Evaluating distinct components of empathic behaviour in frontotemporal dementia

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Background

Empathy is not a unitary construct and includes both cognitive and emotional components. The former taps into the understanding of another's perspective, while the latter refers to one's ability to share another's emotional experience[3, 4]. Impairment of empathy is a key feature of frontotemporal dementia (FTD)[1,2], forming part of the diagnostic criteria for behavioural variant FTD[5]. However such deficits have been poorly studied so far. This study investigated different aspects of empathy both on a cross-sectional and longitudinal basis.

Methods

Baseline:

113 individuals were investigated: 34 bvFTD, 14 semantic variant primary progressive aphasia (svPPA), 19 nonfluent variant PPA (nfvPPA), 12 logopenic variant PPA (lvPPA), as well as 11 with Alzheimer's disease (AD) and 23 controls.

The modified Interpersonal Reactivity Index (mIRI) and the Revised Self-Monitoring Scale (RSMS) were completed by an informant well known to the individual. The mIRI was made up of two subscales: perspective taking (PT, a measure of cognitive empathy; *max = 35*) and empathic concern (EC, a measure of emotional empathy; *max = 30*). The RSMS also contained two subscales: sensitivity to expressive behaviours of others (EX; *max = 24*) and tendency to monitor self-presentation (SP; *max = 30*).

Follow-up:

A subset of 36 individuals completed a follow-up assessment (17 bvFTD, 6 svPPA, 5 nfvPPA, 3 lvPPA and 5 controls) at a mean (standard deviation) of 1.0 (0.2) years from baseline. Changes in scores on the mIRI and RSMS over time were assessed.

Results

Baseline analysis:

For the cross-sectional analysis, a one-way ANOVA was run but the assumption of homogeneity of variance was violated; therefore, the Brown-Forsythe F-ratio is reported and indicated that there was a significant effect of diagnosis on the total mIRI score [$F(5,38.9) = 14.0, p < .001$] and total RSMS scores [$F(5, 39.7) = 17.7, p < .001$].

Post hoc tests revealed significant differences on the mIRI scores between the control group and the bvFTD ($p < .001$), svPPA ($p = .002$), and the AD ($p = .049$) groups. There were no other significant differences [nfvPPA ($p = .437$) lvPPA ($p = .245$)]. Whereas on the RSMS three of the groups scored significantly lower than controls [bvFTD ($p < .001$), svPPA ($p < .001$), lvPPA ($p = .010$)] with no significant differences in the nfvPPA ($p = .669$) and the AD ($p = .069$) groups (*Figure 1*).

On the mIRI subscales participants tended to perform worse on PT (M = 19.0, SD = 7.5) compared to EC (M = 21.8, SD = 6.5), whilst on the RSMS subscales performance was worse on EX (M = 14.0, SD = 9.1) compared to SP (M = 17.8, SD = 7.9). *Figure 2* shows this breakdown across the groups for the mIRI [EC: $p < .001$, PT: $p < .001$] and the RSMS [EX: $p < .001$, SP: $p < .001$].

Follow-up analysis:

A repeated measures ANOVA showed no significant effect of time on the mIRI ($p = .596$) or on the RSMS ($p = .575$) scores but did show an effect of diagnosis (both $p < 0.05$). However, there was a trend for a decrease over time in both empathy scores in nfvPPA [mean decrease in mIRI 5.9 per year, RSMS 6.4 per year], in RSMS in bvFTD [4.3 per year] and in mIRI in lvPPA [5.6 per year] (*Figure 3*).

Conclusion

The results suggest that people with FTD have deficits across multiple measures of empathy, and particularly score worse on measures of their ability to take another's perspective and express their behaviour. However there is variability in different measures and across the different phenotypes. While our findings suggest that there is not a significant effect of time on these empathy scores, it is likely that this is due to the low sample size and will be investigated further in a larger group of participants. The findings have important implications for understanding the differences and changes in empathy across FTD subtypes.

Diagnosis	N	Age	Disease Duration	MMSE
Control	23	64.4 (16.4)	n.a.	29.5 (1.5)
bvFTD	34	64.7 (7.5)	6.8 (4.8)	24.8 (4.8)
svPPA	14	65.4 (7.2)	5.3 (2.9)	22.3 (7.4)
nfvPPA	19	71.1 (8.9)	5.8 (5.0)	23.3 (5.3)
lvPPA	12	68.2 (8.6)	4.6 (1.9)	18.8 (7.1)
AD	11	70.0 (8.8)	5.9 (3.0)	17.2 (4.6)
***p*-value**		<0.001	n.s	<0.001

Figure 1: Total scores for the mIRI and the RSMS

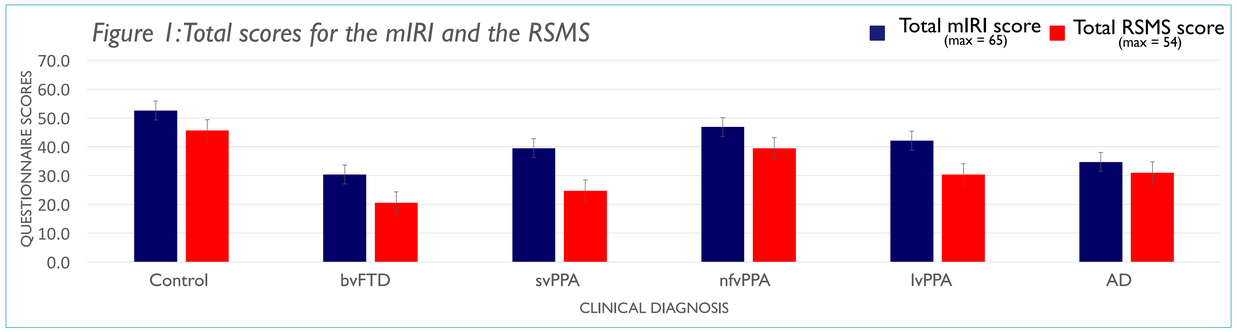


Figure 2: mIRI and RSMS subscale scores

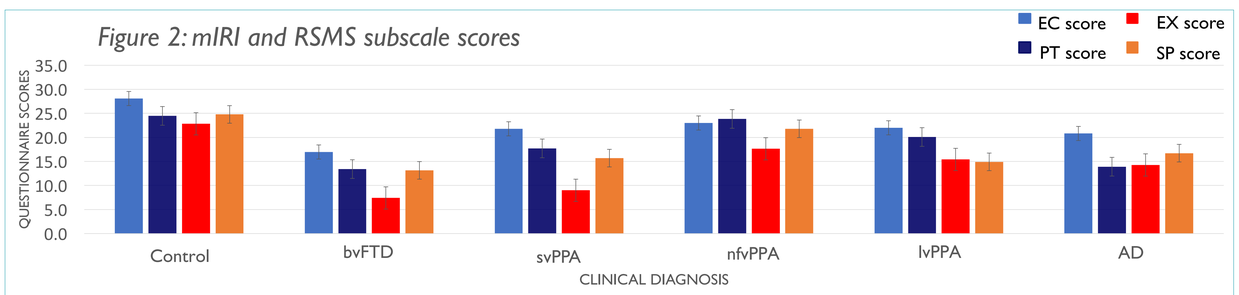
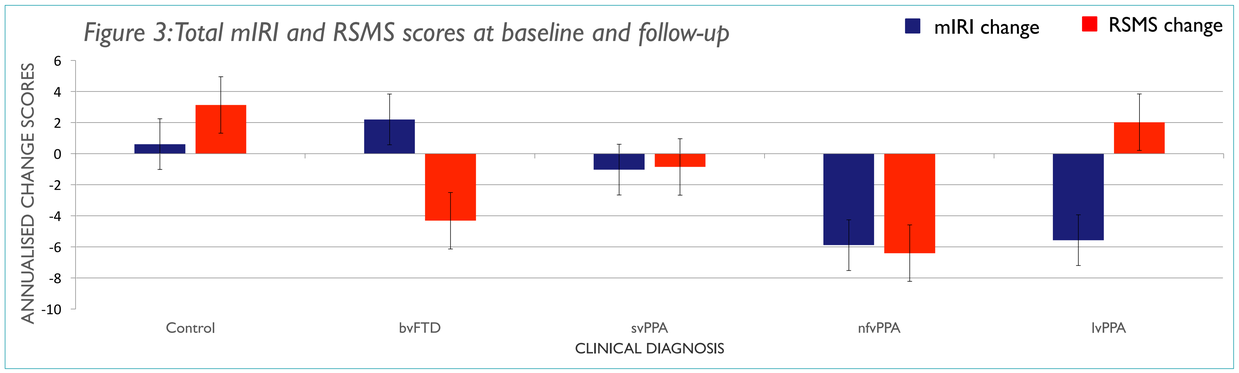


Figure 3: Total mIRI and RSMS scores at baseline and follow-up



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