Social cognition tasks as neuropsychological marker of the behavioral variant of Frontotemporal Dementia: a call for new research to define clinical validity

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Introduction

Current criteria for behavioral variant of Frontotemporal Dementia (bvFTD) diagnosis recognize **"loss of empathy/empathy"** as one discriminating feature. Although the rationale for the use of **social cognition tasks** in suspicion of bvFTD is supported by extensive research evidence, the clinical maturity of socio-emotional tasks still needs to be assessed. In this study, we reviewed current literature on the **neuropsychological assessment of social cognition abilities** in bvFTD trying to define the **maturity** of currently available evidence supporting their use for the early and differential diagnosis of bvFTD.

Methods

Papers (up to March 2019) were selected searching the PubMed and Medline databases according to these criteria:

• bvFTD represents the target population, classified according to validated clinical diagnostic and research criteria (Neary, Snowden et al. 1998, Rascovsky, Hodges et al. 2011)

• Search limited to emotion recognition, empathy, ToM, and other social cognition aspects (no scales or questionnaires)

• Only papers reporting indices of accuracy and/or sensitivity/specificity in classifying bvFTD from controls or other diseases were considered.

• Among the 160 papers initially included in the paper selection, only 14 papers were eligible for the scope of the present review

• Quality of evidence was assessed through QUADAS-2

Results

• A high heterogeneity was found in study design, statistical approach, follow-up length, and cognitive tests used

• Social cognition tests show an **excellent accuracy in discriminating patients from controls** (AUC range 0.88-0.97) (Table 1).

• Socio-affective skills showed good/excellent values of AUC in distinguishing **bvFTD from AD** (range 0.74-0.93) and from **psychiatric patients** (range 0.93-1) (See Table 2 and Table 3).

• A high risk of bias for "reference standard" and "flow and timing" was present in about a third of clinical studies, the risk of bias for index tests and patient selection was overall low.

Conclusions

Despite studies variability, the results support the rationale for the investigation of **affective aspects of social cognition** for the early differential diagnosis of bvFTD. The research priorities should thus focus on the comparison between different tasks tapping the same facet of social cognition, the evaluation of the advantages of **combined batteries** over single tasks, and the validation of social cognition tasks in large multicultural bvFTD populations

Table 1. Accuracy measures in bvFTD patients vs control subjects.

Paper	Study group		Social cognition skill	Sens	Spec	AUC	Accuracy
Diehl-Schmid et al., 2007	25 bvFTD	33 HC	Emotion Recognition	94%	100%	0.97	-
Glechgerrcht et al., 2010	35 bvFTD	14 HC	Affective DM	-	-	0.971	-
			Affective ToM			0.957	
			Cognitive ToM			0.960	
Downey et al., 2013	20 bvFTD	20 HC	Affective ToM	-	-	0.88	85%
Bertoux et al. 2013	20 bvFTD	30 HC	Emotion Recognition Cognitive ToM	-	-	-	88%
Schroeter et al. 2018	86 bvFTD	43 HC	Affective ToM	-	-	0.895	-
Baez et al., 2019	16 bvFTD	22 HC	Affective ToM	-	-	-	97.4% ∫

Table 2. Accuracy measures in bvFTD vs AD patients.

Paper	Study group		Social cognition skill	Sens	Spec	AUC	Accuracy
Bertoux et al., 2013	20 bvFTD	20 AD	Emotion Recognition Cognitive ToM	-	-	0.93	82.5%
Buhl et al., 2013	11 bvFTD	10 AD	Emotion Recognition	-	-	0.79	71%
			Affective ToM	-	-	0.86	81%
			Emotion Recognition (basic emotions)	-	-	0.79	71%
			Emotion Recognition (complex emotions)	-	-	0.88	76%
Possin et al., 2013	22 bvFTD	26 AD	Knowledge of Social Norms	-	-	-	75%
Bertoux et al., 2016	38 bvFTD [19 A-bvFTD, 19 na-bvFTD]	28 AD	Emotion Recognition Cognitive ToM	-	-	-	85.1% A-bvFTD 93.9% NA-bvFTD
Carr et al., 2017	12 bvFTD	12 AD	Self-rated Emotional Intelligence	91%	66%	0.77	-
Dodich et al., 2018	48 bvFTD	47 AD	Emotion Recognition Cognitive ToM Cognitive Empathy	-	-	-	86%

Table 3. Accuracy measures in bvFTD vs. psychiatric patients.

Paper	Study sample		Social cognition skill	Sens	Spec	AUC	Accuracy
Bertoux et al., 2012	37 bvFTD (17 E-bvFTD, 20 M-bvFTD)	19 MDD	Emotion Recognition Cognitive ToM	91.9% All bvFTD 94.1% E-bvFTD	89.5% All bvFTD 89.5% E-bvFTD	0.97 All bvFTD	-
			Emotion Recognition Cognitive ToM	89.2% All bvFTD 94.1% E-bvFTD 85%	100% All bvFTD E-bvFTD M-bvFTD	0.98 All bvFTD	-
Chiu et al., 2018	25 bvFTD	20 MDD	Emotion Recognition	-	-	0.93-0.99	-
Baez et al., 2019	16 bvFTD	13 BD	Affective ToM	-	-	-	89%

Figure 1. Quality of evidence for included studies
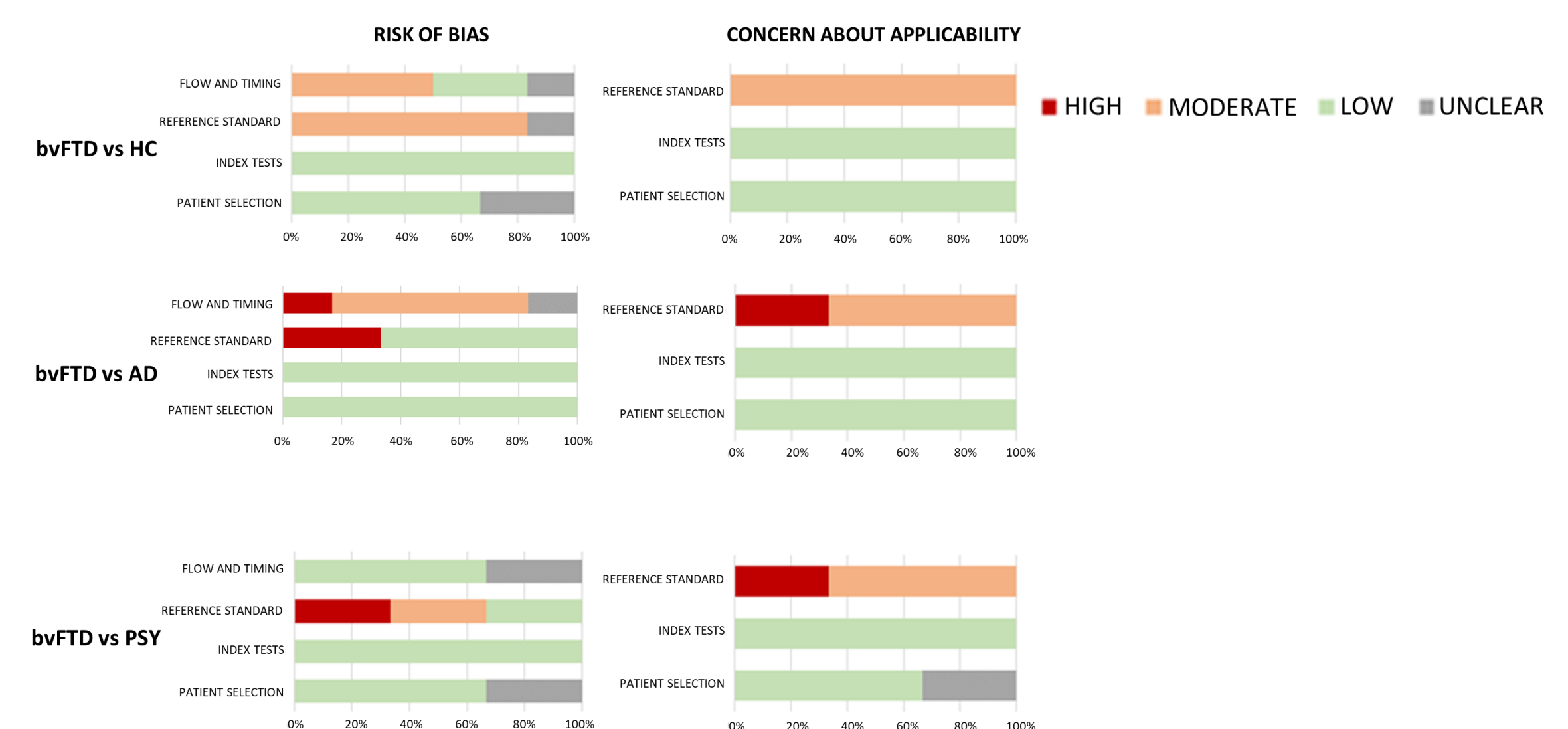
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