TITLE: Social Media Captures Demographic and Regional Physical Activity

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**Table S1.** Fitness keywords used to collect data from Twitter’s streaming API. Note that some keywords (e.g. ‘run late’) permitted keyword-based filtering of irrelevant content, as described in the *Methods: Data processing* section of the manuscript.

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| "I love Spectrum Fitness more every time I go. Indoor pool: winning. Planet Fitness: lacking"  |
| "Out with my cousin kayaking today @ smugglers cove https://t.co/3erzvy3sum"  |
| "I love swimming in the ocean!!" |
| "Just so everyone knows Dan bowled a 38 last night??? @greekkinder @vanmoutsos"  |
| "Dancing was her favorite part of today’s party. @ wdiv https://t.co/dol0b5coc5" |
| "#whoareyou #namaste @ the Family Yoga Center Inc. https://t.co/1ft6rwvmya" |
| "Disfrutando el fin muy relax... #feelgood #resting @ Jazzercise Fitness in West Jordan https://t.co/wbdmzzzylk"  |
| "Mixing it up with an early morning workout = photo safari #denver livingsocial @ Denver Capitol Building https://t.co/yvtaqqsuiv" |
| "#spring #springbreak sailing camp on #lakeaustin #austin #atx for #kids just days away! https://t.co/oaed967cd6" |
| "#arcadefun #grandparentslove #margaret @ putt putt golf & games https://t.co/j3rl7g6g5g"  |

**Table S2.** A sample of ten tweets from the dataset. As indicated in these tweets, users may post updates in the midst of their activity, or discuss recent or planned activity.



**Fig. S1.** Google Trends search index distribution for topic “fitness center”



**Fig. S2.** Google Trends search index distribution for topic “weight loss”

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**Fig. S3.** Sentiment toward exercise measured as the proportion of tweets classified as ‘happy’ sentiment score of 0.80 or higher within each county for women.

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**Fig. S4.** Sentiment toward exercise measured as the proportion of tweets classified as ‘happy’ sentiment score of 0.80 or higher within each county for and men.

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| **Table S3.** Pearson correlations between Twitter variables and physical inactivity. Negative correlations are higher between overall tweet volume and inactivity prevalence for both males and females. |
|  |  | Percent inactive |
|  |  | Female | Male |
| Percent tweets exercise-related (logged) | Midwest | -0.132 | -0.047 |
|  | Northeast | -0.373 | -0.234 |
|  | South | -0.174 | -0.203 |
|  | West | -0.267 | -0.217 |
|  | National | -0.263 | -0.251 |
| Tweet sentiment | Midwest | -0.077 | -0.063 |
|  | Northeast | -0.271 | -0.063 |
|  | South | -0.051 | -0.027 |
|  | West | -0.076 | -0.194 |
|  | National | -0.116 | -0.115 |
| Exercise intensity | Midwest |  0.001 | -0.123 |
|  | Northeast | -0.048 |  0.060 |
|  | South |  0.063 | 0.006 |
|  | West | -0.004 | -0.203 |
|  | National | -0.001 | -0.061 |
| **Table S4.** Mixed-effects regression for 2015 county-level, sex-specific inactivity prevalence across the United States |
|  | Female | Male |
| Percent of tweets exercise-related logged | -0.425\*\*\* | -0.476\*\*\* |
|  | 0.078 | 0.075 |
| Tweet sentiment toward exercise | -0.008\*\*\* | -0.004 |
|  | 0.003 | 0.003 |
| Avg. exercise intensity, via Tweets | 0.001 | -0.002 |
|  | 0.001 | 0.001 |
| 'Fitness center' Google search index | -0.023 | -0.003 |
|  | 0.028 | 0.020 |
| 'Weight loss' Google search index | 0.210\*\*\* | 0.138\*\*\* |
|  | 0.042 | 0.030 |
| Median age | -0.054 | -0.027\*\* |
|  | 0.011 | 0.011 |
| Median household income (in 1000s) | -0.090\*\*\* | -0.085\*\*\* |
|  | 0.005 | 0.005 |
| Percent non-Hispanic black | 0.031\*\*\* | -0.007 |
|  | 0.006 | 0.006 |
| Percent Hispanic | -0.006 | -0.003 |
|  | 0.005 | 0.005 |
| Percent with access to exercise space | -0.027\*\*\* | -0.030\*\*\* |
|  | 0.003 | 0.003 |
| Driving death rate | 0.848\*\*\* | 0.904\*\*\* |
|  | 0.099 | 0.099 |
| Violent crime rate | 0.001\*\* | 0.00002 |
|  | 0.0003 | 0.0003 |
| Constant | 24.393\*\*\* | 26.878\*\*\* |
|  | 3.447 | 2.562 |
| Observations | 2,768 | 2,805 |
| Adjusted R-Squared | 0.793 | 0.674 |
| Std. deviation, random intercept | 3.143 | 2.216 |
| Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01 |  |  |
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| **Table S5.** Mixed-effects regression for county-level, female-specific inactivity by region - Twitter variables only |
|  | Midwest | Northeast | South | West |
| Percent of tweets exercise-related (logged) | -0.223\* | -1.345\*\*\* | -0.905\*\*\* | -1.185\*\*\* |
|  | -0.134 | -0.445 | -0.132 | -0.223 |
| Sentiment toward exercise | -0.006 | -0.02 | -0.009\* | -0.01 |
|  | -0.004 | -0.023 | -0.005 | -0.008 |
| Avg. calories expended | 0.0003 | 0.014\* | 0.002 | -0.0002 |
|  | -0.002 | -0.008 | -0.002 | -0.003 |
| Constant | 23.952\*\*\* | 19.314\*\*\* | 28.523\*\*\* | 19.949\*\*\* |
|  | -0.816 | -1.871 | -0.978 | -0.97 |
| Observations | 961 | 217 | 1,367 | 385 |
| Adjusted R-Squared | 0.487 | 0.390 | 0.600 | 0.427 |
| Std. deviation, random intercept | 2.546 | 1.895 | 3.606 | 2.341 |
| Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01 |  |  |  |  |

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| **Table S6:** Mixed-effects regression for county-level, male-specific inactivity by region - Twitter variables only |
|  | Midwest | Northeast | South | West |
| Percent of tweets exercise-related (logged) | -0.177 | -1.149\*\*\* | -0.954\*\*\* | -1.135\*\*\* |
|  | 0.132 | 0.426 | 0.114 | 0.226 |
| Sentiment toward exercise | -0.001 | -0.019 | -0.005 | -0.030\*\*\* |
|  | 0.005 | 0.018 | 0.005 | 0.009 |
| Avg. calories expended | -0.006\*\*\* | 0.01 | -0.001 | -0.006\* |
|  | 0.002 | 0.007 | 0.002 | 0.004 |
| Constant | 25.385\*\*\* | 18.492\*\*\* | 24.757\*\*\* | 21.711\*\*\* |
|  | 0.746 | 1.51 | 0.829 | 1.056 |
| Observations | 994 | 216 | 1,384 | 396 |
| Adjusted R-Squared | 0.387 | 0.152 | 0.545 | 0.439 |
| Std. deviation, random intercept | 2.228 | 0.9078 | 3.013 | 2.452 |
| Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01 |  |  |  |  |