 2020; APM Research Lab, 2020). Interestingly, our study found that race and ethnicity, poverty, employment, and job loss were all significantly associated with dietary changes in initial bivariate models, but many of these economic effects dissipated when the other social and environmental variables were included in the multivariate regression model. Race and ethnicity, food insecurity, and challenges with food access remained key predictors of making healthy and unhealthy shifts in the final models, highlighting the importance of the social and cultural contexts, and food environments, in which poverty and unemployment occur (Story et al., 2008).

The results of this study suggest that there are a few processes that may underlie dietary changes during the pandemic. First, living in a neighborhood with low food access or having inadequate transportation may prevent people from adopting healthy dietary patterns. Indeed, food access challenges have been associated with unhealthy dietary patterns before the pandemic (Minaker et al., 2013; Walker et al., 2010), and with unhealthy changes during the pandemic (Scarmozzino & Visioli, 2020). Having children in one's household may also be a barrier to healthy eating during the pandemic, conceivably due to inadequate childcare resources and virtual learning demands during school closures.

Our findings also identified strategies that may have promoted healthy diets during this crisis. First, receiving unemployment benefits was associated with healthy dietary changes. Through the CARES Act, individuals receiving unemployment insurance were given a $600 weekly supplement (Karpman & Acs, 2020), which may have benefited some low-income households (Ganong et al., 2020), and removed financial barriers to healthy eating. Second, informal social support may also be helpful, as having a larger social network was linked with healthy changes. This aligns with previous literature indicating that individuals who are embedded in a larger social network have more resources and support, and improved health outcomes (Powell et al., 2015; Story et al., 2008; Umberson & Karas Montez, 2010).

Like any study, ours had limitations. First, longitudinal research is needed to fully understand the processes underlying these dietary changes. Longitudinal research is also needed to determine the long-term health implications of the dietary changes made during the

pandemic, and if they will be sustained. Second, qualitative data is needed to unpack peoples' lived experiences during the pandemic, providing a richer understanding of how, when, and why these factors lead to healthy vs. unhealthy dietary changes. Third, the study used a single-item measure of self-reported dietary change because it was cost-prohibitive and not practical to include a longer dietary assessment in this population panel survey. A validated measure of change in dietary healthfulness during the pandemic did not exist, therefore we consulted with UAS survey experts to develop the measure, for which reliability could not be assessed. However, other research has suggested that the validity of many single-item dietary measures is in line with that of multi-item dietary measures (Bergkvist & Rossiter, 2007; Dollinger & Malmquist, 2009; Loftfield et al., 2015; Milton et al., 2011; Scott et al., 2015). Fourth, our measure did not assess the degree of dietary change. However, given the vulnerability of L.A. County residents to poor diet and diet-related disease (L.A. County Department of Public Health, 2018), any population-level dietary shifts may be impactful. Future studies should consider detailed dietary assessments that provide a more in-depth picture of the degree of change; although these measures can be costly when used at the population level. Finally, self-report data, as was used in this study, is subject to potential recall bias.

These limitations are outweighed by the notable strengths of this study. Most notably, we analyzed a large, representative dataset of a diverse urban population that's been hard hit by the pandemic. The rich data on these panel participants uniquely allowed for the assessment of many socio-ecological factors that have been associated with diet and dietary change before the pandemic (Story et al., 2008). Results of this study may not be generalizable to areas other than L.A. County, but are likely useful for similar large metropolitan counties within the U.S. The main policy implication of this study is that healthy diets may be promoted during times of crisis, by providing financial assistance to low-income families and recently unemployed individuals, and by improving access to food through the expansion of food outlets and safe public transportation.

Compliance with ethical standards

The authors have no conflicts of interest. The UAS survey panel was approved by the Institutional Review Board of University of Southern California. All procedures performed in this study involving human participants were in accordance with ethical standards set forth by the Declaration of Helsinki. Informed consent was obtained from all individual participants involved in the UAS survey panel, and the authors of this study used publicly available, de-identified data in all analyses.

Author contributions

All authors contributed to the conceptualization, review, and editing of this manuscript. Sydney Miller wrote the original draft. She also conducted the formal analyses, with the assistance of Michelle Livings, and under the advisement of Drs. Kayla de la Haye and Wändi Bruine de Bruin. Dr. de la Haye is the Primary Investigator on the study.

Author note

We have no known conflicts of interest to disclose.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.appet.2021.105586.

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