**Supplementary Figure 1**. Flow diagram of study participants.

**NHANES initial sample**

2007-2008 10,149

2009-2010 10,537

2011-2012 9,756

2013-2014 10,175

2015-2016 9,971

2017-2018 9,254

**Total 59,842**

**932** Excluded

435 Non-snackers

295 Missing HH marital status

202 Missing HH education status

**216** Excluded

79 Missing height/weight

44 Diagnosis of diabetes

93 Use of medication known to impact hunger, appetite, or weight status

**6,117** participants met inclusion criteria

**5,901** participants eligible

**4,985** final analytic sample

**53,725** Excluded

52,050 <12 years or >19 years

1,675 < 2 days of dietary recalls

**Supplementary Table 1**: Total snack parameters as predictors of HEI-2015 component subscales, data 2007-2018 National Health and Nutrition Examination Survey components (n=4,985)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **HEI Component** |  |  | **Snack Frequency** | **Snack size** | **Snack Energy Density** |
| **Adequacy Components** |
|  | **Max Points** | **Mean1 (SE)** | **Β(SE)2** |
| Total Fruits  | 5 | 2.2 (0.05) | 0.2 (0.04) \*\*\* | -0.001 (0.0002)\*\*\* | -0.18 (0.03)\*\*\* |
| Whole Fruits  | 5 | 2.1 (0.05) | 0.3 (0.04)\*\*\* | -0.001 (0.0002)\*\*\* | -0.2 (0.03)\*\*\* |
| Total Vegetables  | 5 | 2.3 (0.03) | -0.004 (0.04) | -0.0006 (0.0001) \*\*\* | 0.03(0.03) |
| Greens and beans | 5 | 1.2 (0.04) | -0.02(0.05) | -0.0006 (0.0002)\* | 0.002 (0.03)  |
| Whole Grains  | 10 | 2.5 (0.07) | 0.09 (0.08)  | -0.0003 (0.0003) | 0.1 (0.05)\*  |
| Dairy  | 10 | 6.6 (0.07) | -0.1 (0.07) | -0.0009 (0.0003)\* | -0.1 (0.06)\* |
| Total Protein  | 5 | 4.0 (0.03) | -0.1 (0.03)\*\*\* | -0.0008 (0.0002)\*\*\* | 0.05 (0.02)\*  |
| Seafood and plant protein  | 5 | 2.0 (0.05) | 0.08 (0.05) | -0.0003 (0.0002) | 0.1 (0.04)\* |
| Fatty Acids  | 10 | 2.0 (0.07) | -0.1 (0.1) | -0.0003 (0.0004)  | 0.05 (0.07)  |
| **Moderation Components**  |
| Refined Grains  | 10 | 4.8 (0.07) | 0.3 (0.07)\*\*\* | 0.002 (0.0005)\* | -0.1 (0.07) |
| Sodium  | 10 | 4.0 (0.07) | 0.6 (0.07)\*\*\* | 0.002 (0.0004)\*\*\* | -0.006 (0.07) |
| Added Sugars  | 10 | 5.8 (0.07)  | -0.5 (0.07)\*\*\* | -0.003 (0.0005)\*\*\* | 0.3 (0.06)\*\*\* |
| Saturated Fat  | 10 | 5.5 (0.07) | 0.2 (0.07)\* | -0.0006 (0.0003)  | -0.3 (0.06)\*\*\* |

\*p<.05; \*\*\* p<.001; HEI= Healthy Eating Index;

1 Mean (SE= Standard Error) of HEI subscales

2 Models examining snacking parameters as predictors of HEI subscale scores; controlling for age, gender, race and ethnicity, education status, marital status, EI:EER and survey cycle

**Supplementary Table 2**: Food only snack parameters as predictors of HEI-2015 component subscales, data 2007-2018 National Health and Nutrition Examination Survey components (n=4,757)

|  |  |  |  |
| --- | --- | --- | --- |
| **HEI Component**  | **Food Snack Frequency**  | **Food Snack Size**  | **Food Snack Energy Density**  |
| **Adequacy Components** |
|  | **Β(SE)2** |
| Total Fruits  | 0.3 (0.04) \*\*\* | -0.001 (0.0001)\*\*\* | -0.38 (0.03)\*\*\* |
| Whole Fruits  | 0.4 (0.04)\*\*\* | -0.0008 (0.0002)\*\*\* | -0.5 (0.03)\*\*\* |
| Total Vegetables  | 0.1 (0.03)\*\*\* | -0.0006 (0.0001) \*\*\* | -0.008(0.03) |
| Greens and beans | 0.09(0.06) | -0.0003 (0.0002) | -0.02 (0.03)  |
| Whole Grains  | 0.2 (0.06)\*  | -0.0001 (0.0002) | 0.001 (0.06)  |
| Dairy  | 0.09 (0.06) | -0.0005 (0.0002)\* | -0.1 (0.05)\* |
| Total Protein  | 0.05 (0.03) | -0.0007 (0.0001)\*\*\* | 0.001 (0.03)  |
| Seafood and plant protein  | 0.2 (0.05)\*\*\* | -0.0002 (0.0002) | 0.09 (0.04)\* |
| Fatty Acids  | -0.1 (0.09) | -0.00005 (0.0003)  | 0.08 (0.07)  |
| **Moderation Components**  |
| Refined Grains  | 0.09 (0.08) | -0.00001 (0.0004) | 0.009 (0.07) |
| Sodium  | -0.03 (0.08) | 0.001 (0.0004)\* | 0.1 (0.08) |
| Added Sugars  | 0.2 (0.08)\* | -0.001 (0.0004)\*\*\* | -0.2 (0.06)\*\*\* |
| Saturated Fat  | 0.2 (0.06)\*\*\* | -0.001 (0.0003)\*\*\*  | -0.1 (0.06)\* |

\*p<.05; \*\*\* p<.001; HEI= Healthy Eating Index

1 Mean (SE= Standard Error) of HEI subscales

2 Models examining snacking parameters as predictors of HEI subscale scores; controlling for age, gender, race and ethnicity, education status, marital status, EI:EER and survey cycle

**Supplementary Table 3**: Beverage only snack parameters as predictors of HEI-2015 component subscales, data 2007-2018 National Health and Nutrition Examination Survey components (n=3,442)

|  |  |  |  |
| --- | --- | --- | --- |
| **HEI Component**  | **Beverage Snack Frequency**  | **Beverage Snack Size**  | **Beverage Snack Energy Density**  |
| **Adequacy Components** |
|  | **Β(SE)2** |
| Total Fruits  | 0.1 (0.1) | -0.0007 (0.0003)\* | 0.1 (0.1) |
| Whole Fruits  | 0.05 (0.1) | -0.0008 (0.0003)\* | 0.2 (0.1) |
| Total Vegetables  | 0.009 (0.06) | -0.0008 (0.0002) \*\*\* | 0.05(0.09) |
| Greens and beans | 0.01(0.08) | -0.001 (0.0002)\*\*\* | 0.1 (0.1)  |
| Whole Grains  | 0.05 (0.1)  | -0.001 (0.0004)\* | 0.2 (0.2)  |
| Dairy  | -0.2 (0.2) | -0.0008 (0.0007) | 0.1 (0.2) |
| Total Protein  | -0.09 (0.06) | -0.0006 (0.0002)\* | 0.04 (0.08)  |
| Seafood and plant protein  | 0.02 (0.1) | -0.0008 (0.0003)\* | 0.05 (0.09) |
| Fatty Acids  | 0.07 (0.2) | -0.00002 (0.0006)  | -0.3 (0.2)  |
| **Moderation Components**  |
| Refined Grains  | 0.02 (0.2) | 0.004 (0.0006)\*\*\* | 0.07 (0.2) |
| Sodium  | 0.4 (0.1)\* | 0.003 (0.0007)\*\*\* | 0.3 (0.1) |
| Added Sugars  | -0.6 (0.2)\*\*\* | -0.004 (0.0008)\*\*\* | 0.4 (0.2)\* |
| Saturated Fat  | 0.05 (0.2) | 0.002 (0.0005)\*\*\*  | -0.3 (0.2) |

\*p<.05; \*\*\* p<.001; HEI= Healthy Eating Index

1 Mean (SE= Standard Error) of HEI subscales

2 Models examining snacking parameters as predictors of HEI subscale scores; controlling for age, gender, race and ethnicity, education status, marital status, EI:EER and survey cycle