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Associative memory and memory complaints in people with first episode of depression: use of the Face-Name Associative Memory Exam (FNAME)

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Abstract

The aim of the study is to assesses associative memory and memory complaints in daily life in people with a First Episode of Depression (FED). This is a preliminary pilot study with observational design. Thirty participants were recruited and assessed: fifteen patients (FED) and 15 healthy (HCtrl) participants. The recruitment was from Mental Health Units between 2021 to 2022. DSM-5 diagnostic criteria and the International Neuropsychiatric Interview (MINI) were used to diagnose depression. The cognitive tests used were face-Name Associative Memory Exam (FNAME), daily life memory questionnaire (MFE-30), and Montreal Cognitive Assessment Test (MoCA). FED patients showed mean score compared to the HCtrl significantly higher on the MFE-30, but there were no significant differences in the FNAME. Furthermore, the results no significant correlations were observed between subjective (MFE-30) and objective (FNAME) memory performance. We observed a dissociation between FED patients' perception of memory difficulties and their objectively measured memory.

Keywords: Associative memory; depression; FNAME; neuropsychological assessment; subjective memory complaints

1. Introduction

Major Depressive Disorder (MDD) is a mental condition characterized by a persistent low or depressed mood, anhedonia or decreased interest in pleasurable activities, feelings of guilt or worthlessness, lack of energy, poor concentration, appetite changes, psychomotor retardation or agitation, sleep disturbances, or suicidal thoughts, that causes social or occupational impairment (American Psychiatric Association [APA], 2014). Depression is a common disorder worldwide, affecting 280 million people (World Health Organization [WHO], 2021), and it is among the top ten causes of disability in the world (Greer et al., 2010). It is presented as a set of predominantly affective symptoms impacting on people's functional status (Evans-Lacko et al., 2018; Vigo et al., 2016).

Importantly, MDD can lead to cognitive dysfunction (Butters et al., 2008; Hammar & Ardal, 2013; Knight & Baune, 2018; Paelecke-Habermann et al., 2005; Porter et al., 2003; Salagre et al., 2017; Song et al., 2006; Vázquez et al., 2010; Trivedi & Greer, 2014). Memory complaints are amongst the most frequent complaints (Vázquez et al., 2010) and there is evidence that patients with depression have lower memory performance compared to healthy controls (Elgamal et al., 2010; Hammar & Ardal, 2013; Hammar et al., 2022; see James et al., 2021 for a meta-analysis).

Research on memory complaints (i.e., the subjective perception of memory decline) in depression has gained significant attention recently (Dillon & Pizzagalli, 2018; LeMoult & Gotlib, 2019; Ramponi et al., 2010). Studies conducted in the general population found a relationship between depression and memory complaints (Bassett & Folstein, 1993; Chandler & Gerndt, 1988; Gagnon et al., 1994; O'Connor et al., 1990; Rohling et al., 2002; Sachs-Ericsson et al., 2021). Also, other studies with young adults show that depression is considered the only variable that explains memory complaints (Au et al., 2008; Barker et al., 1995; Derouesne et al., 1999). Furthermore, it has been shown that people with depression and severe anxiety report more memory complaints than people diagnosed with mild cognitive impairment (MCI; Mendes et al., 2021; Sinforiani et al., 2007).

Another important aspect is that people's beliefs about their own memory abilities, known as memory self-efficacy, can influence how they use their memory in everyday situations (Bandura, 1989; Villamarín, 1990). Strongly negative beliefs about memory performance may have an important implication for cognitive biases (Montejo et al., 2013; Randolph et al., 2004), with a decrease in self-efficacy judgements observed in depression (Kavanagh, 1992; Lippke, 2020; Maddux & Meier, 1995; Beaudoin & Desrichard, 2011).

The relationship between memory complaints and objective memory has

also sparked interest. The study by Antikainen et al. (2001) showed that people with depression had a greater number of memory complaints and poorer performance on objective memory tests (Comijs et al., 2002; Derouesné et al., 2004; Zandi, 2004). However, Lahr et al. (2007) showed that people with depression presented more cognitive complaints in daily life than in neuropsychological tests, probably due to the associated negative self-perception (Beblo et al., 2010). In addition, a low correlation between objective and subjective assessment of memory has been observed in people with more severe depression (Crumley et al., 2014).

In a recent review, Varghese et al. (2022) concluded that the number of depressive episodes experienced might determine the type of cognitive impairment observed. While first episode of depression (FED) subjects performed significantly worse than controls on processing speed and executive/working memory, patients with recurrent depression performed significantly worse, with verbal learning and memory being the most impaired domain. Another recent review (Kriesche et al., 2023), assessing neurocognitive deficits in depression in the acute and remitted state, concluded that in the acute phase, there is strong support for impairment in processing speed, learning, and memory. Follow-up studies and direct comparisons revealed less pronounced deficits in remission, although deficits were still present in attention, learning and memory. A positive correlation between the number of episodes and cognitive deficits as well as depression severity and cognitive deficits was also reported.

In recent years, associative memory impairment has attracted interest in the field of neuropsychology (Bird, 2017; Chirico et al., 2020; Loewenstein et al., 2017; Rentz et al., 2011; Yu et al., 2021) as a sensitive marker of cognitive decline. The focus of this study was to assess episodic memory using an ecologically valid and demanding test, namely, the adapted Face Name Associative Memory Exam (FNAME; Alegret et al., 2015 a, 2024; Amariglio et al., 2012; Enriquez-Geppert et al., 2021; Flores-Vázquez et al., 2021; Flores-Vázquez et al., 2023; Rentz et al., 2011, 2017; Rubiño & Andrés, 2018) to detect differences in memory performance in people with FED.

In this study we use the adapted FNAME (Flores-Vázquez et al., 2021) because it can evaluate associative memory in a more ecological way. Furthermore, it is important to quantify memory complaints to obtain both subjective and objective measures of memory functioning in FED patients. Finally, MoCA was used as a reliable measure of general cognitive function that is sensitive to early changes in cognitive ability across domains but robust to depression symptoms within healthy cohorts (Freitas et al., 2012).

The scientific literature on cognitive deficits in FED patients seems confusing. There is scientific evidence that FED patients show that global cognitive functioning is preserved, but present deficits mainly in processing

speed and executive functions. Furthermore, there are contributions showing that the general group of FED patients assessed with neuropsychological tests can be divided into cognitively preserved and cognitively impaired FED patients. Therefore, we set out the following objective and hypothesis. The aim of this study is to assess the episodic memory of patients with a FED using the FNAME and the perception of memory deficits with the daily life memory failures questionnaire (MFE-30) to better understand their memory difficulties and their perception of them.

If patients with depression have cognitive deficits typically observed by episodic memory assessment, then associative memory performance and perception of memory functioning may be significantly impaired relative to healthy controls.

The use of an ecological, valid and cognitively more demanding neuropsychological assessment test such as the face-name associative memory test (FNAME) show that FED patients have a lower performance in episodic memory and a higher number of memory complaints (MFE-30) than cognitively healthy persons. Furthermore, the assessment of episodic memory using the FNAME (objective memory) shows a lack of concordance with memory complaints using the MFE-30 (subjective memory) in a sample of FED patients.

2. Method

2.1 Study Design

This is a preliminary pilot study with an analytical observational design. The primary study variables were FED and associative memory. Other secondary variables were memory complaints, global cognitive status, and symptoms and intensity of depression.

2.2 Participants

In this study, the sampling method was non-probabilistic. An agreed sample was obtained in relation to the eligibility criteria by convenience sampling as this was a preliminary pilot study. Thirty participants were recruited and 15 of them met the criteria for FED. This group was recruited from the Mental Health Unit of the Psychiatric Hospital in Palma and the Mental Health Unit of the Regional Hospital of Inca. The other 15 participants were healthy controls (HCtrl) recruited from the general population. The recruitment lasted between March 2021 to October 2022.

FED participants met the following inclusion criteria: 1) they were between 18 and 65 years old and, 2) they had a diagnosis of FED fulfilling DSM-5® criteria. Exclusion criteria for both FED and HCtrl participants included: 1) substance abuse, such as alcohol (>24 g/day in women, 40 g/day in men) and other drugs, 2) people with other mental health or neurological disorders. HCtrl participants were volunteers with similar sociodemographic characteristics to FED participants. They reported no neurological or psychological disorders, and they did not take psychotropic drugs.

This study was approved by the Research Committee of the Son Espases University Hospital (HUSE, dictum number CI-481-20) on 14th January 2021; and the Research Ethics Committee of the Balearic Islands (CEI-IB; dictum number IB 4429/21 PI) on 24th February 2021. All participants signed the informed consent.

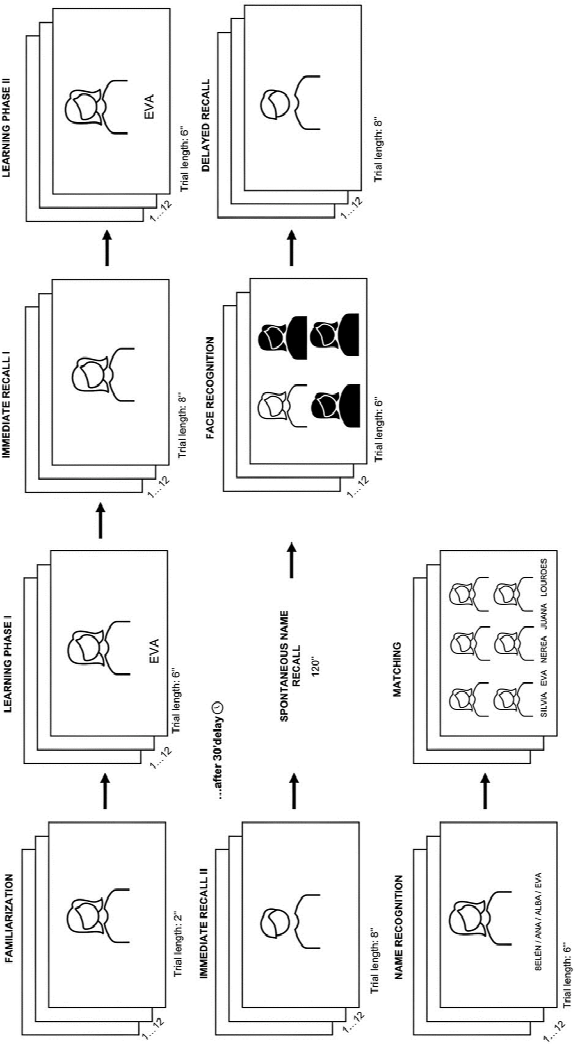
2.3 Material and procedure

This study was an analytical, cross-sectional, prospective, observational design. Primary care physicians and/or psychiatrists from the different health centres in Palma initially assessed the participants considering the inclusion criteria. FED participants were then asked to voluntarily participate in the study and referred to the researchers to take a complete medical history and confirm the inclusion criteria. The approximate duration of each clinical and neuropsychological evaluation session was 50 minutes. On visit 1 (day 1), the psychiatrist explained the protocol to the participants and gave them the information sheet and the informed consent. The selection criteria were reviewed, and the clinical interview was conducted using the International Neuropsychiatric Interview (MINI, Sheehand et al., 1998; Ferrando et al., 2000) to exclude other comorbid psychiatric disorders. Additionally, the interviewer-administered Montgomery-Asberg Depression Scale (MADRS; Montgomey & Asberg, 1979; Lobo et al., 2002) was used to assess depressive severity. On visit 2 (day 7), the psychologist collected the sociodemographic data and used the Self-Reported Rapid Depressive Symptom Scale (QIDS-SR16; Rush et al., 2003; Gili et al., 2014) to assess depressive severity of the last week.

The extended and modified Face-Name Associative Memory Exam (FNAME, Rentz et al., 2011) was then administered as shown in Figure 1 (Flores-Vázquez et al., 2021; Siquier & Andrés, 2022). The administration of the FNAME was carried out in 12 steps: 1) Familiarization: participants underwent a trial where they only looked at faces, 2) Learning I: participants underwent the trial to look at the 12 face-name pairs, 3) Immediate recall I:

they were asked to provide the name associated with each face, 4) Learning II: they looked at the face-name pairs they previously associated incorrectly, 5) Immediate recall II: again they were asked to provide the name associated with each face, 6) Re-learning: participants were presented again with the face-name pairs they did not remember, 7) Thirty minutes delay, 8) Spontaneous name recall: participants were asked to freely recall all the names they had learned in 2 minutes, 9) Face recognition: participants performed a face recognition and matching test, 10) Delayed recall: participants were asked again to say aloud the name associated with each face, 11) Name recognition: participants were asked to select the name associated with the face from among four. 12) Finally, matching, where participants were asked to match the correct name with the corresponding face. Participants responded verbally and the responses were recorded on a scoring sheet.

Figure 1. Scheme representing the expanded and modified FNAME paradigm, extracted from Siquier and Andrés (2022)



The daily life memory failures questionnaire (Memory Failures of Everyday, MFE-30; Sunderland et al., 1984) was administered during the 30-minutes delay within the administration of the FNAME. We used the version of the test validated in the Spanish population (Lozoya-Delgado et al., 2012), which consists of 30 questions about daily situations and activities. Participants answered these using a Likert scale from 1 (never or almost never) to 5 (always or almost always), with a maximum score of 150.

The Montreal Cognitive Assessment test (MoCA; Nasreddine et al., 2005), a 30-items screening test that evaluates different cognitive domains (memory, visuospatial ability, executive function, attention, concentration, working memory, language and, orientation) was administered to observe whether participants had impaired global cognitive function. A cut-off score of 26 or higher out of 30 indicates normal cognitive state. One point was added to this score if the participant had 12 years or less of formal education when the total score was below 30.

2.4 Statistical analysis

Statistical analyses were performed using IBM SPSS Statistics 20.1. Normality and homogeneity of variances were verified with the Shapiro-Wilk test and the Levene's test, respectively. Descriptive statistics were carried out for the different sociodemographic, clinical, and cognitive variables of the FED and HCtrl groups, with means and standard deviation, and inferential statistics carried out by means of the Mann-Whitney (*U*) test and mixed model ANCOVA. Effect sizes were measured using r_{rb}, rank biserial correlation, and Eta squared (η^2). Moreover, correlations were calculated with Spearman's Rho (*r)* with the total sample (with *p*-value adjustments).

3. Results

FED patients obtained scores indicating they had moderate depression with a score in MADRS: M = 26.63, SD = 5.54, range = 20-35; and QIDS-SR16: M = 15.3, SD = 5.05, range = 9-19.

3.1 Socio-demographic data and cognitive tests results

Socio-demographic data and results from the different general cognitive tests are shown in Table 1.

Table 1. Demographic data with means and standard deviation of FED and controls

	FED n = 15			HCtrl n = 15				
Males	3 (20%)			8 (53.3%)				
Females	12 (80%)			7 (46.66%)				
	M	SD	Range	M	SD	Range	p-value	r_{rb}/ η^2
Age	50.20	8.04	32-60	45.07	8.64	29-62	.062	.35
Education (years)	10.30	2.49	8-15	16.27	3.47	12-20	.001	.73
MFE-30	43.33	25.40	42-70	19.66	10.1	12-29	047	.14
MoCA	22.02	5.21	20-28	26.73	2.46	26-30	786	.01

Note. FED, participants with first episode of depression; HCtrl, healthy controls; *p*-value with significance levels: p < .001 (high), *p* < .01 (medium), *p* < .05 (low); r_{rb}, rank biserial correlation (effect size): r_{rb} < .3 small effect, r_{rb} .3 to .50 medium effect, r_{rb} > .5 large effect (Cohen, 2016), MFE, Memory Failures of Everyday Questionnaire; MoCA, Montreal Cognitive Assessment; η^2, Eta squared (effect size): .01 = small effect size, .06 = medium effect size, .14 or higher = large effect size (Cohen, 2016); M, means; SD, Standard Deviation

There were more women than men in the FED group, but this was not the case in the control group. There was no significant difference between groups for age (*U*[29] = 66.5, *p* = .062), but a significant difference between groups was observed for years of education (*U*[29] = 19, *p* = .001).

Given the significant difference between groups at the level of years of education, the comparison of groups for the cognitive measures was carried out using ANCOVAs controlling this variable as a covariate. Results showed significant differences between groups for the MFE (*F*[1, 29] = .06, *MSE* = 1690.34, *p* = .047, η^2 = .14), but not for the MoCA (*F*[1, 29] = .08, *MSE* = .06, *p* =.786, η^2 = .01). Table 2 presents the results of the different FNAME subtests.

Table 2. The different FNAME subtests with means and standard deviations for FED and healthy controls. Significance levels are provided for the ANCOVAs controlling for the effect of education. Effect sizes are also included

	FED			HCtrl			p-value	η^2
FNAME subtests	M	SD	Range	M	SD	Range		
Immediate Recall I	5.26	3.26	3-11	7.5	2.51	7-11	.712	.01
Immediate Recall II	7	3.29	2-12	9.93	1.98	9-12	.932	.01
Total IR (I + II)	12.26	6.55	5-23	17.43	4.23	16-23	.872	.01
Spontaneous name Recall	8.06	2.89	6-12	9.66	1.98	6-12	.454	.02
Face recognition	11.86	.35	11-12	11.86	0.50	10-12	.968	.01
Delayed recall	8.26	3.39	3-12	10	2.06	8-12	.613	.01
Name recognition	11.80	.41	11-12	11.93	.25	11-12	.500	.01
Matching (Association)	9.53	3.14	5-12	11.53	.72	10-12	.469	.02
Total score	61.80	14.99	39-80	72.46	7.65	65-82	.861	.01

Note. FED, participants with first episode of depression; HCtrl, healthy controls; Total IR, Total immediate recall; *p*-value, significance level; η^2, Eta squared (effect size): .01 = small effect size, .06 = medium effect size, .14 or higher = large effect size (Cohen, 2016); M, means; SD, Standard Deviation

The ANCOVA controlling for the effect of education revealed no significant effect of group on any of the FNAME subtests (see Table 2): Immediate Recall I (F[1,29] = .14, MSE = .89, p = .712, η^2 = .01), Immediate Recall II (F[1,29] = .01 , MSE = .04, p = .932, η^2 = .01), total immediate recall (F[1,29] = .03 , MSE = .54 , p = .872 , η^2 = .01), Spontaneous Name Recall (F[1,29] = .58, MSE = 2.86, p = .454, η^2 = .02), Face Recognition (F[1,29] = .003, MSE = .001, p = .968, η^2 = .01), Delayed Recall (F[1,29] = .26, MSE = 1.79, p = .613, η^2 = .01), Name Recognition (F[1,29] = .47, MSE = .06, p = .500, η^2 = .029, Matching (F[1,29] = .54, MSE = 2.74 , p = .469, η^2 = .02), and the total score (F[1,29] = .03, MSE = 3.60, p = .861, η^2 = .01).

3.2 Recall means (subtest) (mixed model ANCOVA)

The immediate and delayed recall subtests were analysed using a 2 (groups) x 3 ANCOVA (subtest: immediate recall I, recall immediate II, delayed recall) controlling for education as a covariate. In this analysis, no significant group effect was observed (F[1, 26] = .09, MSE = 1.43, p = .761, η^2 = .003).

Therefore, the control group did not recall significantly more face-name associations than the FED group (see Table 2). For the type of recall subtest, a significant effect was not observed either (F[1, 26] = 1.90, MSE = 8.64, p = .172, η^2 = .13), and the interaction group by recall type (F[1,26] = .35, MSE = 1.29, p = .701, η^2 = .13) was not significant.

3.3 Results of the correlations between FNAME, MFE-30 and MoCA

Correlations between FNAME, MFE-30 and MoCA of all participants (FED and healthy controls) are presented in Table 3.

Table 3. Correlations between FNAME, MFE-30, and MoCA

	MoCA	TIR	SNR	RD	Matching	Total score
MFE-30	-.08	-.04	-.029	-.032	-.24	-.045
MoCA		.66**	.62**	.54**	.49**	.67**
Total IR			.79**	.79**	.70**	.96**
SNR				.85**	.71**	.90**
DR					.78**	.90**
Matching						.80**

Note. MFE, Memory Failures of Everyday Life Questionnaire; MoCA, Montreal Cognitive Assessment; FNAME, Face-Name Associative Memory Exam; Total IR, total immediate recall; SNR, spontaneous name recall; DR, delayed recall; **, the correlation is significant at the .01 level (bilateral); *, the correlation is significant at the .05 level (bilateral)

The score obtained on the subjective memory complaints questionnaire (MFE-30) did not significantly correlate with the FNAME subtests (p > .051). The score obtained from the MoCA was significantly correlated (p < .012) with the different FNAME subtests (total immediate recall, spontaneous name recall, delayed recall, association, total score). The total immediate recall measure and the rest of the FNAME subtests were significantly correlated with each other (p < .010).

4. Discussion

The main aim of this study was to assess possible associative episodic memory deficits and subjective memory complaints in FED by using the FNAME and the MFE-30, respectively.

MDD is a heterogeneous mental disorder that affects people throughout his life (Knight et al., 2020; Lupien et al., 2018; Schwert et al., 2018). This mental disorder affects neurocognitive functions, including processing speed, attention and executive functions (Dotson et al., 2020). It is also important to explore associative memory, scarcely investigated in individuals with depression, especially FED. Therefore, this study provides results mainly related to the performance of associative episodic memory in FED patients.

The results did not show statistically significant differences between groups in relation to their performance on the different FNAME subtests. This result is aligned with the observation made by Alegret et al. (2015b), that worse performance on the S-FNAME was not related to depression symptoms. Additionally, other studies that have assessed episodic memory in FED patients found no differences in performance compared to healthy controls (Albus et al., 1996; Cullen et al., 2015; Fossati et al., 2003; Kyte et al., 2005¸ van Eijndhoven et al., 2011). Therefore, these findings do not support the hypothesis that FED patients have memory problems due to poor learning (Butters et al., 2008; Knight & Baune, 2018; Song et al., 2006; Vázquez et al., 2010), consolidation (Dong et al., 2012; Dzib- Goodin et al., 2017) or recall (Halvorsen et al., 2011, Lahr et al., 2007; Serra-Blasco et al., 2019). Also, this result may be related because the faces presented in the test (FNAME) are of the same race as the faces of the patients evaluated. In our study, the faces were of the same race and the names were Spanish to carry out the face-name association. Therefore, as the faces of the FNAME are of the same race as the FED patients assessed, this involved that they are easier to recall than if they were not of the same race (Herzmann et al. 2017). The same does not occur in the study by Chirico et al. (2020) where approximately 60% of the faces presented in the test were not of the same race as the patients evaluated.

Deficits in associative memory have been investigated in other clinical populations such as Alzheimer's disease (Della Sala et al., 2012; Liang et al., 2016) and Parkinson's disease (Bezdicek et al., 2019; Cohn et al., 2016; Siquier & Andrés, 2022), and in non-clinical populations such as ageing (Enriquez-Geppert et al., 2021; Flores-Vázquez et al., 2021). In the present study, associative memory performance with the FNAME in FED patients was analysed using supposedly more sensitive and cognitively demanding subtests, such as matching, which was shown to be sensitive to Parkinson's disease (Siquier & Andrés, 2022).

However, our results showed no significant differences between FED patients and healthy controls, even though FED participants reported a higher number of complaints than control participants in daily life. These results support the findings from previous studies (Comijs et al., 2002; Gagnon et al., 1994; Mendes et al., 2021; Miebach et al., 2018; Rohling et al., 2002; Sachs-Ericsson et al., 2021), showing that although patients with MDD had relatively preserved memory tests they under-estimated their memory functioning, a pattern distinct from HCtrl. They showed inaccurate memory self-awareness as the underestimated their memory functioning, a pattern distinct from HCtrl.

In our study, subjective memory complaints did not show a statistically significant correlation either with the different subtests of the FNAME. This lack of concordance between objective cognitive deficits and subjective memory complaints has also been shown in previous studies (Antikainen et al., 2001; Baeza-Velasco et al., 2020; Farrin et al., 2003; Mohn & Rund, 2016; Schweizer et al., 2018; Schwert et al., 2018; Serra-Blasco et al., 2019; Srisurapanont et al., 2017) in patients with heterogeneous referral depression diagnoses (severity, onset time, number of episodes, etc.). There was a dissociation between subjective and objective memory performance, with depressive symptoms showing a robust relationship with self-reports of memory complaints, even after adjusting for aged, gender, and general cognitive ability.

Therefore, our results support the notion that patients with FED present a dissociation between objective memory (FNAME) and subjective memory (MFE-30). Beliefs about memory self-efficacy as an estimate of actual memory abilities may have an influence on the way people use their memory in everyday situations (Bandura, 1989; Villamarin, 1990). In this sense, when beliefs about memory performance are negative (Cavanaugh & Murphy, 1986; Montejo et al., 2013; Randolph et al., 2004). This may result in a sort of self-fulfilling prophecy and, consequently, a confirmation bias. Therefore, our results suggest that FED patients may present a negative cognitive predisposition for their memory performance, which may affect subjective memory leading to a greater number of memory complaints in daily life (Montejo et al., 2013; Randolph et al., 2004) without objective memory being really affected. More specifically, self-efficacy moderates the relationship between self-rated memory function and depressive symptoms. Higher self-efficacy may buffer against the impact of subjective memory difficulty on one's mood and thereby mitigating the effect of depressive symptoms on memory (Bhang et al., 2020; O'Shea et al., 2016). Therefore, they perform worse than their target performance would suggest (Vannini et al., 2017).

The MoCA score was significantly correlated with the scores on all FNAME subtests. A stronger correlation was observed with matching, delayed recall, and spontaneous name recall, which have proven to be most sensitive to cognitive decline (e.g. Siquier & Andres, 2022). Most of the studies in

Varghese's review (2022) showed that there were no significant differences in global cognitive functioning between FED patients and healthy controls. In this study, it is noteworthy that although FED patients and healthy controls did not differ significantly on the MoCA score. FED patients presented an average score below the cut-off score of 26 points (also see Blair et al., 2016; Sánchez-Nieto & Mendoza-Núñez, 2021). This may be because the MoCA test evaluates attention and executive functions, while the FNAME evaluates associative episodic memory. In this regard, the studies in Varghese's review (2022) found that FED patients had significantly lower performance in processing speed and executive functions. Therefore, depression has been shown to negatively impact neurocognitive functions, particularly those governed by frontal-subcortical networks, such as executive functions. This relationship was stronger in study samples with and older mean age, and the relationship was stronger in clinical compared to subthreshold depression and in individuals taking antidepressant medication (Dotson et al., 2020). Another important aspect that partially supports the results of our study is that there is evidence that cognitive impairment may be present from the first episode, not all studies showed consensus on this (Ahern and Semkovska, 2017; Varghese et al., 2022). More specifically, the results of the study by Vicent-Gil et al. (2018) observed after the assessment of cognitive functions: language, attention, working memory, verbal memory, processing speed and executive functioning that there were a higher number of cognitively preserved patients (37/50) and other cognitively impaired patients (13/50). In addition, patients with multiple episodes of depression showed greater cognitive impairment than people with FED (Lin et al., 2021; Varghese et al., 2022).

It is also important to refer to the limitations of this study. Firstly, we encountered the difficulty of recruiting patients with depression who met the inclusion criteria. In this sense, a relatively small sample was obtained that offered initial results and an approach to the objective of the study that requires broader research. Therefore, statistical analyses were carried out with a non-parametric approach. This is a preliminary pilot study that suggests new clues, but future research with larger samples should be carried out to obtain more consistent results. And secondly, this research began to be carried out during the COVID-19 pandemic, which led to significant fluctuations (non-recruitment periods) with participants. This is a pilot study that suggests new indications, but future research with larger samples should be carried out to obtain more consistent results. The difficulty in recruitment also determined that a 'one-to-one' match was not carried out between the participants in the experimental and control groups in relation to age, gender, and educational level. This gave rise to differences in educational level between participants in both groups, so it was controlled as a covariate. Gender differences in cognitive

test performance (MoCA, FNAME and MFE-30) were not provided due to the small sample size and because it was a preliminary pilot study. In addition, the control participants performed adequately on the cognitive tests, but a validated test was not used to evaluate mood; information was only collected through the participant's form about their general health status (they reported that they were active in the labour market, and self-employed). Therefore, in future research these aspects will be considered to overcome the limitations.

Even considering the above limitations, the present study is relevant because: 1) FNAME is a more cognitively demanding test using sensitive measures in the assessment of associative memory; 2) patients with FED that underestimation in memory performance would be a premorbid state of functioning not identified in objective cognitive assessments; and 3) this assessment could have an important implication in the treatment of patients with a negative thought pattern. This could be incorporated for a section in cognitive restructuring therapy.

5. Conclusion

In sum, this study provides evidence with the following conclusions: 1) patients with FED score lower on the different subtests and on the overall FNAME score. In this sense, FED patients do not show a statistically significant lower performance in the associative memory test compared to healthy control participants; and 2) FED patients have a higher number of memory complaints than healthy control participants. This suggests that FED patients show a lack of concordance when memory is assessed objectively (FNAME) and subjectively (MFE-30).

The conclusions presented must be considered with precaution due to the temporal context in which the evaluations were carried out. Also, it is important to highlight that although the results obtained are part of a preliminary pilot study, they should be taken into consideration in order to incorporate the assessment of episodic memory with the FNAME (an ecologically and cognitively more demanding test) in the neuropsychological assessment protocols of patients with depression, and furthermore, knowledge of these results may have a positive impact from the cognitive-behavioural therapeutic approach for a psychological intervention approach.

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Declaration of interests

The authors declare no conflicts of interest.

Ethical statement

This study was carried out in compliance with the principles of the Declaration of Helsinki (2013). The processing, communication and transfer of personal data was in accordance with the provisions of Organic Law 3/2018, on the 5 December, on the protection of personal data and guarantee of digital rights. This study was approved by the Research Committee of the Son Espases University Hospital (HUSE) with dictum number CI-481-20 (approval date: 14th January 2021) and the Research Ethics Committee of the Balearic Islands (CEI-IB) with dictum number IB 4429/21 PI (approval date: 24th February 202). All participants signed the informed consent.

Data Availability Statement

The original contributions presented in this study are included in this article, and further inquiries can be directed to the corresponding authors.

Author Contributions

J.R. participated in conceptualization, investigation, data curation, methodology, supervision, formal analysis, project administration, validation, resources, and visualization. A.M. participated in conceptualization, investigation, methodology, project administration, resources, and visualization. C.N. participated in conceptualization, investigation, data curation, methodology, supervision, formal analysis, project administration, validation, resources, and visualization. F.C. participated in conceptualization, investigation, methodology, project administration, resources, and visualization. J.F.F.V. participated in conceptualization, investigation, methodology, validation, resources, and visualization. S.E.G. participated in conceptualization, investigation, methodology, validation, resources, and visualization. P.A. participated in conceptualization, investigation, data curation, methodology, supervision, formal analysis, project administration,

validation, resources, and visualization. All authors read and wrote the manuscript and approved it in its final manuscript.

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