Supporting Information

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SI Methods

Health Message Intervention. While in the fMRI scanner, participants were exposed to messages promoting physical activity and emphasizing their risk due to sedentary behavior (e.g., "You are at risk. A sedentary lifestyle increases the risk of developing diabetes, hypertension, colon cancer, depression and anxiety, obesity, and weak muscles and bones"; $n = 10$), reasons not to be sedentary (e.g., "The more you sit, the more damage it does to your body. When you sit for long periods of time, your body can't handle sugar and fat—this can mean higher risk for disease"; $n = 10$), reasons to be more active (e.g., "Exercise can help you deal with stress. Being active can give you a mental break from what's troubling you, take a step back and make time for yourself"; $n = 10$), as well as tips for how to become more active (e.g., "Move more while you watch TV or watch less. Exchange a portion of your TV watching for something more active—like going for a walk"; $n = 10$) and how to be less sedentary (e.g., "The best parking spots for your health are farther away. Choose the last row of a parking lot or the top floor so that you have farther to walk"; $n = 10$; see Fig. 4 for an example block). Each message block consisted of an initial suggestion, followed by a reason why participants should increase their activity or decrease their sedentary time, or how participants might think about implementing the suggestions, using simple text and pictograms. At the end of each block describing why to be less sedentary/more active or how to be less sedentary/more active, participants had a brief reflection period in which they were asked to envision how they would apply the message in their own life.

SMS Intervention Reinforcement. During the month following the fMRI intervention appointment, participants received two SMS text messages each day, according to their assigned affirmation or control condition. On one-half of the days, participants first received either a text message focusing on their top-ranked value (affirmation condition) or their bottom-ranked value (control condition), and on the other half of the days, participants all received value-neutral messages about everyday activities. These were a subset of the same messages they had viewed during the affirmation task in the scanner. Next, following the first messages, participants received a second text message, which contained one of the messages from the health messages scanner task (advice or benefits of increase activity, the health risks of a sedentary lifestyle, or control messages about everyday activities), as distributed in the scanner task.

Triaxial Accelerometers. Triaxial accelerometer data were collected at 20 Hz and then down-sampled to 1-min epochs to provide a single measure of activity intensity (gravity subtracted signal vector magnitude; SVMg) per minute. These data were visually inspected by a trained research assistant who was blind to study condition and tagged to identify windows of nonwear and sleep. The remaining periods in which participants were awake and wearing the device were subjected to further analysis; data were used for participants on days in which they wore the device for at least 4 h (of 1,772 person days tagged, 1,668 d, or 94%, met this criterion). Previous studies have validated the use of triaxial accelerometers calibrated using specific activities completed in the laboratory (58, 60, 61).

Self-Report Measures Collected. At baseline (T1) and directly following the scan (T2), participants completed measures common to several major theories of health behavior change (62), including their attitudes (10-item semantic differentials, e.g., Increasing my daily physical activity would be Wise…Foolish; Pleasant…Unpleasant; Good…Bad) intentions (2 items, e.g., "I intend to increase my daily physical activity"), self-efficacy (3 items, e.g., "I can increase my daily physical activity"), perceived norms (11 items, e.g., "what percentage of your friends are in the process of increasing their daily physical activity"; "most people who are important to me think I should increase my daily physical activity"), and self-standards (2 items; "I am the type of person who can increase my daily physical activity") related to physical activity.

fMRI Data Acquisition and Preprocessing. The functional images were recorded using a reverse spiral sequence (repetition time, 2,000 ms; echo time, 30 ms; flip angle, 90°; 43 axial slices; field of view, 220 mm; slice thickness, 3 mm; voxel size, 3.44 × 3.44 × 3.0 mm). A spoiled gradient echo (SPGR) sequence recorded high-resolution T1-weighted structural images (124 slices; slice thickness, 1.02 × 1.02 × 1.2 mm). In-plane T1-weighted overlay images were also acquired (43 slices; slice thickness, 3 mm; voxel size, 0.86 × 0.86 × 3.0mm) to allow two-stage coregistration. Functional data were preprocessed using Statistical Parametric Mapping (SPM8; Wellcome Department of Cognitive Neurology, Institute of Neurology, London, UK) for all stages apart from the initial despiking, which was carried out using the 3dDespike program as implemented in the AFNI toolbox. Differences in time of acquisition across the 43 slices were corrected using a sinc interpolation algorithm with the first slice as reference. Then motion artifacts were corrected through spatial alignment to the first slice of each volume. Next the mean image across all blood oxygen level-dependent (BOLD) functional images was coregistered with the in-plane T1 image, and then the high-resolution T1 SPGR image was coregistered to the in-plane T1 image. Following coregistration, the high-resolution T1 images were segmented into white and gray matter, allowing the skull to be removed. Structural and functional images were then normalized to the skull-stripped MNI template provided by FSL ("MNI152_T1_1mm_brain.nii"). In the final preprocessing step, the functional images were smoothed using a Gaussian kernel (8-mm FWHM). To allow for the stabilization of the BOLD signal, the first five volumes (10 s) of each run were discarded before analysis.

SI Results

Relationship Between Self-Report Measures and Behavior Change. We examined the relationship between baseline and postscan self-report predictors collected (attitudes, intentions, self-efficacy, self-standards, norms) and behavior following the intervention, controlling for baseline sedentary behavior and other demographics. Higher perceptions of oneself as the kind of person who can increase their physical activity (self-standards) were associated with lower sedentary behavior overall in the month following the intervention ($\gamma_{\text{baseline standards}} = -0.057$; $t = -2.20$; $P = 0.04$). Those who started out perceiving themselves to be the kind of person who can change their physical activity behavior, however, showed slower reductions in sedentary behavior over time than those who did not start out as perceiving themselves as being able to change ($\gamma_{\text{baseline standards} \times \text{time}} = 0.002$; $t = 2.93$; $P = 0.003$; controlling for other self-report measures). Those who had more positive baseline attitudes toward physical activity showed faster declines in sedentary behavior in the month following the scan than those with less positive baseline attitudes ($\gamma_{\text{baseline attitudes} \times \text{time}} = -0.0003$; $t = -2.81$; $P = 0.005$), whereas more positive postscan attitudes toward being active were associated with slower declines in sedentary behavior in the month following the scan ($\gamma_{\text{postscan attitudes} \times \text{time}} = 0.002$; $t = 2.20$; $P = 0.03$), controlling for baseline and other postscan self-report measures.