**REVIEWER A**

**Thank you very much for your comments. They were useful and an additional learning for future studies.**

**1 – Title:** I think that the title may have to change, because authors do not study only
executive functions as the title suggests. According do scientific
literature, executive functions (EF) are on-line low order (inhibition,
updating, shifting) and higher order (problem solving, decision making,
planning) neurocognitive domains that regulate other cognitive functions and
this manifest in adequate goal directed behavior and volitional processes.
However, author´s went beyond EF as we can see by instruments used for
other neurocognitive processes: Attention, processing speed and acquired
knowledge (WAIS subtests), visuospatial/perception (FCR), episodic memory
(RAVLT). Thus, before methods section authors states “Our study aimed to
describe and explore the neuropsychological profile, the CR, and the
indicators of emotional distress…”. In this sense, I suggest a title rearrangement to better match the manuscript aims.

**Answer:** We think you are right, and we changed the title for “Neuropsychological profile, cognitive reserve, and emotional distress in a Portuguese sample of severely obese patients.”

**2 - Introduction:** Yes, it is adequate. However, there is a description about metabolic issues, which is very important. Diabetes may have some association within executive
functions. Maybe some research may be used to stress this issue

**Answer:** We stressed the issue with this paragraph presenting more research:“Several epidemiological studies have highlighted the deleterious effect of obesity, impaired fasting glucose, dyslipidaemia and hypertension on cognition, suggesting that metabolic syndrome may be a prodromal state of vascular cognitive impairment4. Regarding diabetes, authors even describe a link to different stages of cognitive dysfunction, ranging from diabetes-associated decrements to dementia, with these stages not being necessarily part of a continuous process and showing different prognoses5.

The relationship between obesity and cognitive functioning, particularly during middle age, is also well-documented and has been pointed out as a significant risk factor for the appearance of cognitive decline and vascular dementia or Alzheimer's disease (AD), regardless of comorbid diseases6. Elderly patients with severe obesity displayed higher concentrations of hippocampal markers associated with AD (amyloid ß and tau) than those who are not obese7,8

**3 - Methods:** WCST and SCL-90 internal consistency should be placed in materials and not in the results section.

**Answer:** We though that internal consistence of WCST and SCL-90, could be better placed in the method namely in the procedures because it was de local to describe a step for include or exclude items in the result analysis.

**4 –** **Methods:** A literature-based explanation of previous procedures in computing Cognitive Reserve (CR) are needed. The methodology used to build CR variable was used before? If so, please provide a reference**.**

**Answer:** We based our method for CR analysis on Roldan-Tapia, Garcia, Casanovas and León (2012), because the Portuguese reality is very similar to the Spanish reality. We think that although it had been useful to make additional questions like leisure activities or others, it could make the protocol even more extensive. We also think that using only schooling is a reductive way of verifying the CR. On the other hand, the most consensual form of assessing to the pre-morbid intelligence is through vocabulary because using computerized forms that do not allow replication and comparison because they are not adapted to other languages does not seem us useful: “For the CR measurement, we adopted the method of Roldan-Tapia, Garcia, Casanovas and León (2012) applied in a study that used the CR concept in one hundred and sixty healthy subjects and highlighted its relation to cognitive functions as relevant as executive functions, working memory, and attention35”.

**5 – Results:** Please check this entire section. Standardization in describing statists in
the text is needed. Sometimes there p values r coefficient’s are in italic
sometimes are not. Also, standardize spaces between them coefficients,
symbols and numbers… Sometimes they have sometimes they don´t have.
There are some minor errors in the text. Examples: “trails” instead of
trials Almeida (2005) instead of Almeida (2018).

**Answer:** We checked the entire section of results and we standardized spaces. We also did a review with an English native to correct the errors. We changed the reference of Almeida (2005) to Almeida (2018) because it was a lapse.

**6 – Discussion:** It is adequate. However, as I emphasize before in the introduction, some more details could be added in explain the relationship between diabetes and
EF. Thus, in table 6 there aren´t statistical differences in cognitive
measurements in diabetes. Why is this happening if previous literature
supports a different perspective?

**Answer:** We tried to justify our results a little more in the discussion: “In our sample, the statistical difference for DM and a single cognitive measurement that is memory, lead us to consider different studies that addressed the relationship between glycaemic control and cognitive dysfunction and reported mixed results. In fact, despite considering DM a consistent risk factor for reduced cognitive performance, the problem is that different models have been used for studying this relation namely, glycaemic control, cardiovascular risk factors, and depression. Some results even suggest no involvement in cognitive performance and peripheral insulin resistance among individuals with adequately controlled DM and that the factors associated with cognitive performance may differ by DM status with different needs of management 66. In our study, we obtained data on vascular risk factors like DM, from the clinical records of each patient but we didn’t investigate the method used for the glycaemic measurement or if there was an associated medication for controlling it, which may be a question to do in future approaches.”

**7 – References:** Some references don´t have DOI. Please check it. Tables / Figures:  There are some typos in Portuguese below tables in p values.

**Answer:** We asked a specialist in library and documentation to review all our references and not all articles have a DOI. We correct the typos in Portuguese below tables.

**REVIEWER B**

Agradecemos as alterações propostas pelo revisor B uma vez que foram um enorme contributo para a nossa aprendizagem e para futuros trabalhos. As alterações efetuadas aparecem a vermelho no texto bem como as alterações feitas após correção do inglês.

**Comentário 1:** Os autores devem considerar reformular ambas as frases. O leitor pode intuir causalidade quando, em rigor, o que se mostra nos resultados são associações

**Resposta:** “A obesidade grave esteve associada a um pior desempenho cognitivo da amostra. A reserva cognitiva foi superior nos mais jovens”.

**Comentário 2:** O que os autores demonstram é a presença de valores abaixo da norma em aspetos do desempenho cognitivo. Portanto a associação entre as duas condições e não o efeito adverso da obesidade no desempenho cognitivo.

**Resposta:** A obesidade grave está associada a uma diminuição do desempenho cognitivo e emocional que é coadjuvada pelo envelhecimento, reserva cognitiva baixa e comorbilidade

**Comentário 3:** PF ver comentário anteriores

Resposta: Feitas as alterações em inglês.

**Comentário 4:** Os autores deve considerar reformular esta frase!

**Resposta:** “Several epidemiological studies have highlighted the deleterious effect of obesity, impaired fasting glucose, dyslipidaemia and hypertension on cognition, suggesting that metabolic syndrome may be a prodromal state of vascular cognitive impairment4. Regarding diabetes, authors even describe a link to different stages of cognitive dysfunction, ranging from diabetes-associated decrements to dementia, with these stages not being necessarily part of a continuous process and showing different prognoses5.

The relationship between obesity and cognitive functioning, particularly during middle age, is also well-documented and has been pointed out as a significant risk factor for the appearance of cognitive decline and vascular dementia or Alzheimer's disease (AD), regardless of comorbid diseases6. Elderly patients with severe obesity displayed higher concentrations of hippocampal markers associated with AD (amyloid ß and tau) than those who are not obese7,8”

**Comentário 5:** Talvez os autores queiram substituir “highlighting the role” por “suggesting a role”

**Resposta:** Neuroimaging studies have identified structural alterations, morphometric differences, and changes in regional cerebral perfusion, especially in the frontal, temporal, and parietal regions and in a manner inversely associated with BMI, suggesting a role of obesity in the appearance of dementia processes at different life stages9.

**Comentário 6:** Os autores devem indicar as referências em que se suportam como fazem com as restantes patologias.

**Resposta:** De Wit L, Kirton JW, O'Shea DM, Szymkovicset SM, McLaren ME, Dotson VM. Effects of body mass index and education on verbal and nonverbal memory. *Neuropsychology, Dev Cogn B Aging Neuropsychol Cogn.* 2017;24(3):256-263

Kirton JW, Dotson VM. The interactive effects of age , education , and BMI on cognitive functioning. *Neuropsychology, Dev Cogn B Aging Neuropsychol Cogn.* 2016;23(2):253-262. doi:10.1080/13825585.2015.1082531

**Comentário 7:** Os autores deviam explicitar as taxas de participação e, se recolhidos, os motivos da rejeição.

**Resposta:** “We adopted a sequential sampling sequence, assuming a non-attendance rate of the first query near 30%34”.

**Comentário 8:** Nem esta frase nem a tabela 3 deixam claro para o leitor as variações a que os autores se referem.

**Resposta:** descrevemos por extenso os resultados estatísticos para a distribuição das medidas antropométricas, medidas cognitivas e medidas emocionais para as medidas sociodemográficas como género, idade, escolaridade e profissão.

**Comentário 9:** É desnecessário, considerando que só se devem apresentar as correlações que atingem significância estatística

Resposta: Retirada a palavra “significantly”

**Comentário 10:** Esta frase não é explicita para o leitor. Os autores devem explicitar a que variável se referem as percentagens entre parêntesis.

**Resposta:** “The groups aged 41-50 years old (32.8% with low CR *vs.* 16.1% with high CR) and 51 - 60 years old (28.1% with low CR *vs.* 16.1% with high CR) had the most patients with the lowest CR. Conversely, the highest CR was found among the younger age groups of 21 - 30 years old (14.1% with low CR *vs.* 28.6% with high CR) and 31 - 40 years old (20.3% with low CR *vs.* 33.9% with high CR)”.

**Comentário 11:** Relativo à população portuguesa?

**Resposta:** Immediate Recall (μ = 8.41; δ = 2.33), Retention index (μ = 9.69; δ = 2.86), Digit Span (μ = 10.63; δ = 3.67) and TMT B (μ = 9.42; δ = 2.78) presented results below the first standard deviation regarding the Portuguese population.

**Comentário 12:** Os autores deviam considerar a hipótese de juntar os dados (correlações) das tabelas 4 e 6 numa única tabela. Nas mesmas, deverão igualmente considerar não discriminar o valor de p e o teste, bastado o valor da correlação.

**Resposta:** Juntamos as tabelas 4 e 6 para uma melhor visualização dos resultados tal como sugerido e retiramos o nome das estatísticas utilizadas.

**Comentário 13:** Os autores devem explicitar melhor porque é que consideram que os seus resultados podem ter relevância para o papel protetor da reserva cognitiva em eventuais défices cognitivos.

**Resposta:** “In fact, investigations with CR-mediated differential brain activation using diverse conditions concluded that younger volunteers with low CR activated more brain regions than those with a high CR in a visual task, with similar results for the comparison between young and older healthy people that also showed different patterns of activation according to age42. The authors suggest that this is a compensatory strategy to cope with age-related changes, associated with exposure to, and interaction with, favourable environments and, that can result in milder clinical deficits in the presence of neurological pathology. Investigations also concluded that a greater CR was associated with preserved attention/executive functions in the presence of elevated BMI attenuating the expression of obesity-related deficits in these domains10”.

**Comentário 14:** Para observar ou conjeturar declínio os autores teriam de ter efetuado um estudo longitudinal. Devem portanto reformular.

**Resposta:** “The comparison of the WCST results of our sample with a non-obese adult population suggests a sharp decrease in the patients’ cognitive flexibility aggravated by increasing age, decreasing schooling and professional status, demonstrating that obese individuals are less able to adjust their behaviour when rules change, worsening when BMI increases”

**Comentário 15:** Similar?

**Resposta:** similar.

**Comentário 16:** Não se percebe como é que o empobrecimento cognitivo pode ter um papel de melhoria na qualidade e nos estilos de vida.

**Resposta:** “It has become clear that aging, low CR, and comorbidity have contributed to cognitive impoverishment, and may play an important role in the decrease of health literacy, adherence and maintenance of healthy life behaviours, in which are included eating and exercise habits.”

**Comentário 17:** Os autores devem considerar listar este item e os três seguintes numa categoria distinta (não são efetivamente hábitos de vida!).

**Resposta:** Separamos os últimos 4 parâmetros e atribuímos o título “obesity course”.

**Comentário 18:** Os autores devem apresentar os desvios padrão também para ambos os géneros. Para simplificação da estrutura da tabela, poderão apresentar as médias (para a amostra total, mulheres e homens) com os respetivos desvios padrão entre parêntesis.

Resposta: Adicionamos os desvios-padrão para a amostra de homens e de mulheres entre parêntesis e separadamente.

**Comentário 19:** Está tabela talvez possa ser eliminada e o seu conteúdo totalmente abordado em texto.

**Resposta:** A tabela foi eliminada e o seu conteúdo foi descrito na secção dos Resultados.

Comentário 20: Tratando-se de uma comparação dos dados do estudo com os da adaptação da SCL-90-R numa população normativa, feita por Batista (1993), os autores devem: (i) primeiro apresentar os seus resultados (i.e. Severe obese man **|**  Normative …); (ii) explicitar a proveniência dos dados da normativos.

Resposta: O título foi reformulado e a ordem de apresentação dos dados também. Apresentam-se primeiros os resultados da população em estudo e depois os dados da amostra normativa.