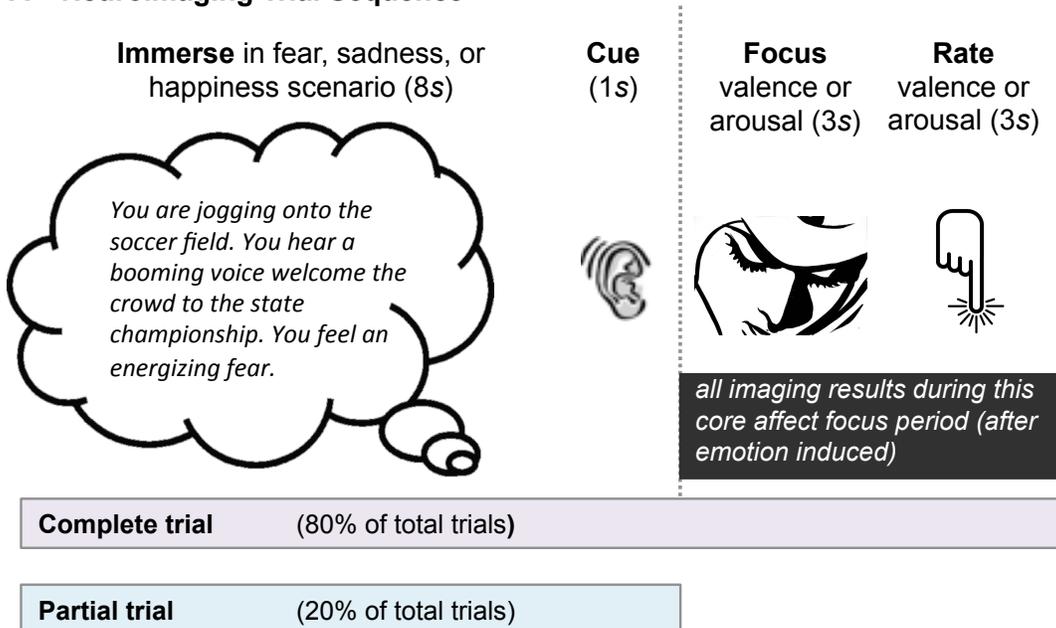
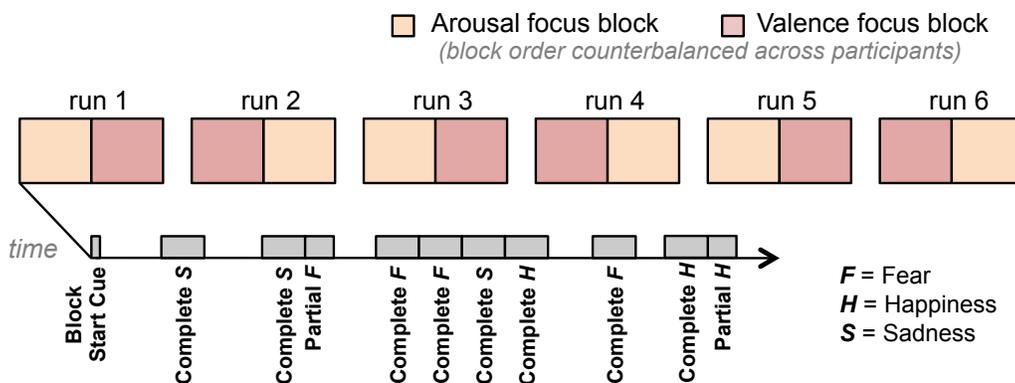
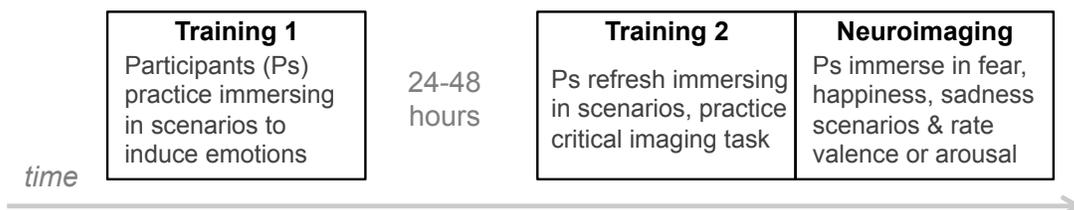
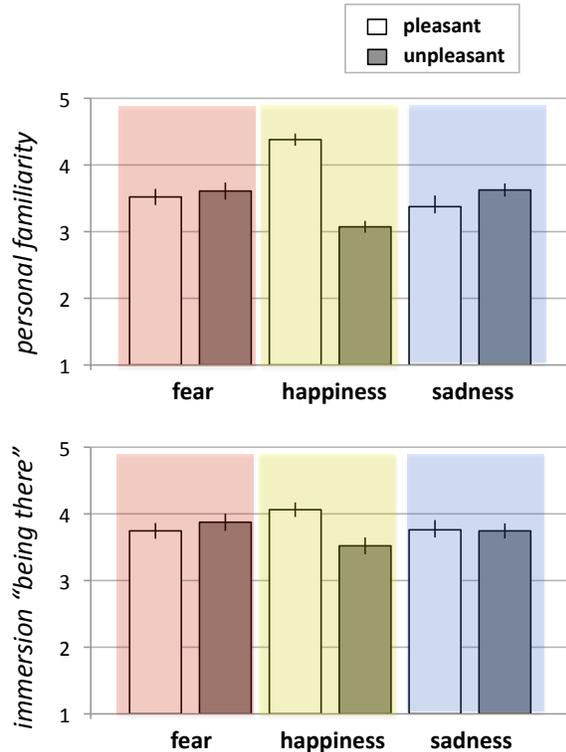


**Supplemental Methods – Overview****A Neuroimaging Trial Sequence****B Neuroimaging Block Structure****C General Procedure**

**Figure S1.** (a) The sequence of events that make up complete and partial trials in the neuroimaging paradigm (b) The neuroimaging block structure: within each block, randomly intermixed complete trials (4 per category), partial trials (1 per category) occurred amongst jittered no sound baseline. (c) The general procedure, including initial training session prior to the neuroimaging session.

**Supplemental Methods – Scenarios**

**Figure S2.** Mean ratings of participants' personal familiarity with the emotion induced by the scenario and "being there" immersed in the emotion induced by the scenario (larger numbers indicate greater familiarity or immersion) as a function of the pleasant and unpleasant scenarios for each emotion category. Error bars represent standard error of the mean, computed across participant means for each condition.

Full scenarios 50-60 words in length were constructed using a five-sentence template. Written as second-person narratives, the language expressed a richly affective experience using engaging, gender-neutral prose. The first sentence established a bodily state and setting with two clauses. A first clause described the state of the body (e.g., you are walking, sitting, lounging, running, awaking etc.) with the second clause elaborating the action and/or setting. The second sentence described the primary emotional stimulus or event using active

construction and a present tense verb to encourage participants to fully engage with the imagined scenario. The third sentence developed the level of arousal using physiological references (e.g., heart rate, sweating, breathing, muscular or stomach states) and continued elaborating the event as it unfolded in time. The fourth sentence developed valence using pleasant (e.g., charming, lovely, delightful, etc.) and unpleasant descriptors (e.g., disagreeable, horrible, repulsive, etc.) to depict states of mind, developing the unfolding event even further. The terms pleasant and unpleasant were never used because they anchored the rating scale. The final sentence categorized the experience with the sentence "You feel a(n) [adjective] [fear, happiness, or sadness]." The adjective was used to reiterate valence (e.g., warm sadness, raging sadness, etc.). The core versions of each scenario contained the first clause of sentence one, sentence two, and sentence five.

In order to vary valence and arousal, scenarios were written to fall into four quadrants of affective space created from crossing unpleasant and pleasant valence with high and low arousal (examples provided in Table 1). For each emotion category, 12 scenarios were written for each quadrant, producing 48 scenarios for each category and 144 scenarios overall. Quality audio recordings were then created for the 48 full and core versions developed for each category, spoken by an adult woman. Her prosody was tailored to the intended arousal and valence of each scenario to facilitate induction of those states in participants. Scenarios were recorded using the freely available Audacity software at a 44.1 khz sampling rate, 16 bits, and converted to MP3 format. The maximum amplitude was also normalized across scenarios to equate the volume.

To verify that the scenarios elicited the intended variation in subjectively experienced valence and arousal, an independent set of participants rated the 144 full scenarios, presented in a random order, for valence, arousal, or ease of experiencing the named emotion (39 participants overall; 13 each for valence, arousal, ease). Of the 48 scenarios developed for a given category, 24 were selected for the complete trials in the imaging experiment, 6 from each quadrant. Any scenario receiving a mean ease rating below 3 on a 6-pt scale ranging from 1-impossible to 6-extremely easy to imagine was excluded from the selection process. The critical scenarios selected for each category displayed the following properties. Scenarios written for high arousal quadrants were rated higher in arousal than those written for low arousal quadrants ( $p < .05$ ). Scenarios written for pleasant quadrants were rated significantly higher on a bipolar valence scale (with the mean located on pleasant side of the scale) than scenarios written for unpleasant quadrants (with the mean located on the unpleasant side of the scale;  $p < .05$ ). Furthermore, item valence and arousal ratings were not significantly correlated ( $p > .05$ ).

To ensure that a range of scenarios was heard in each run of the imaging experiment, the four scenarios in complete trials for a given category were sampled equally from the four valence x arousal quadrants. In other words, the four complete trials per category in every run contained one scenario from each quadrant. Six additional scenarios were selected from each category for use in the partial trials of the experiment. One scenario from each valence x arousal quadrant, a scenario from the quadrant that would be considered typical of the emotion (e.g., high arousal, unpleasant fear; low arousal, pleasant happiness), and its opposite in affective

space (e.g., low arousal, pleasant fear) made up the six scenarios selected for partial trials. Although affective space could not be sampled evenly to select six scenarios, the sampling procedure used ensured that there were equal numbers of pleasant and unpleasant valence, high and low arousal scenarios across the complete set of partial trials. A scenario from each quadrant not sampled twice for partial trials was selected for practice trials (i.e., there were two practice trials per category). During training, participants listened to the 72 scenarios that would later occur in complete trials of the imaging experiment, the 18 scenarios that would later occur in partial trials of the imaging experiment, and the 6 scenarios that would later occur in practice trials. In total, these 96 scenarios had equal numbers of fear, happiness, and sadness scenarios from each quadrant. These 96 scenarios are provided in the Appendix.

### ***Supplemental Methods - Versions of the Experiment***

Across the six runs in the experiment, each fear, happiness, and sadness scenario was presented twice, once in an arousal block and once in a valence block. To create the first version of the experiment, the 24 critical scenarios presented in complete trials and the 6 scenarios presented in partial trials for each category were randomly assigned to the valence blocks of the six runs. Scenarios in the valence blocks of run one, two, and three were repeated in the arousal blocks of run four, five, and six respectively. Scenarios in the valence blocks of run four, five, and six were first encountered in the arousal blocks of run one, two, and three. To control for repetition order, a second version was created in which scenarios in valence and arousal blocks were flipped (i.e., scenarios initially rated first for valence were rated first for arousal in the second version and vice versa). Finally, two

additional versions were created paralleling the first two in which the order of the runs was simply reversed to control for general stimulus order effects.

### ***Supplemental Methods - Training Procedure***

A written script was used to instruct participants during both training sessions. In the first training session, which typically lasted about 2.5 hours, participants received an overview of the scenarios and instruction on how to imagine them. Participants were encouraged to immerse themselves in each scenario as they listened with eyes closed, and experience the scenario as if it was actually happening to them, in as much vivid detail as possible. Participants were also instructed that some scenarios could be construed in a number of ways, emphasizing that the task was to immerse in the specific fear, happiness, or sadness described. In all training exercises, a few silent seconds followed each scenario so that participants could engage fully in the feeling that occurred when the situation was construed as the named emotion. Participants focused on the feeling in their body and mind during this time. Participants practiced imagining two happiness scenarios (one being a more typical pleasant, low arousal example and the other being a more atypical unpleasant, high arousal example) during the instructional period. Before beginning any task, participants were also introduced to the relation between the full and core scenarios, and encouraged to reinstate the full scenario whenever they heard a core scenario.

Following the initial instruction period, participants listened over computer headphones to the full versions of the 96 scenarios that would later be presented in the scanner and in practice trials prior to the scan session. Upon hearing a bell two seconds after a scenario ended, participants opened their eyes and judged how

personally familiar the feeling was on a 1-5 scale (1 = not familiar, 3 = somewhat familiar, 5 = very familiar). Participants rated the familiarity of the feeling evoked by each fear, happiness, or sadness experience, as compared to those feelings evoked in their everyday life. At the start of all training tasks, participants performed two practice trials in which they rated the feeling evoked by the two happiness examples from the instructions. They then listened to the 96 scanner and practice scenarios in a random order (with no blocking of category).

After taking a short break, participants listened to the core versions of the same scenarios, again in a random order. During three silent seconds following the scenario, participants were encouraged to elaborate the experience, immersing themselves fully into the scenario as it became enriched and developed from memory. Upon hearing a bell, they opened their eyes and rated three kinds of mental imagery using a 1-5 scale (1 = none, 3 = moderate, 5 = high). In the following order, participants rated the vividness of the internal imagery experienced within the body, the external imagery experienced of the outside world, and the thought imagery experienced within their mind. The goal of the imagery ratings was to encourage participants to generate rich simulations as they listened to the core version of each scenario.

After another short break, participants were introduced to the concepts of valence and arousal, and practiced focusing on and rating their feeling state. Valence was explained as a basic sense of feeling good or bad as something is happening to you. Arousal was explained as a basic sense of how much the body and mind are being stirred as something is happening to you (i.e., the degree to which one feels awake and reactive). Low, medium, and high arousal states were

described in further detail to ground out the definition of arousal (adjusted based on piloting). After listening to the definitions, participants were asked to define valence and arousal to the experimenter. If a participant provided an incorrect or vague definition, the experimenter explained the concept further and again asked the participant to generate the meaning.

Participants were next introduced to the rating scales used for valence and arousal, and asked to rate seven short sentences first for valence and then for arousal. Six sentences varying in their mean valence and arousal rating were selected from a published study (Colibazzi et al., 2010), along with a seventh neutral sentence we constructed about brushing one's teeth. If a participant's rating clearly deviated from the published means, the experimenter probed the participant for understanding of valence or arousal, again re-explaining if the participant misunderstood the concept. After rating the sentences, participants were introduced to the event sequence of complete trials. Participants practiced imagining the scenario, centering in on the valence quality of the feeling, and rating it using the appropriate scale. Valence ratings were practiced initially, followed by arousal ratings. The two happiness examples from initial instruction were used as the first practice trials. When ready, participants then engaged in a series of six complete trials. In these trials, they heard practice scenarios that had been included in the prior training tasks, but that were not used in the critical scanner runs.

Participants returned for the second session 24-48 hours later. At the start of this session, participants listened over headphones to the 96 full scenarios in a random order and vividly imagined the scenario as if it were happening to them. When they heard a bell sound two seconds after the scenario had finished, participants

opened their eyes and rated how much they experienced 'being there' in the feeling using a 1-5 scale (1 = not at all, 3 = somewhat, 5 = very much). The experimenter emphasized during instruction that participants should rate their ability to experience the feeling of fear, happiness, or sadness as described in the scenario. This first phase, which typically lasted about an hour, ensured that participants were reacquainted with the details of the full scenarios just before hearing the core versions in the scanner.

Participants were then instructed on and practiced the task they would perform in the scanner. The definitions of arousal and valence were refreshed, and participants were again asked to generate the meaning of each concept to confirm their understanding. Next, participants practiced using each scale with their eyes closed. Beginning with the valence scale, participants pressed the button corresponding to each point on the scale as the experimenter named them aloud moving from left to right: very unpleasant, somewhat unpleasant, neutral, somewhat pleasant, and very pleasant. The experimenter would then name a point on the scale at random, and the participant would press the corresponding button. The experimenter cycled through two random orders of the scale points in this exercise. Finally, the participants used the scale to rate the sentences from the first training session once more with eyes closed. This process was repeated with the arousal scale, which contained the following points from left to right: low, medium-low, medium, medium-high, and high. To make responses, participants rested the three middle fingers of their left and right hands on six response box buttons. Simultaneously pressing the middle two buttons with the right and left index fingers was the response for the mid-point of each scale. The middle and ring fingers were used to make responses on the

left and right side of the scale. Participants practiced making responses on e-prime button boxes in the lab and used Current Designs fiber optic button boxes designed for high magnetic field environments in the scanner. In the scanner, two response boxes stabilized in a foam pad lay on the participant's legs so their fingers could rest comfortably on the six buttons.

Following practice with the scales, participants were told that they would complete one block of valence trials and one block of arousal trials in each imaging run. The cue word 'valence' or 'arousal' was repeated three times at the beginning and mid-point of the run to indicate the rating to be made during the first and second block respectively. The cueing period lasted 3 s and was always followed by 9 s of no sound so that the cueing period could be separated from the critical events in the experiment. The experimenter also informed participants of the block order prior to each imaging run so they knew which cues to expect at the beginning and middle of the run. Debriefing after the scan session confirmed that every participant heard the cues in each run, and never lost track of which rating they were making.

Participants practiced the critical trial types (complete, partial) separately first, as described in the *Methods* section. They then completed several short arousal and valence blocks with all trial types intermixed, as during each block of the imaging experiment. The practice blocks used the six practice scenarios not included in the imaging experiment, with each block containing equal numbers of fear, happiness, and sadness scenarios. Participants started with a short valence block that contained the valence cue followed by two complete trials, one partial trial, and no-sound baseline jitter presented in a pseudo-random order. A comparable arousal block was then performed. All six practice scenarios were

heard during the first two practice blocks. In the next two practice blocks, practice scenarios heard initially in a valence block were presented in the arousal block and vice versa. The valence block came first followed immediately by the arousal block. The blocks were performed as a set so the participant could become used to switching to the other rating upon hearing the cue at the beginning of the second block. In the last practice set, an arousal block came first followed immediately by a valence block. These blocks were longer so the participant could gain a better sense of what the imaging runs would be like, containing five complete trials and one partial trial (with the six practice scenarios repeating in each block). Participants were informed that the repeated scenarios were for practice purposes and that scenarios would not repeat in this manner during the imaging runs. They were also informed that although scanner blocks would be longer, the task itself would be exactly the same, with all trial types occurring in a random, unpredictable order.

### ***Supplemental Methods - Image Acquisition and Preprocessing***

Following the practice, the experimenter and participant walked 5 min across campus to the MRI center. Once the participant was situated comfortably in the scanner, an initial anatomical scan was collected. The participant was then reminded of the task using brief instructions and of the valence and arousal scales by pressing the appropriate button as the experimenter named each point on the scale. When the participant was ready, the experimenter initiated the first functional run and then continued with the next five runs, pausing for a short break between runs. A second anatomical scan was collected last. Total time spent in the scanner was a little over an hour.

Anatomical MPRAGE scans acquired at the beginning and end of the session (192 sagittal slices, TR = 2300 ms, TE = 4ms, flip angle = 8°, FOV = 256 mm, matrix = 256, bandwidth = 130 Hz/Px, voxel size = 1 mm × 1 mm × 1 mm) were later averaged to produce a high-quality anatomical dataset. In each intervening 9 min 3 s functional run, 163 T2\*-weighted echo planar image volumes depicting BOLD contrast were collected using a Siemens 32-channel head coil and parallel imaging with an iPAT acceleration factor of 2 (56 2 mm axial slices, TR = 3000 ms, TE = 30 ms, flip angle = 90°, bandwidth = 2442 Hz/Px, FOV = 220 mm, matrix = 64, voxel size = 3.44 mm × 3.44 mm × 2 mm). These parameters were selected to minimize susceptibility artifact in OFC and amygdala while maintaining satisfactory signal-to-noise ratios.

Slice time correction was performed on the functional volumes followed by motion correction and transformation to Talairach space, which were performed in a single step to reduce error that occurs when the functional data are independently warped multiple times. The transformation matrix for motion correction was generated in which all functional volumes were registered to a volume near the beginning of the first run. To generate the Talairach transformation matrix, the averaged anatomical was first skull-stripped and aligned to the same functional volume used as the registration base for motion correction. The anatomical was then transformed to Talairach space using an automated procedure employing the TT\_N27 template (also known as the Colin brain, an averaged dataset from one person scanned 27 times). The matrices generated from the Talairach transformation of the anatomical dataset were concatenated with the motion correction matrix and applied in one step to the functional volumes. At this point, the

voxel dimensions of the functional volumes were also resampled from 3.44 mm × 3.44 mm × 2 mm to 3 × 3 × 3 mm. The functional data were next smoothed using an isotropic 6 mm full-width-half-maximum Gaussian kernel. Finally, the signal intensities in each volume were divided by the mean signal value for the respective run and multiplied by 100 to produce percent signal change from the run mean. Statistical analyses were performed on the percent signal change data. In all later regression analyses, the six regressors obtained from motion correction during preprocessing were included to remove any residual signal changes correlated with movement (translation in the X, Y, and Z planes; rotation around the X, Y, Z axes). Scanner drift was also removed by finding the best-fitting polynomial function correlated with time in the preprocessed time course data.

### ***Supplemental Methods - High-Low Split Arousal Analysis***

An additional regression analysis was run at the subject level with no amplitude modulation. In this regression, the arousal focus conditions for each category were split into a low and high arousal condition, creating six arousal focus conditions (i.e., fear-low, fear-high, happiness-low, happiness-high, sadness-low, sadness-high). The high and low conditions for each category contained equal numbers of trials and were defined prior to the imaging experiment using arousal ratings from an independent set of participants (see *Scenarios* section). Rating data from the imaging experiment was consistent with the rating data from the independent sample; the high condition was rated as significantly higher in arousal than the low condition in each category ( $p < .001$ ). The scenarios were modeled as six conditions representing category and rating block (i.e., fear-arousal, fear-valence, etc.). The valence focus

conditions were also modeled as six conditions, with each category split into pleasant and unpleasant conditions (e.g., fear-pleasant, fear-unpleasant, etc.). As for all other regressions, conditions were

modeled using Gamma functions convolved with a boxcar function that represented the duration of events in the condition.

### ***Supplemental Results – Behavioral Ratings from Scan Session***

**Table S1.** Descriptive statistics for the valence and arousal ratings, and the correlation between the valence and arousal ratings, by emotion category.

Category	Valence				Arousal				Correlation
	M	SE	Min	Max	M	SE	Min	Max	r
fear	2.81	0.04	1.00	4.88	4.13	0.06	1.88	5.00	0.01
happiness	3.57	0.06	1.38	5.00	3.40	0.05	1.19	5.00	-0.01
sadness	2.48	0.04	1.00	4.56	3.38	0.05	1.13	4.94	-0.30

*Note.* The standard error of the mean (SE) was computed across participant means for each condition. Min and max represent the mean minimum and maximum computed across individual participant minimums and maximums. Similarly, the correlation reported is the mean of individual correlations. Seven participants showed a moderate, significant correlation between valence and arousal for sadness. One participant showed a moderate, significant correlation for fear.

### ***Supplemental Results – Whole-brain Analyses***

**Table S2.** Regions across the whole-brain in which activity was positively correlated with arousal ratings.

Brain Region	Volume	Center Voxel			Mean t
		x	y	z	
R Occipital Cortex	157	27	-81	12	3.91
R Fusiform Gyrus	42	21	-70	-14	3.83
L Amygdala extending into L Insula	42	-28	-5	-8	3.79

*Note.* Volume is the number of 27mm<sup>3</sup> voxels.

## Appendix

Written versions of the scenarios that participants heard (and immersed in) during training and during neuroimaging are included below, in a table analogous to Table 1 for each emotion. In our methodological approach, the full versions of the scenarios are presented during training sessions outside the scanner, with the shorter core versions (first clause of sentence 1, sentence 2, and sentence 5) of the scenarios presented during the neuroimaging paradigm. The scenarios later presented during partial “catch” trials in the neuroimaging paradigm are labeled with “[catch]” at the beginning of the scenario, and the scenarios presented only during practice outside of the scanner are labeled with “[practice]” at the beginning of the scenario. All other scenarios were presented during the critical complete trials in the neuroimaging paradigm.

### *Fear Scenarios*

	High Arousal	Low Arousal
<b>Pleasant</b>	<p>You are sitting stiffly in a rollercoaster car, creeping up one click at a time. You reach the peak of the hill and are suddenly whizzing downwards. Your heart is pounding and your stomach drops as crisp air blasts your face. You delight in the uncontrollable rush dipping and swirling high above the ground. You feel an invigorating fear.</p> <p>You are standing backstage waiting, watching for your cue after a quick costume change. You burst on stage to perform a well-known witty dialogue with your costar. Your heart beats quickly as fresh energy pulses through you. The presence of the audience before you demands magnificent charisma. You feel an exhilarating fear.</p> <p>You are climbing up a seaside cliff, an excursion on your Caribbean vacation. You arrive at the top and jump off before you have time to think. Your stomach is whirling as you flail your arms and legs freely in the air. The fantastic intensity of having no control overpowers all thinking. You feel a thrilling fear.</p> <p>You are jogging onto the soccer field, your cleats digging into the firm ground. You hear a booming voice welcome the crowd to the state championship. You jump in place to shake off the restlessness in your stomach. Looking around at your team, a rushing excitement deepens your</p>	<p>You are lounging in bed watching a movie, the made-for-TV variety. You follow the protagonist who is about to confront her cheating lover. Settling under the covers, you curl up and wait for the drama to unfold. The increasingly dramatic music lures your mind, producing an appealing anticipation. You feel an enchanting fear.</p> <p>You are sitting at your desk, your morning coffee steaming next to your computer. You open an e-mail and discover that you have been chosen to give a speech. You lean back and close your eyes, inhaling a full breath. Inspirational words float in your mind as you imagine a crowd before you. You feel an enticing fear.</p> <p>You are sitting down for brunch, fresh flowers adorning the table. You find a seat and wait for your significant other's parents to arrive. You gently wave as they enter the restaurant and your shoulders naturally settle. They respond with broad smiles and you relax in the comfortable moment. You feel an agreeable fear.</p> <p>You are sipping punch at a school reunion, scanning the growing crowd. You notice your high school crush from across the room returning your gaze. Your crush looks away and you smile to yourself in the private moment. A soft amusement begins to arise as your mind becomes lost</p>

competitive fire. You feel an energizing fear.

You are pacing while calling your significant other, finally hearing a voice. You convince your partner to ditch work and take a road trip together. Jumping in your car, you stop for a brief moment to catch your breath. You put the car in drive, hitting the gas pedal with mischievous delight. You feel an excited fear.

You are sitting atop a waterslide, gurgling liquid plummeting feet from you. You slide over the edge and are sucked downward with the current. The cool water washes over your tensed abdomen as you slip and slide. Moving nonstop in the gushing stream unleashes your mind in a freeing high. You feel a vitalizing fear.

[CATCH] You are jumping off the ski lift, landing in untouched powdery snow. You push off and within seconds are speeding down a steep hill. Before long you are working up a sweat, sticking to your warm clothing. You turn sharply and delight in the precarious balance of speed and control. You feel an adventurous fear.

[PRACTICE] You are watching a football game, edging forward to the tip of the sofa. You bet on the underdog team who could still win in the final minute. You jump up and start pacing, your palms sweaty as the players line up. The play commences and you are captivated by the euphoric anticipation. You feel a passionate fear.

in a familiar fantasy. You feel a lovely fear.

You are lounging on the couch, hanging out with friends in your apartment. You make a silly bet and promise to do something embarrassing if your friend wins. You shift to lay your head on a pillow as your friend begins laying out rules. While the gentle teasing continues, your mind constructs entertaining possibilities. You feel an amusing fear.

You are sitting down at your desk, sluggish after a big lunch out. You open a letter that indicates you have been nominated for an award. Giving into your body's desire to unwind, you relax your muscles, tilting your head back. Your mind wanders agreeably and envisions winning against stiff competition. You feel an appealing fear.

[CATCH] You are lying back in bed, resting a book carefully on the nightstand. You consider the new job you will start tomorrow to end your long unemployment run. You stretch out and roll over, your body recovering a soothing alignment. Closing your eyes, you imagine the deep satisfaction of depositing your first pay check. You feel an encouraging fear.

[CATCH] You are sitting in a recliner, tilting back as you stare at your laptop. You visit an online shop and spontaneously buy an expensive jacket. Clicking to finalize the purchase, you exhale gradually with a bit of disbelief. Gazing at the confirmation page, you sense a delightful tension developing. You feel an alluring fear.

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**Unpleasant**

You are driving home from work, only a mile from your house. You steer around a bend and another car rapidly swerves into your lane. Your muscles instinctually tighten as you slam your foot on the brakes. The advancing car's blinding headlights deepen the jarring sensory disturbance. You feel a piercing fear.

You are confined to an airplane seat, passing time by listening to music. You abruptly jerk violently as the plane dips and

You are awaking to your beeping alarm clock, which is pulsing predictably. You mindlessly search out the curved snooze button and press it lightly. You remain still, movement disagreeing with your worn out body. In the darkness, visions of your early meeting creep into your awareness. You feel a bothersome fear.

You are sitting down resting, finally a free moment between meetings. You check the news online and a breaking story reports a

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oxygen masks deploy. For a moment all that you sense is a shocking internal numbness. You stare in horror at the mask dangling in front of you. You feel a dreadful fear

You are walking to your car alone, the city parking deck dimly lit. You hear an explosive bang and see a man running with a pointed gun. You quickly drop behind a car and attempt to control your shallow breathing. You try to dismiss the horrendous vision of what will happen if he finds you. You feel a perilous fear.

You are driving down an isolated road, cutting through a thick dark forest. You coast slowly as your car breaks down and your cell phone reception vanishes. Sweating profusely, you try repeatedly to start the exasperatingly unresponsive car. You peer around anxiously for signs of life in the beam of your headlights. You feel a panicked fear.

You are sitting home alone reading, immersed in a dramatic murder mystery. You startle violently when you hear the piercing sound of glass breaking. Launching out of your chair, your heart is palpitating wildly in your chest. Your mind harbors terrible visions of your assailant as you grab for the phone. You feel a striking fear.

You are sitting in the doctor's office, glancing at the cautionary posters. You learn from the doctor that you must undergo a spinal tap procedure. As he explains the details, you sense the queasiness in your stomach escalating. Thinking about the unbearable pain gives his words an appalling reality. You feel a ghastly fear.

[CATCH] You are standing in a sports bar, angular flat screen TVs everywhere. You catch sight of a news bulletin that a tornado has hit your hometown. Your stomach cinches in knots as you run outside to call your family. Listening to their prerecorded voicemail, horrible possibilities are flooding your mind. You feel a paralyzing fear.

[CATCH] You are hiking in the woods, the

mass mall shooting. Your body sinks reading that the shooter was a troubled teen who killed himself. Your thoughts wander to the unfortunate fate of the innocent shoppers. You feel a distant fear.

You are sitting down after lunch out, your desktop reappearing at your touch. You notice a pressing e-mail from your boss that you forgot to address. Taking a deep breath, you lengthen your spine in an attempt to reenergize. You slowly re-read the message with the burden of responding quickly. You feel an inconvenient fear.

You are standing up to leave the office, papers neatly arranged on your desk. You spot a new e-mail with a subject line reading 'spreading flu virus.' You sense yourself recoil slightly as you click to close out of your e-mail. As your computer shuts down, you fixate on a sensation of disagreeable fatigue. You feel a nagging fear.

You are standing paying for your lunch, handing crisp dollars to the cashier. You survey full tables of work colleagues in search of an open seat. Scanning the crowd, you hear yourself swallow and linger on the sensation in your throat. You mosey towards a table of humorless coworkers you don't talk to often. You feel a timid fear.

You are sitting in a class, unexpectedly interested in the day's topic. You alone raise your hand when the professor poses a challenging question. In the silence, you sense your heart beating steadily as you look around at your peers. Doubt begins to seep into your mind, undermining your initial confidence. You feel an insecure fear.

[CATCH] You are slouching in your Friday class, having given up listening to a boring lecture. You catch an unexpected announcement that midterm grades were surprisingly low. You shift in your seat and yawn widely as you rub your eyes. The frustrating intensity of the long test is slowly coming back to you. You feel a tedious fear.

[PRACTICE] You are sitting outside with

crisp autumn air filling your lungs. You step off the path to take a photograph and hear aggravated reptilian hissing. Gasping, your stomach tightens as you see a snake poised a foot from you. You begin backing away, terrified, trying to ignore the gripping urge to run. You feel a daunting fear.

a friend, resting under a large oak tree. You say something judgmental without considering your friend's point of view. You take in a deep breath as you see discomfort appearing on your friend's face. An awkward silence ensues as your insensitivity resonates for several moments. You feel a bumbling fear.

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## *Happiness Scenarios*

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### **High Arousal**

### **Low Arousal**

#### **Pleasant**

You are putting groceries away, thinking about what to have for dinner. You catch the lottery drawing on TV and realize the numbers match your ticket. Your heart is pounding and your legs wobble as you fixate on the string of digits. Euphoria engulfs you as you imagine an easier life free from financial concerns. You feel an ecstatic happiness.

You are standing at an art opening, a crowd forming to hear the prize winners. You listen as your name is energetically announced for best novice photograph. Your heart begins pumping and your mouth drops open in shock. Walking swiftly through the parting crowd, you relish the remarkable honor. You feel an incredible happiness.

You are performing a challenging piano solo, your fingers working the keys. You finish the piece and receive thunderous applause as you rise. You bend at the waist into a deep bow and sense your heart thumping rapidly. Glowing with satisfaction, you continue to feed off the crowd's energy. You feel a proud happiness.

You are running a half marathon, your feet moving unconsciously now. You see the finish line and summon a burst of energy to cross it. You are breathing heavily as your legs rhythmically begin to slow. The physical accomplishment hits you in a wave of ecstatic glee. You feel an amazing happiness.

You are walking into your childhood home,

You are entering your parent's house, escaping the cold winter wind. You smell the aroma of freshly baked cookies before catching sight of anyone. Your stomach rumbles gently as the tautness in your chilled body subsides. Cheerful holiday memories dance in your mind alongside the appetizing scent. You feel an embracing happiness.

You are awaking to your buzzing alarm, coming out of a deep, restful sleep. You look at the clock and glimpse a sweet note from your significant other. You unfold onto your back and stretch your limbs widely under the sheets. The small act of kindness generates a quiet sense of delightful contentment. You feel a fulfilling happiness.

You are walking in a national park, signs indicating a scenic lookout nearby. You stop ahead to take in the amazing view of a shimmering pristine lake. Your breathing slows and softens as your eyes pour over the expansive vista. The effort of your last steps evaporates in the appealing aesthetic around you. You feel an airy happiness.

You are sitting in a beach chair, looking out at the glittering ocean. You watch the palette of the sun and sky swirl together at dusk. In this moment, you experience your chest rising and falling softly. You take in the refreshing simplicity of the natural beauty around you. You feel a calm happiness.

You are lounging on a cushy floor pillow,

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having been abroad for months. You open the door and are instantly greeted with hugs and smiles. You grasp your siblings and parents tightly, inhaling deep into your belly. You are overwhelmed by the open assurance experienced in the close moment. You feel a heartwarming happiness.

You are playing outside with your nephew, running around tirelessly. You rake up a leaf pile and then take turns jumping in the heap. You find yourself quickly out of breath from jumping and laughing. You rapidly forget about being a grown-up and surrender to youthful fun. You feel an enlivening happiness.

[CATCH] You are pushing a grocery cart, checking items off your list. You hear the familiar voice of a good friend who has been away for months. You quickly turn around and your body elevates as you are met with a warm smile. You throw up your arms in excitement, exclaiming a heartfelt 'how are you?' You feel a radiant happiness.

[PRACTICE] You are sitting rigidly at your desk, tensely attending to your computer. You submit your online midterm and a grade of 98% suddenly appears. Your heart begins to race as you throw your arms in the air. Smiling widely, your mind is flooded by a delightful new self-confidence. You feel a bursting happiness.

opening a new magazine. You glance up as your puppy trots over and wiggles into your lap. As her small body relaxes, you sense both your hearts beating evenly. Tenderly petting her soft fur cultivates a lovely sense of ease. You feel an affectionate happiness.

You are lying in a hammock, a breeze softly blowing across your body. You reopen your book and easily fall back into the fictional tale. As you escape reality, you sense the weight of your body release into the hammock. The mental immersion fosters a gentle liberation from the outside world. You feel a serene happiness.

[CATCH] You are sitting in your backyard, resting on the one shaded porch step. You twist open an ice cold beverage to satisfy your growing thirst. As you yawn widely and deeply, you sense how dry your throat has become. You take a gulp and relish the soothing relief the cool liquid delivers. You feel a refreshed happiness.

[CATCH] You are wading into a lake, calm waters gradually surrounding your body. You lie back in the water and float in the gentle rhythm of the waves. Your eyes close softly as you center on the warming sensation of the rising sun. A wonderful sense of freedom begins to permeate and calm your mind. You feel a soothing happiness

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### Unpleasant

You are standing wearily in the vet's office, trying to maintain composure. You know the vet supports the difficult decision to end your pet's suffering. A wave of nausea surfaces and you reach out to stabilize yourself. You give your consent, recalling the incredible pain you witnessed during the night. You feel a taxing happiness.

You are sprinting to home base, playing the final inning in a softball championship. You twist your knee when you collide with the catcher to score the winning run. You hear a pop and pant sharply as a throbbing pain erupts in your knee. Rolling over, the discomfort obscures the celebratory chants of teammates. You feel a

You are walking to the locker room, your t-shirt soaked with sweat. You linger physically in the exhausting weight workout you just finished. A cramping ache in your left quad directs your attention to each small step. Finally the nagging tightness in your muscle forces you to an undesirable stop. You feel a drained happiness.

You are sitting in a work meeting, trying not to daydream during mundane dialogue. You soon realize you are receiving praise for ideas originally belonging to a coworker. Peering at your boss, you take a deep breath as you hear him continue on. You look down, withdrawing for a moment from the uncomfortable situation.

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distressed happiness.

You are walking down the hall, trying to get to a meeting on time. You run into a difficult colleague and end a tense exchange with a biting remark. Your stomach tightens the moment the last sarcastic jab escapes your lips. The cutting retort echoes poisonously in your head as your colleague sulks away. You feel a disturbing happiness.

You are standing in a friend's kitchen, nervously prying open a sealed envelope. You quickly find out that you passed the big exam but your friend didn't. You gasp in disbelief of the results and your friend swiftly turns away from you. Violently shaking your head, you can sense your presence becoming uncomfortable. You feel an unwelcome happiness.

You are sitting on a medical chair, a needle securely taped to your arm. You begin filling the first blood donation bag as the nurse adjusts your IV. Squeezing a ball in your hand, you sense your stomach becoming unsettled. You avert your gaze from the unwelcome sight of blood spurting from your body. You feel a sobering happiness.

You are standing outside on break, conversing with a close coworker. You pause while your friend bravely describes shameful rumors circulating about you. You sense your stomach churning as you avert your watering eyes for a second. Still absorbing the stinging gossip, you are grateful for your friend's presence. You feel an agitated happiness.

[CATCH] You are biking with your sister, traversing a neighborhood with no sidewalks. You see a speeding car zoom close to your sister and knock her off balance. Your heart is racing and your hands clammy as you leap off your bike. You try to push away nasty thoughts of what could have happened but didn't. You feel a grave happiness.

[CATCH] You are jogging with your brother, trying to keep up with his fast pace. You hear him mumble that he is moving

You feel a tainted happiness.

You are looking out at the rain, wishing you had volunteered to host dinner. You stand and slowly prepare for the difficult drive to your friend's house. Pulling on your jacket, you shudder slightly as you lift up your hood. A booming clap of thunder deepens your conflicted craving to stay home. You feel a cumbersome happiness.

You are sitting drinking tea, tucked in a corner of a local coffee shop. You confess to your best friend that you purposely didn't help a coworker. As you express your regret, your heartbeat slows to a more natural speed. Now you can see that you were acting defensively, driven by your own insecurities. You feel a remorseful happiness.

You are rocking in your favorite chair, gently flipping your cell phone open and closed. You want to share a recent promotion with your brother who is unavailable overseas. Wishing you could call him, you close your eyes and release a held breath. You continue fiddling with your phone, a tender solitude clouding your mind. You feel a lonely happiness.

You are paying for groceries, opening your wallet as the last items are scanned. You wince at the expensive bill for your long awaited dinner party with friends. As you swipe your credit card, you can hear your heart beating in your chest. You mull over undesirable sacrifices now needed to balance your monthly budget. You feel a difficult happiness.

[CATCH] You are casually window shopping, enjoying the slow pace of the weekend. You bump into an annoying acquaintance and lie about being rushed to get away. Saying good-bye, your stomach flutters in the wake of the awkward interaction. You turn away slowly, unexpectedly bothered by your contrived escape. You feel an uncomfortable happiness.

[PRACTICE] You are strolling into work, sipping your much needed morning coffee. You greet your devoted assistant and

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across the country for a great job. You gasp loudly, slowing to a fast walk while failing to conceal your dumbfounded state. You selfishly think about losing your brother to a career move. You feel a grieving happiness.

exaggerate your liking of her new haircut. Your stomach doesn't feel quite right as she agrees that it suits her style. Smiling to conceal your poor first impression, you contemplate her perceptions. You feel a tricky happiness.

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## *Sadness Scenarios*

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### **High Arousal**

### **Low Arousal**

#### **Pleasant**

You are rushing into your best friend's house, pushing the door open. You yell out that you accepted a fantastic job offer across the country. You begin to sweat as you run up the stairs, hearing a faint cheer. Racing down the hall, a lovely familiarity washes over you. You feel an adoring sadness.

You are running in a charity race, your first time covering this long a distance. You see the finish line and remember your aunt's lost battle with cancer. Covered in sweat and heart pumping, you pick up your pace. The cheerful chanting ahead instills an overwhelming sense of courage. You feel a beneficial sadness.

You are standing on your college quad, dressed in a smart-looking cap and gown. You listen for the graduation decree and upon hearing it fling your cap upwards. Following energetic classmates, you sweat lightly as you march away a graduate. You catch a friend's eye and flashback to your delightfully lively freshman dorm. You feel a spirited sadness.

You are dancing at a wedding, the floor packed with friends and family. You lock eyes with your younger sister and reality hits that she is the bride. You sense your heart pumping as you consciously slow your movements. You smile widely in adoration of her and the celebration of new beginnings. You feel a joyful sadness.

You are perched facing the TV, friends joining you for a special viewing. You watch the story line develop in the finale of your favorite television drama. Clapping

You are lying in your bed, buried under layers of soft blankets. You drift to the high school reunion postcard on your nightstand. Closing your eyes, you sense the calm rhythm of your heart beating. Hazy memories echo cheerful laughter of friends long out of touch. You feel a warm sadness.

You are stretched out on the sofa, a classic movie on TV. You realize that the holiday filled with presents, food, and family is almost over. Your eyes are heavy and begin to close as you exhale easily and softly. The joy of annual traditions and thoughtful gift giving loosens your mind. You feel a contented sadness.

You are looking in the mirror, trying on your first expensive business suit. You see a professional staring back and for a moment don't recognize yourself. You glance at the worn jeans on the floor and spontaneously hold in a breath. Surprised by your new look, you exhale accepting the promising new identity. You feel an enriching sadness.

You are inching under the sheets, slowly getting settled at the late hour. You long for a good night's sleep after spending all your waking hours working. You sense your stiff neck relax as you rest your head on a pillow. You curl up and let go of the day, finally a moment of lovely calm. You feel a peaceful sadness.

You are sitting packing your suitcase, mixing work suits and beach attire. You glance at your spouse and wish you could travel to the Miami conference together.

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your hands together, you gasp in unison with others at the plot twist. When the show concludes, you engage in a lively discussion of the thrilling ending. You feel a playful sadness.

You are playing charades, gathered at a friend's house for game night. You try to act out an abstract word and end up confusing your team. As you jump about gesturing vigorously, you sense your heart beating faster. You watch the hourglass run out and collapse on the floor laughing, losing the round. You feel a silly sadness.

[CATCH] You are marching into your boss's office, on a private mission. You deliver a thoughtful speech and quit your loathsome job on the spot. Walking swiftly to your desk, disheartened coworkers gather around. You promise to keep in touch as you eagerly pack up your things. You feel an empowered sadness.

[CATCH] You are gathering on the basketball court, focused on your intramural team captain. You listen to a lively recap of the solidarity that won your final game. Smiling as sweat drips off your face, your body is still energized. You shout one last cheer with teammates, individuals who have become good friends. You feel a merry sadness.

Anticipating the warm Florida weather, you sense your heart beating softly. You imagine lying comfortably by the hotel pool with a refreshing drink in hand. You feel a tranquil sadness.

You are strolling past stores, shopping for family during the holiday season. You discover a gadget and instead of buying it for yourself purchase it as a gift. You detect your energy level shift ever so slightly as you hold the package. The gorgeous aesthetics of the design are even more appealing up close. You feel a fascinated sadness.

[CATCH] You are sitting in your car, rotating the key smoothly in the ignition. You hear the radio click on and catch the last verse of an old favorite. In the moment following, you allow your eyes to close and release a breath. You hum the tune in its absence, the rhythm pleasing to your mind. You feel an enjoyable sadness.

[PRACTICE] You are lying in bed barely awake, perceiving the faint buzz of your alarm. You linger in a dream wishing you could fall back into the fuzzy fantasy. Hovering just outside of waking awareness, your body remains settled and still. You continue nurturing your connection to the lovely dream as you open your eyes. You feel a charming sadness.

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### Unpleasant

You are running inside to open a letter, grasping it firmly in one hand. You learn that you have been rejected from your back-up graduate school. Your eyes swell and your body caves inward as hope morphs into devastation. Stinging tears rush out as your mind becomes alarmingly agitated with self-criticism. You feel a rampant sadness.

You are standing in the airport, waiting for an update on your flight status. You hear an intercom voice cancel your flight home to your family for the holidays. Your body quivers and you fight back tears when the airport is officially closed. Your hopeless mind topples into despair walking towards the snowy parking lot. You feel a depressing sadness.

You are reclining watching evening sitcoms, relaxing at the end of a long day. You see a commercial soliciting donations to help starving children abroad. As the commercial ends, you close your eyes and sense yourself exhale. Your mind resides momentarily in the heartache behind the emaciated faces. You feel an dreary sadness.

You are standing in line, eager to get a seat in the crowded movie theater. You overhear the person ahead get the last ticket to the only worthwhile film. Your body sinks as you scan the other lackluster possibilities on the board. You can't seem to disengage from your disappointment to choose something else. You feel a disheartening sadness.

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You are driving on back roads, attempting to avoid rush hour traffic. You slam the brakes when a dog darts onto the road but you can't stop. Tears begin to swell as you leap out of the car as fast as you can. You immediately register a lifeless form and drop to the ground in agony. You feel an uncontrollable sadness.

You are walking into a friend's house, dropping by to return a movie. You witness your significant other in an intimate embrace with your friend. Your stomach is nauseated, the shocking infidelity settling into your body. Your mind is spinning trying to understand the terrible betrayal of trust. You feel a devastating sadness.

You are standing sorting mail, a stack accumulating from the busy week. You open your credit card bill and cringe at a balance of thousands. Your stomach becomes uneasy as you examine the accruing charges. Rubbing your forehead, you retreat into your disturbingly overwhelmed mind. You feel a staggering sadness.

You are sitting in the doctor's office, resting on the crackling sanitary paper. You face your doctor who informs you gently that the cancer has returned. You bury your head in your hands, inhaling in short sharp breaths. Questioning what fight you have left, your only desire is to recoil from the world. You feel a bleak sadness.

[CATCH] You are walking along the sidewalk, scanning the street vigilantly. You search for your missing cousin who hasn't been seen in 24 hours. Your throat instantly goes dry when you think of the danger she might be facing. You sense yourself losing faith, your distressed mind plunging into doubt. You feel a severe sadness.

[PRACTICE] You are running for the phone, your personal cell ringing loudly at work. You answer and your sister softly tells you that she is terminally ill. You struggle for a breath as your stomach flip-flops in a moment of silence. You briefly flash forward to a dreadful future without

You are sitting on a park bench, rays of sunshine highlighting your body. You twist your neck to stretch and see a homeless man in the distance. His presence remains with you as your muscles unwind and loosen. The disheartening expression on his dirt-stained face fills your mind. You feel a delicate sadness.

You are standing before a busy hostess, amidst a small crowd of people. You learn from her that the wait to be seated is 45 minutes. Your stomach grumbles as you turn to relay the message to your friends. You shuffle toward the packed bar, frustrated by the inconvenience. You feel an untimely sadness.

You are sitting at the table, spooning a heap of food on your plate. You taste the casserole made from a new recipe and are disappointed. Setting down your fork momentarily, you hear your stomach quietly rumbling. You look at your plate and avoid taking another bite of disagreeable blandness. You feel a dissatisfied sadness.

You are sitting at the kitchen table, booting up your laptop to check e-mail. You try launching the internet and a message appears indicating a malfunction. After another failed attempt, you slowly close your computer and let go of a breath. You lean forward and rest your head on the table, giving up for now. You feel an inept sadness.

[CATCH] You are standing facing the mirror, rubbing your sleepy eyes to wake up. You reach for the faucet and spot a raised red pimple on your cheek. You stare at your face, motionless until a sigh escapes and your shoulders sink. The small blemish nudges your drowsy mind, annoyingly directing your attention. You feel a dashed sadness.

[CATCH] You are sitting on the floor, sorting through a photo box you discovered. You find an endearing picture of your grandfather who passed away years ago. You softly close your eyes, briefly tearing up as you hold the photograph. For a moment, you are

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your loving sister. You feel a horrid  
sadness.

reunited with a tender sorrow, faded but  
still present. You feel a wistful sadness.

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