SUPPLEMENTARY METHODS 1

Participants performed a verbal working memory task (VWMT) during fMRI scanning. The VWMT was administered using E-Prime (Psychology Software Tools, Inc.) and consisted of 192 trials, on which 4 letters were presented on a screen for 1500 milliseconds (ms). Participants were asked to remember all 4 letters. Following a 3000 ms delay interval, a probe letter was presented for 1500 ms. Participants indicated whether the probe was a member of the current memory set. Half of the probes (96 trials) were negative, requiring a "no" response, and half were positive (96 trials), requiring a "yes" response. One-fourth (24 trials) of the negative probes were of Low-demand, meaning that the probe letter had not been presented in at least 3 trials, therefore, these probes were unfamiliar and easy to reject. Another one-fourth of the negative probes were moderately demanding (i.e., Medium-demand), because the probe letter was moderately familiar since it had been present in the previous set. Another one-fourth of the negative trials were of High-demand because the probe letter had appeared in the previous two memory sets, making the probe letter highly familiar and thus even more difficult to reject. The final one-fourth of negative trials were response conflict trials, but those trials were not included in this analysis because the type of demand was qualitatively different (i.e., the probe did not vary in how many times it was previously presented). Inter-trial Intervals (ITIs) were jittered, ranging between 1500 ms and 9000 ms.

SUPPLEMENTARY RESULTS 1

We examined the relationship between the self-reported measures of distress and objective measures of subject group (categorical) and task performance (continuous), plotted in Figure S1. Along with self-reported distress measures (*Worry*, *Anxiety*, *Sleep problems*, *Fatigue* and *Depression*), we included the following: *Group* = pre-treatment cancer group, coded as a rank variable, to reflect increasing severity of anticipated treatment (1=CNTRL, 2=PRE-RADIO, 3=PRE-CHEMO); *Hb* = haemoglobin concentration, which is inversely related to the effects of pre-treatment; *RT* = average reaction time on the verbal working memory task; *Acc*. = accuracy on the verbal working memory task, as the fraction of correct responses (see Berman et al., 2013 for further details on the measures).

We Z-scored each variable across subjects, then performed Principal Component Analysis (PCA) on the set of behavioural measures, to identify the strongest covariance relationships between the variables. In order to test the stability of PCs, we ran PCA in a Bootstrap resampling framework. For every iteration, we resampled on subjects with replacement, and re-ran the PCA. We measured the confidence intervals for the loadings on each behavioural variable in $\boldsymbol{u}_i$.

Only PC#1 had significantly stable loadings on behavioural variables; it accounted for a median of 36.4% behavioural variance (interquartile range: 34.7% to 39.5%). As shown in Fig. S1, all distress measures are correlated with intensity of pre-treatment cancer group (positive *Group* loading and negative *Hb* loadings), and negatively correlated with task performance (positive *RT* loading, negative *Acc* loadings).

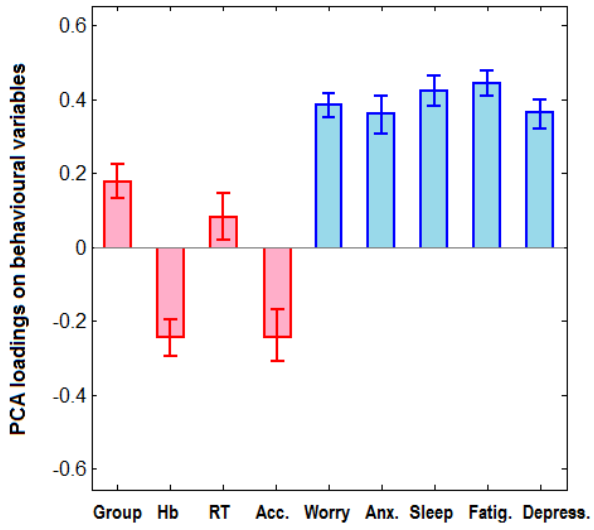

FIGURE S1: Principal Component Analysis (PCA) of combined objective (red) and self-report (blue) behavioural measures. Objective measures include: Group = cancer group (rank variable, where 1=control 2=radiotherapy 3=chemotherapy), Hb = haemoglobin concentration, RT = reaction time, Acc.= accuracy. Self-report measures include: Worry, Anx.= anxiety, Sleep = sleep problems, Fatig. = fatigue and Depress. = depression. The bar plot shows behavioural loadings for PC#1, which is the only one with significantly stable loadings. The Bootstrapped Standard Error bars are also shown (1000 resamples).