

**Supplementary Table 1:** Exploratory analyses: group means versus healthy controls.

Variable	Response	bvFTD	nvPPA	svPPA
UPDRS	FE-SR	$\hat{\beta} = -2.2842$ , 95% CI: (-4.5364, -0.03204), p = 0.0471	$\hat{\beta} = -3.1525$ , 95% CI: (-5.3440, -0.9610), p = 0.0090	$\hat{\beta} = -2.2571$ , 95% CI: (-3.8623, -0.6519), p = 0.0078
	Face Expression	$\hat{\beta} = -1.1099$ , 95% CI: (-2.4561, 0.2364), p = 0.1025	$\hat{\beta} = -0.8564$ , 95% CI: (-2.5719, 0.8592), p = 0.2916	$\hat{\beta} = -0.6419$ , 95% CI: (-2.2109, 0.9272), p = 0.3986
	Self-Report	$\hat{\beta} = 1.2399$ , 95% CI: (-0.4504, 2.9301), p = 0.1427	$\hat{\beta} = 2.1979$ , 95% CI: (-0.2995, 4.6953), p = 0.0769	$\hat{\beta} = 1.6379$ , 95% CI: (-0.1033, 3.3792), p = 0.0633
Non-target response	FE-SR	$\hat{\beta} = -2.3898$ , 95% CI: (-4.1028, -0.6768), p = 0.0081	$\hat{\beta} = -3.1461$ , 95% CI: (-4.9688, -1.3234), p = 0.0026	$\hat{\beta} = -2.3334$ , 95% CI: (-4.0349, -0.6319), p = 0.0095
	Face Expression	$\hat{\beta} = -1.1042$ , 95% CI: (-2.3344, 0.1259), p = 0.0769	$\hat{\beta} = -0.9205$ , 95% CI: (-2.9522, 1.1113), p = 0.3374	$\hat{\beta} = -0.6545$ , 95% CI: 2.3414, 1.0324), p = 0.4252
	Self-Report	$\hat{\beta} = 1.2888$ , 95% CI: (-0.1271, 2.7047), p = 0.0727	$\hat{\beta} = 2.2207$ , 95% CI: (0.6353, 3.8062), p = 0.0107	$\hat{\beta} = 1.6800$ , 95% CI: (-0.1101, 3.4702), p = 0.0639
Physiological Response	FE-SR	$\hat{\beta} = -2.5618$ , 95% CI: (-4.5816, -0.5420), p = 0.0153	$\hat{\beta} = -3.0895$ , 95% CI: (-4.9668, -1.2123), p = 0.0036	$\hat{\beta} = -2.2754$ , 95% CI: (-3.8825, -0.6682), p = 0.0075
	Face Expression	$\hat{\beta} = -0.9773$ , 95% CI: (-2.0466, 0.09192), p = 0.0718	$\hat{\beta} = -0.7505$ , 95% CI: (-2.5154, 1.0145), p = 0.3687	$\hat{\beta} = -0.7325$ , 95% CI: (-2.2247, 0.7597), p = 0.3165
	Self Report	$\hat{\beta} = 1.6630$ , 95% CI: (-0.02927, 3.3553), p = 0.0537	$\hat{\beta} = 2.2323$ , 95% CI: (-0.3756, 4.8401), p = 0.0850	$\hat{\beta} = 1.5428$ , 95% CI: (-0.07215, 3.1578), p = 0.0600

**Supplementary Table 2:** Within group slopes of relationship between exploratory measures and the difference score as well as its components per diagnosis group (i.e., the extent to which an exploratory measure correlates with the response of interest within each group).

Variable	Response	bvFTD	nfvPPA	svPPA
UPDRS	FE-SR	$\hat{\beta} = -0.00425$ , 95% CI: (-0.2729, 0.2644), p = 0.9735	$\hat{\beta} = -0.00567$ , 95% CI: (-0.1917, 0.1803), p = 0.9447	$\hat{\beta} = -0.4163$ , 95% CI: (-0.9795, 0.1469), p = 0.1324
	Face Expression	$\hat{\beta} = -0.01919$ , 95% CI: (-0.1654, 0.1270), p = 0.7824	$\hat{\beta} = -0.1407$ , 95% CI: (-0.2872, 0.005728), p = 0.0569	$\hat{\beta} = -0.4958$ , 95% CI: (-1.0793, 0.08779), p = 0.0867
	Self-Report	$\hat{\beta} = -0.01606$ , 95% CI: (-0.2158, 0.1837), p = 0.8662	$\hat{\beta} = -0.1452$ , 95% CI: (-0.3640, 0.07353), p = 0.1578	$\hat{\beta} = -0.1217$ , 95% CI: (-0.7885, 0.5452), p = 0.6927
Non-target Responses	FE-SR	$\hat{\beta} = -0.6514$ , 95% CI: (-1.0501, -0.2526), p = 0.0035	$\hat{\beta} = -0.7427$ , 95% CI: (-1.5916, 0.1061), p = 0.0775	$\hat{\beta} = 0.2196$ , 95% CI: (-0.3960, 0.8353), p = 0.4483
	Face Expression	$\hat{\beta} = -0.2488$ , 95% CI: (-0.5127, 0.01507), p = 0.0627	$\hat{\beta} = 0.6063$ , 95% CI: (-0.3680, 1.5806), p = 0.1859	$\hat{\beta} = 0.07837$ , 95% CI: (-0.5555, 0.7122), p = 0.7896
	Self-Report	$\hat{\beta} = 0.3980$ , 95% CI: (0.06367, 0.7323), p = 0.0226	$\hat{\beta} = 1.3238$ , 95% CI: (0.5687, 2.0788), p = 0.0047	$\hat{\beta} = -0.1349$ , 95% CI: (-0.8279, 0.5580), p = 0.6749
Autonomic Reactivity	FE-SR	$\hat{\beta} = 1.4979$ , 95% CI: (0.08290, 2.9129), p = 0.0394	$\hat{\beta} = 0.5979$ , 95% CI: (-0.4208, 1.6166), p = 0.2079	$\hat{\beta} = 0.2617$ , 95% CI: (-0.8215, 1.3450), p = 0.6076
	Face Expression	$\hat{\beta} = 1.0796$ , 95% CI: (0.4099, 1.7492), p = 0.0038	$\hat{\beta} = 0.6664$ , 95% CI: (-0.3190, 1.6517), p = 0.1558	$\hat{\beta} = 0.8973$ , 95% CI: (-0.1692, 1.9639), p = 0.0916
	Self-Report	$\hat{\beta} = -0.4181$ , 95% CI: (-1.6070, 0.7708), p = 0.4646	$\hat{\beta} = 0.1198$ , 95% CI: (-1.3648, 1.6045), p = 0.8557	$\hat{\beta} = 0.6321$ , 95% CI: (-0.5168, 1.7810), p = 0.2532

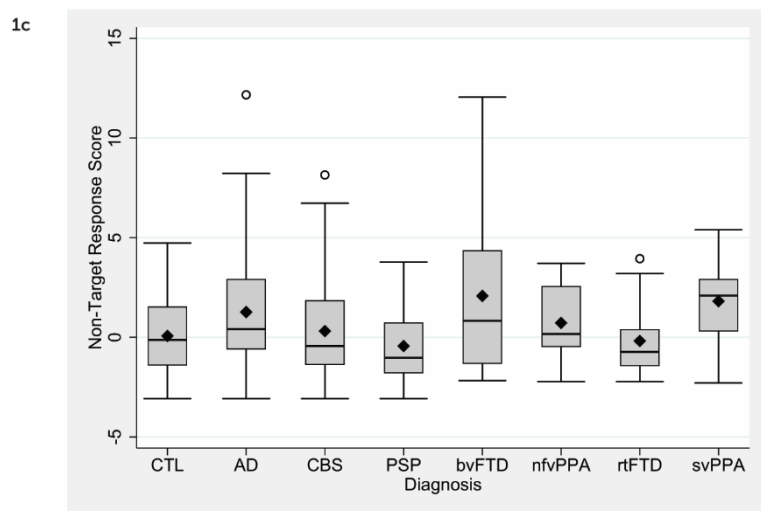
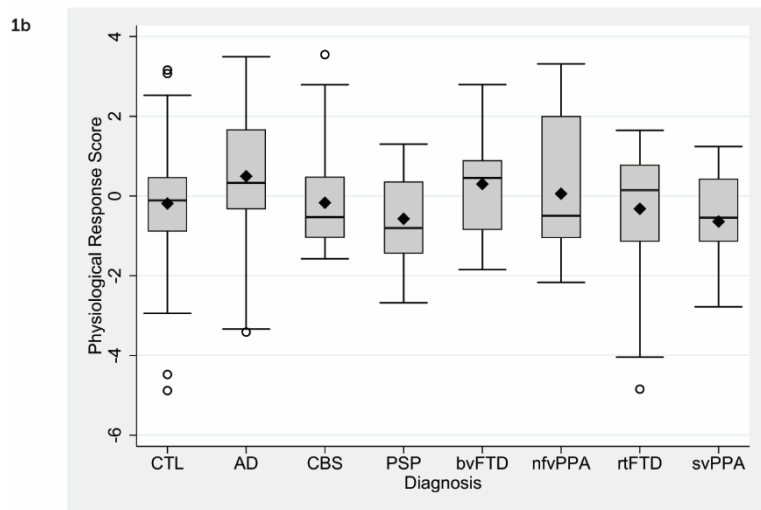
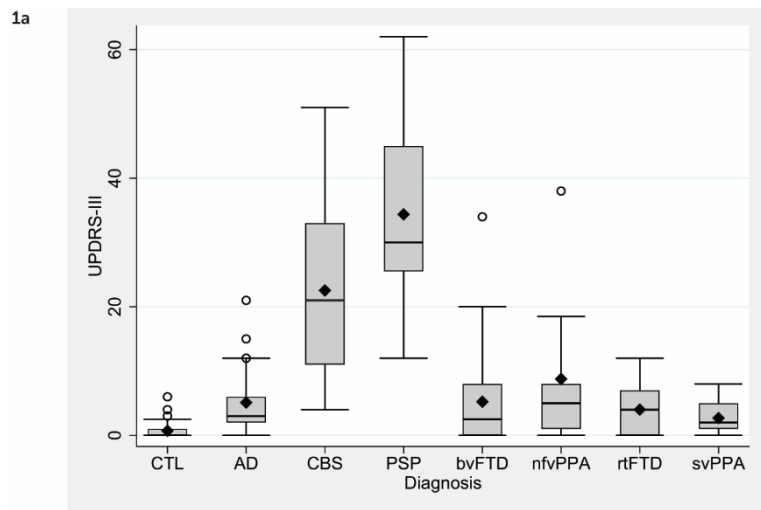
## **Supplementary Figure 1) Secondary Outcome Measures**

**Supplementary Figure 1a) UPDRS across all diagnoses.** All groups with neurodegenerative diagnoses differed significantly from healthy controls.

**Supplementary Figure 1b) Physiological reactivity in all groups.** This is a composite measure of autonomic arousal over three separate emotionally provocative videos. No groups with neurodegenerative diagnoses differed significantly from healthy controls.

**Supplementary Figure 1c) Non-target responses in all groups.** This measure approximates non-target answering (e.g., only answering in a positive direction for all videos shown). There is a trend for this to be true in both svPPA and bvFTD. Note the large range in bvFTD.

# Supplementary Figure 1) Secondary Outcome Measures



## Supplementary Figure 2: Correlations Between Primary and Secondary Outcome Measures

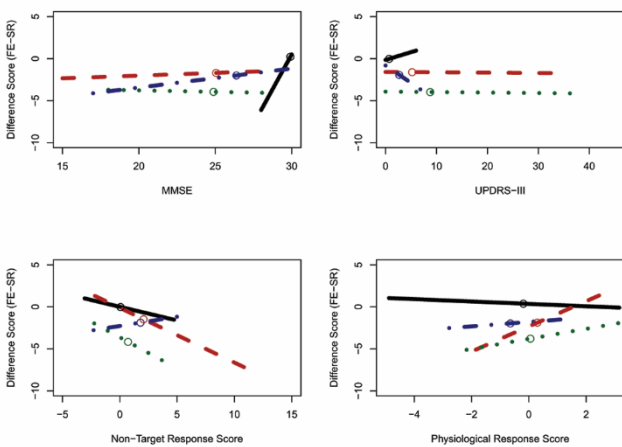
**Supplementary Figure 2a) The relationship between the facial expression minus self-reported emotional reactivity difference score (FE-SR) and three candidate influential variables in bvFTD, nvPPA, and svPPA** (all of which differed from healthy controls in the primary measure of interest). There was no significant between-group interaction with UPDRS. There was a significant relationship in bvFTD between non-target answers and the difference score ( $p = 0.004$ ), with a marginally non-significant correlation between answering indiscriminately and the difference score in nvPPA ( $p = 0.08$ ), but no interaction between groups. There was a significant correlation between autonomic reactivity and the difference score in bvFTD ( $\hat{\beta} = 1.50$ ,  $p = 0.0394$ ), and this correlation differed significantly from that of healthy controls ( $\hat{\beta} = 1.64$ ,  $p = 0.0330$ ).

**Supplementary Figure 2b) The relationship between facial reactivity and three candidate influential variables in bvFTD, nvPPA, and svPPA** (all of which differed from healthy controls in the primary measure of interest). In svPPA, there is a marginally non-significant UPDRS slope  $-0.50$  ( $p$  value =  $0.0867$ ), as well as marginally non-significant physiological response slope  $0.90$  ( $p$  value =  $0.0916$ ). In bvFTD, there is a marginally non-significant non-target slope  $-0.25$  ( $p$  value =  $0.0627$ ). Note that in bvFTD, physiology correlates with facial expression ( $p$  value =  $0.0038$ ), even more so than in healthy controls ( $p$  value =  $0.0149$ ). Nevertheless, there is no overall difference in physiological reactivity in this study between the bvFTD group and healthy controls, despite a trend towards less facial reactivity in the bvFTD group.

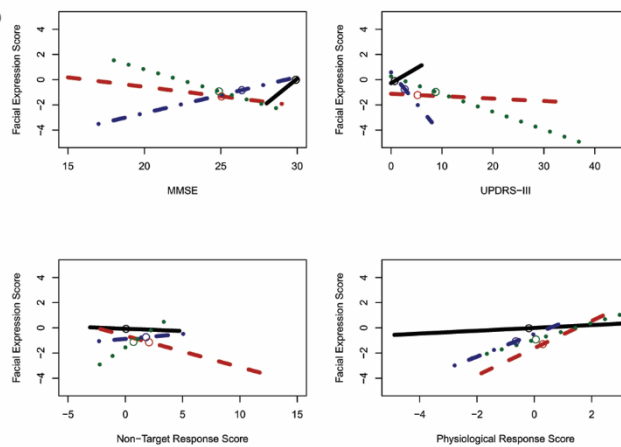
**Supplementary Figure 2c) The relationship between self-report and three candidate influential variables in bvFTD, nvPPA, and svPPA** (all of which differed from healthy controls in the primary measure of interest). Whereas the svPPA group differed from healthy controls in mean self-report, and tendency towards non-target responses, there was no relationship between self-report and any of the possible variables of interest explored here. In nvPPA, there was a significant relationship between non-target responses and self-reported emotion ( $p$  value =  $0.0047$ ), with a significantly different slope in the relationship between overcalling and self-reported emotion ( $p = 0.0275$ ), and there was a significant difference for overcall slope compared to healthy controls ( $p = 0.0155$ ). BvFTD also demonstrated a significant relationship

between overcalling and self-reported emotionality ( $p$  value = 0.0226), though this did not significantly differ from healthy controls.

2a



2b



2c

