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Privação de Sono, Tomada de Decisão e Inteligência Emocional

Verónica Sofia Pinto Rodrigues

Dissertação de Mestrado em Psicologia da Saúde e Neuropsicologia

Orientação: Prof. Doutor Luís Coelho Monteiro

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Instituto de Investigação e Formação Avançada em Ciências e Tecnologias da Saúde, para obtenção do grau de Mestre em Psicologia da Saúde e Neuropsicologia, sob orientação do Prof. Doutor Luís Coelho Monteiro

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RESUMO

O sono tem um papel primordial na qualidade de vida do ser humano, mas mais importante do que isso é uma necessidade básica, inerente a qualquer indivíduo. Com os passar das décadas, a ciência debruçou-se em vários estudos na tentativa de compreender este fenómeno, bem como as consequências da sua falta na vida e no quotidiano do indivíduo. A comunidade científica realizou investigações nos mais diversos ramos ligados ás consequências diretas e indiretas da privação do sono, na tentativa de compreender as correlações fisiológicas e anatómicas entre a atividade cerebral e a privação de sono, e dar resposta a uma sociedade cada vez mais frenética.

Hoje em dia são várias as disciplinas dedicadas ao seu estudo, desde a neurologia, a pneumologia, as neurociências, a psiquiatria, a otorrinolaringologia, a anatomia, a fisiologia, a endocrinologia, a genética, a epidemiologia, a imunologia às ciências ambientais (Harding & Hawkins, 2001; Colten & Altevogt, 2006). À medida que esta complementaridade veio impulsionando o avanço e estruturação do conhecimento científico do sono, tornando-a assim, numa área de conhecimento multidisciplinar (Harding & Hawkins, 2001), a necessidade da criação de uma disciplina científica que se debruçasse exclusivamente sobre o sono e os seus distúrbios começou-se a fazer sentir (Shepard et al., 2005). Contudo, apesar de todas as investigações levadas a cabo neste âmbito, continuam a surgir diariamente, necessidades e limitações às quais ainda não somos capazes de dar resposta.

A presente dissertação tem como principal objetivo a obtenção do grau de Mestre em Psicologia da Saúde e Neuropsicologia, inserindo-se no âmbito da unidade curricular do Instituto de Investigação e Formação Avançada em Ciências e Tecnologias da Saúde – IINFACTS, do 2º ano de Mestrado em Psicologia da Saúde e Neuropsicologia, sendo esta realizada sob a orientação do Prof. Doutor Luís Monteiro. Tem como título principal Privação de Sono, Tomada de Decisão e Inteligência Emocional.

Esta dissertação consiste na realização de um artigo para submissão e publicação subordinado ao tema: Privação de Sono, Tomada de Decisão e Inteligência Emocional.

Palavras-Chave: Privação de Sono; Tomada de Decisão; Inteligência Emocional.

ABSTRACT

Sleep plays a pivotal role in the quality of life of the human being, but more important than that is a basic need, inherent in any individual.

Over the decades, science has looked at several studies in an attempt to understand this phenomenon, as well as the consequences of their lack in the life and daily life of the individual.

The scientific community carried out investigations in the most diverse branches related to the direct and indirect consequences of the sleep deprivation, in an attempt to understand the physiological and anatomical correlations between brain activity and sleep deprivation, and to respond to an increasingly frantic society.

Nowadays there are several disciplines dedicated to its study, from neurology, pneumology, neurosciences, psychiatry, otorhinolaryngology, anatomy, physiology, endocrinology, genetics, epidemiology, immunology to environmental sciences (Harding & Hawkins, 2001; Colten & Altevogt, 2006). As this complementarity has promoted the advancement and structuring of the scientific knowledge of sleep, thus making it a multidisciplinary area of knowledge (Harding & Hawkins, 2001), the need to create a scientific discipline that focused exclusively on sleep and its disorders began to make it self felt (Shepard et al., 2005). However, despite all the investigations carried out in this area, the needs and limitations that we still can not respond to today continue to arise.

The main objective of this dissertation is to obtain a Master's Degree in Health Psychology and Neuropsychology, inserting itself within the scope of the curricular unit of the Institute of Advanced Research and Training in Sciences and Technologies of the Health – IINFACTS, Of the 2nd year of Master's Degree in Health Psychology and Neuropsychology, being carried out under the guidance of Prof. Doctor Luís Monteiro. Its main title is Deprivation of Sleep, Decision Making and Emotional Intelligence.

This dissertation consists in the accomplishment of an article for submission and publication subordinated to the theme: Sleep Deprivation, Decision Making and Emotional Intelligence.

Key-Words: Sleep Deprivation; Decision-Making; Emotional Intelligence.

PARTE I

Artigo para submissão em revista: ***Sleep Deprivation, Decision-Making And Emotional Intelligence.***

Sleep Deprivation, Decision-Making And Emotional Intelligence

Verónica Rodrigues[1], Luís Monteiro[2]

[1] INFACTS, Instituto de Investigação e Formação Avançada em Ciências e Tecnologias da Saúde.
[2]CESPU, Instituto Universitário de Ciências de Saúde.

Correspondence concerning this article should be addressed to Verónica Rodrigues. Instituto Universitário de Ciências da Saúde. Rua Central de Gandra, 1317. 4585-116. Gandra (Portugal). Phone: +351-224157100/+351-224157102. E-mail: rodrigues.veronicasp@gmail.com

Background: Sleep deprivation exists when the former is insufficient to support an adequate vigilance, good overall performance and health. The negative effects of sleep deprivation in alertness and cognitive performance are several, pointing towards a reduction in brain activity and functionality. Sleep loss can hamper a variety of cognitive processes, among them problem solving, inhibitory control and complex decision-making. Several authors also report that a continuous vigil has a profound debilitating effect on individual judgement and decision-making, which depend majorly on integrating emotion with cognition.

Material/Methods: 61 participants of both genders, distributed across two groups, divided in accordance with previously defined selection criteria, aged between 21 and 53 years old. This investigation was transversal, with a single clinical evaluation being conducted, with the main goal of testing the effects of sleep deprivation in decision-making, emotional intelligence and emotional recognition in human faces. The data obtained through the scoring of the different tests were introduced into, and processed in, the software SPSS – *Statistical Package for Social Sciences*, version 19.0.

Results: The experimental group displayed a significantly worse performance than the control group in emotional recognition. Differences were also verified in response timing, with the control group identifying emotions faster and more accurately.

Conclusions: Acute sleep deprivation affects one's ability to quickly recognize emotional expression in human faces, and the emotions transmitted by those expressions.

Key-Words: Sleep Deprivation; Decision-Making; Emotional Intelligence.

INTRODUCTION

Resting hours are increasingly neglected in a society living without time, but it is fundamental to stop, rest and recognize one's own limits. Pathologies associated with sleep are severe and affect an increasingly large number of people (Henriques, 2013).

Rente & Pimental (2004) define regular sleep as being: "one that provides a feeling of well-being and physical and mental rest, providing a night well-slept, with a recovery of energy, allowing the individual to execute the next day's mental and physical tasks in good conditions".

Sleep deprivation occurs when the former is insufficient to support an adequate vigilance, good performance and health, be it via the reduction of overall sleep time (reduction in quantity), or via the fragmentation of sleep by quick awakenings (reduction of quality).

We can also differentiate between two types of sleep deprivation: acute sleep deprivation and chronic sleep deprivation (also known as sleep restriction). A single night of insufficient sleep can have noxious effects in not only one's health, but also cognitive performance. Without an adequate sleep, there is a significant worsening in a variety of cognitive abilities, including the alertness state, vigilance, attention and concentration. Acute sleep deprivation refers to a condition where an individual does not sleep, or has their total sleep time be reduced to significantly less than normal (7 to 9 hours every night), generally lasting for 1 or 2 days. Generally, lack of sleep leads to a decline in assertiveness, empathy and the ability to control impulses and delay gratification, characteristics common to dysfunctions in the pre-frontal lobe (Killgore et al., 2007a). Therefore, we can conclude that the pre-frontal cortex appears to be significantly sensible to the effects of sleep deprivation. Recent discoveries suggest that deficits in emotional decision-making, inhibitory control, humor regulation, moral judgement and response to frustration are related with this sleep deprivation.

Other studies suggest that the effects of sleep deprivation in the ability to integrate emotion and cognition in moral judgement can be dampened by the individual's emotional intelligence.

In volunteer groups, submitted to two nights without sleep, investigators discovered that lack of sleep hampered the volunteers' ability to make moral decisions with emotional charge, taking into consideration the fact that, prior to the investigation starting, these

volunteers scored high in emotional intelligence tests, and did not hesitate to respond about what they believed was morally adequate (Killgore et al., 2007b).

There is no doubt that, following sleep deprivation, there is a statistically significant drop in emotional intelligence, mainly affecting three areas of functioning: intrapersonal consciousness, interpersonal abilities and stress management (Killgore et al., 2007a). In many studies regarding sleep deprivation, the latter was associated with moderate drops in self-reporting traits of emotional intelligence, and, perhaps, in some aspects of coping. This happens because, ultimately, critical decisions are made in stressful environments that involve continuous operation (for instance, military actions). These results underline the importance of obtaining an adequate sleep to sustain an ideal emotional intelligence and an effective coping (Killgore et al., 2007b).

Analyzing the components of emotional intelligence, it is possible to see that it is both intrapersonal and interpersonal. Intrapersonal whenever it refers to the individual themselves: how they recognize and process emotional information, and the degree to which this affects their thoughts and behaviors. Interpersonal whenever it refers to the interactions between individuals: understanding emotions in others, managing emotions in others in social situations (Kornacki & Caruso, 2007). In social interaction, the face performs a fundamental role, constituting an important communication device in the relationship with the world and others (Ekman, 1993; Stone & Valentine, 2007). This way, the ability to correctly recognize emotions in others is an important social skill, allowing the individual to adequately respond to their environment (Damásio, 2003; Keltner & Ekman, 2002). There are various studies that alert to the impact that a single night of sleep deprivation can have over the ability to recognize emotional intensity in human faces (Van der Helm et al.; 2010). In a study conducted by Els Van Der et al. (Schröder, 2010), healthy young adults were divided in two groups: a sleep deprived group, and a control group (where the rhythm of sleep did not suffer any alteration). The tests were performed three times in the sleep deprived group (after 30 hours of sleep deprivation, after the recovery sleep, and three weeks after the initial testing) and twice in the control group (two consecutive days after the resting sleep). In the end, the authors observed a noticeable reduction in the ability to recognize emotions in faces after a single night of sleep deprivation. This deficit was especially evident in the recognition of “happiness” and “anger”, and were particularly heavy in women (with these deficits in emotional recognition being solved by a night of recovery sleep). Finally, it was verified that emotional recognition was not significantly affected with

neutral emotions. Els Van Der et al. (2010) demonstrated that the speed of emotional recognition, with various facial expressions displayed before a night of sleep, improves significantly in the following day, after recovery sleep. In addition, in this study, sleep deprivation was associated to a selective deficit in recognizing emotions with moderate to strong relevance, but not neutral emotions.

These results clash with the study conducted by Maccari et al. (2014), who demonstrated that in a group of individuals subjected to a 24 hours of sleep deprivation, emotional recognition was significantly hampered when test subjects were shown neutral expressions.

Therefore, and despite the discrepancies found in these studies, we can conclude that, even though the impact of a single night of sleep deprivation might be minimal (Van der Helm et al., 2010), it can still have significant implications in social interaction if these hours of sleep deprivation continue to rise, as has been verified in the past decades (Kronholm E. et al., 2008; National Sleep Foundation, 2007).

MATERIAL AND METHODS

Sample

The sample is constituted by 61 participants (N=61) of both genders, distributed by two groups, divided in accordance to previously defined selection criteria. The experimental group was comprised of 31 participants with a poor sleep quality, and/or excessive diurnal sleepiness, aged between 22 and 52 years-old (*M*=32.23; *SD*=10.73). The control group, with a satisfactory sleep quality and quantity, was comprised of 30 participants, aged between 21 and 53 years-old (*M*=36.47; *SD*=11.23).

In order to be part of the experimental group, participants had to have slept less than 7 hours per night for a minimal period of two or more days (required condition to be in acute sleep deprivation); in order to be part of the control group, participants had to sleep between 7 to 9 hours per night, without medication and without any issues with consumption of abusive substances (such as drugs or alcohol). Every participant was informed of the nature of the study and participation in all the tests was voluntary and anonymous.

Tools

In order to collects sociodemographic data and the clinical history of each participant, as well as the presence/absence of sleep symptomatology, a sociodemographic questionnaire was initially applied.

After an extensive research regarding the best tools to use, in order to evaluate the intended characteristics, the following were chosen: *Pittsburgh Sleep Quality Index (PSQI)*, to evaluate the subjective quality of sleep, sleep habits and the occurrence of sleep disturbances; *Epworth Sleepiness Scale (ESS)*, to evaluate the average level of diurnal sleepiness as the individuals conduct their daily tasks; *Iowa Gambling Task (IGT)*, to evaluate decision-making; *Emotional Competence Questionnaire*, to evaluate the different dimensions of emotional intelligence; *Gandra-BARTA (Bolton Affective Recognition Tri-Stimulus Approach)*, to evaluate emotional recognition.

Research Design

The investigation was transversal, with a single clinical evaluation.

Procedure

The main objective was to test the effects of sleep deprivation in decision-making, emotional intelligence and emotional recognition in faces. An experimental method was used, with sleep quality and quantity as independent variables. The dependent variables found were: decision-making, emotional competence and emotional recognition in faces.

Every participant was informed that their participation was voluntary and anonymous, and that their results and responses would be confidential, through an informed consent form presented with the tools indicated above.

The data obtained through the scoring of the various tests was introduced and processed in the software *SPSS – Statistical Package for Social Science*, version 19.0, with the exception of the total results of the BARTA. In the analysis of the clinical and demographic information, as well as the performance in the various tools, a series of parametric statistics, such as the *T Student*, were used, to estimate the differences between the groups, in addition to the mean and standard deviation. Differences with $p<0.05$ were considered statistically significant.

To verify the homogeneity of variances and independence in the sample the Levene Test ($p\geq0.05$) were applied.

RESULTS

The results of the study are discussed below.

Table 1.

Mean, Standard Deviation, t Values and p Values of the results of the Experimental Group and Control Group in the Epworth Sleepiness Scale

	Exprimental Group		Control Group				95% CL	
	M	*SD*	*M*	*SD*	*p*	*t*	*UL*	*LL*
ESE	6.87	3.981	5.80	2.203	.000	2.842	.585	-2.727

Note. Cl = confidence interval; *LL* = lower limit; *UL* = upper limit.

By analyzing Table 1, we can conclude that the experimental group presents a higher diurnal sleepiness than the control group, reflected in an inferior sleep quantity in the experimental group. The differences found between the two groups were statistically significant for diurnal sleepiness ($p<0.05$).

Table 2.

Mean, Standard Deviation, t Values and p Values of the results of the Experimental Group and Control Group in the Pittsburgh Sleep Quality Index

	Exprimental Group		Control Group				95% CL	
	M	*SD*	*M*	*SD*	*p*	*t*	*UL*	*LL*
IQSP	7.16	3.110	3.33	1.295	.000	-6.237	-2.60	-5.056

Note. Cl = confidence interval; *LL* = lower limit; *UL* = upper limit.

As we can confirm from Table 2, our study confirms that the experimental group displays a worse sleep quality than the control group, with the differences found between the two groups being statistically significant ($p<0.05$).

Table 3.

Mean, Standard Deviation, t Values and p Values of the results of the Experimental Group and Control Group in the Emotional Competence Questionnaire

	Exprimental Group		Control Group				95% CL	
	M	*SD*	*M*	*SD*	*p*	*t*	*UL*	*LL*
QCE	207.65	21.21	206.50	24.12	.84	-.197	-12.76	10.47

Note. Cl = confidence interval; *LL* = lower limit; *UL* = upper limit.

Table 3 give us total and partial scores from an important component of emotional intelligence (emotional competence), although one can verify that there are no statistically significant differences between the experimental group and the control group ($p>0.05$), data that goes against our initial expectations.

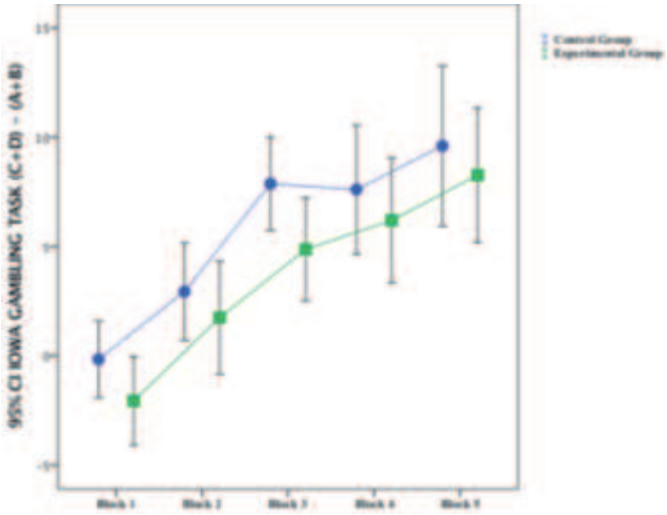


Figure 1. Results obtained by the Experimental Group and Control Group in the Iowa Gambling Test.

As far as decision making is concerned, our results do not allow us to differentiate between the two groups, being that the results obtained cannot find statistically significant differences between in the Iowa Gambling Test ($p>0.05$). This data also goes against our initial expectations.

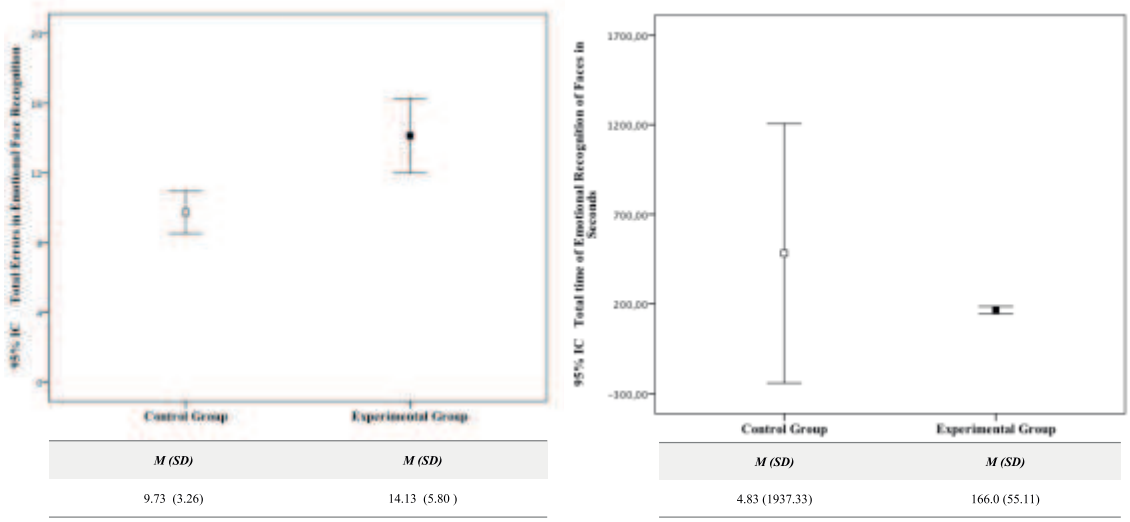
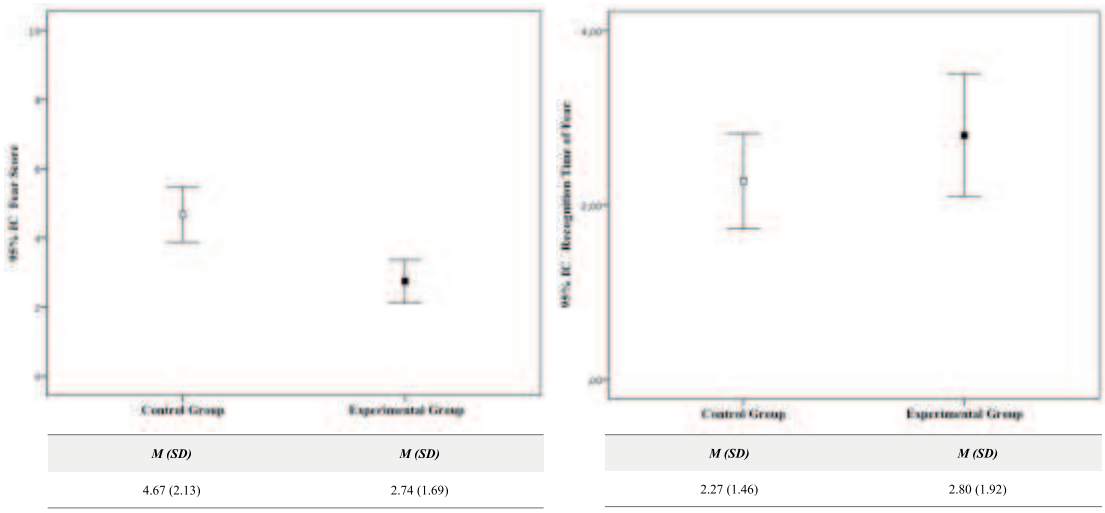


Figure 2. Total number of errors and total time used in emotional recognition by the Experimental Group and Control Group in the BARTA

By analyzing Figure 2, we can observe that the total number of errors in the experimental group (*M*=14.13; *SD*=5.80) is higher than the total number of errors in the control group (*M*=9.73; *SD*=3.26). However, the difference is not statistically significant (p>0.05). Simultaneously, the time used in emotional recognition also displays a difference in favor of the control group (M=4.83; SD=1937.33) when compared to the experimental group (*M*=166.0; *SD*=55.11).

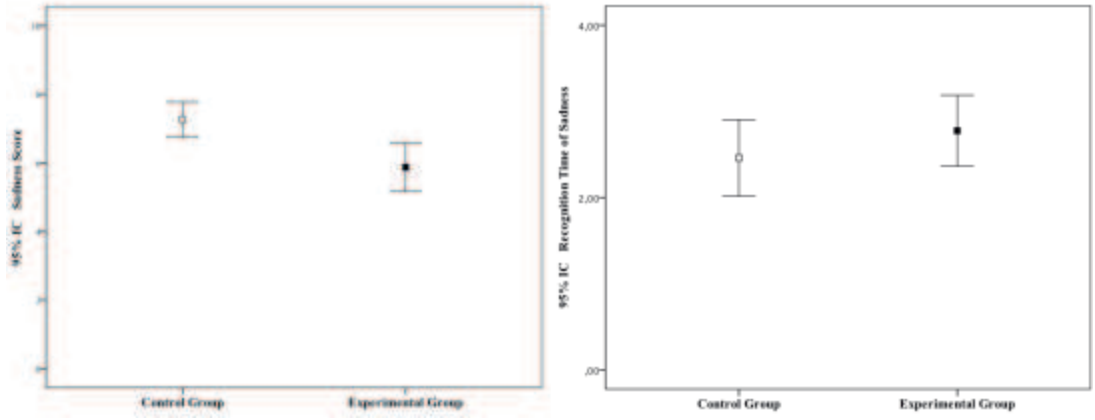
We will now present an analysis between time used and score in the test, since their independent analysis only provided superficial information. Our found allow us conclude that acute sleep deprivation interfere with the emotion facial recognition when the subjects have to identify two of the seven basic emotions, being them fear and sadness.



M (SD)	M (SD)	M (SD)	M (SD)
4.67 (2.13)	2.74 (1.69)	2.27 (1.46)	2.80 (1.92)

Figure 3. Score and Recognition Time for "Fear" in the Experimental Group and the Control Group in the BARTA

Concerning the recognition of fear (Figure 3), we can observe that the results obtained by the experimental group in identifying this emotion (*M*=2.74; *SD*=1.69), were clearly lower than the results of the control group (*M*=4.67; *DP*=2.13), with the difference being statistically significant ($t_{(59)}$=3.904, and p<.05). On the other hand, the time used in emotional recognition also displays a difference in favour of the control group (*M*=2.27; *SD*=1.46), when compared to the experimental group (*M*=2.80; *SD*=1.92), but this difference is not significant.



M (SD)	M (SD)	M (SD)	M (SD)
7.27 (1.36)	5.87 (1.92)	2.45 (1.18)	2.77 (1.12)

Figure 4. Score and Recognition Time for "Sadness" in the Experimental Group and Control Group in the BARTA

The same happens when we compare the results obtained between the two groups in relation to the recognition of sadness (Figure 4), where we can observe that the results obtained by the experimental group in identifying this emotion (M=5.78; SD=1.92) are clearly lower than the results obtained by the control group (M=7.27; SD=1.36), with the difference also being statistically significant between groups ($t_{(59)}$=3.255, and p<.05).

DISCUSSION

Sleep constitutes an essential biological function in all living beings. However, modern society is increasingly affected by sleep deprivation (Banks & Dinges, 2007), therefore making relevant a study directed towards the consequences of this deprivation in the behaviour and day-to-day life of human beings. As previously mentioned, the negative effects of sleep deprivation in alertness and cognitive performance are wide and varied, and point towards a reduction in overall brain functionality in two main structures: the thalamus (the subcortical structure involved in alertness and attention) and the pre-frontal cortex, a region that helps with alertness, attention and higher-order cognitive processes (Thomas et al., 2000). Anatomically speaking, several studies have verified the existence of a relation between the frontal lobe and its associated functions, with executive functions being the most affected by the adverse effects of sleep deprivation (Muzur, Pace-Schott & Hobson, 2002; Boonstra, Stins, Daffertshofer & Beek, 2007; Hsieh, Cheng & Tsai, 2007; Liu, 2008; Balkin, Rupp, Picchionni & Wesensten, 2008; Ginani et al., 2009; Tucker et al., 2010, Orzel-Gryglewska, 2010).

In this investigation, we attempted to ascertain if individuals in acute sleep deprivation would make worse decisions than individuals with a normative sleep cycle, in an effort to understand if there existed a functional deficit associated with lack of sleep in this executive domain, but the results obtained, as indicated above, go against our initial expectations, not revealing any significant difference in performance and decision-making between the two groups. These results may be related with the small sample size, or even with the criteria for inclusion in the experimental group, which only included individuals with acute sleep deprivation. It would be interesting, in future studies, to understand if this similarity between experimental and control groups would continue to exist if the sleep deprivation period was extended, i.e, including a group with chronic sleep deprivation.

Another main objective of this investigation was to try and understand if the effects of sleep deprivation could be moderated by individual differences in emotional intelligence. These differences would be supported by some individuals possessing a "cognitive reserve" that would allow them to sustain their cognitive capacities, despite the sleep deprivation (Killgore WDS., Killgore DB., Day LM., Li C., Kamimori GH & Balkin TJ., 2007b).

Despite the fact that traditional (cognitive) intelligence is critical for our capacity to adapt and survive, most individuals that succeed in modern society demonstrate a set of other equally important skills. Studies prove that successful individuals are capable of regulating their emotional behaviours in a constructive manner, they are skilled in used affective processes to guide their decisions and to improve their decision-making processes, they are competent at identifying and understanding emotional needs in others and they are effective in acting on this information in a pro-social manner. These individuals think and act in a constructive manner and present qualities associated with emotional intelligence (Killgore et al., 2007b). Our results do not support these theories, seeing as no statistically significant difference were found between the emotional capabilities of these two groups.

However, when we evaluate the emotional recognition in faces, we find statistically significant differences in the recognition of sadness and fear between the two groups, which coincides with existing literature that states that there is a marked deficit in the recognition of emotional intensity after a single night of sleep deprivation (Van der Helm et al., 2010). In addition to this, our results reveal that there is no difference in the recognition of neutral emotions, which contradicts some studies such as the one by Maccari et al. (2014), which states that sleep deprivation especially affects the ability of individuals to recognize neutral emotions.

Even though our results are corroborated by other studies, where emotional recognition of neutral emotions is not affected (Van der Helm et al., 20100), there are still some discrepancies in this field. Once again, it would be incredibly relevant to try and understand if these results are mirrored in individuals with chronic sleep deprivation or associated sleep disorders. Finally, future studies should focus on the extent of the consequences of sleep deprivation in the day-to-day lives of individuals with chronic pathologies, and what the implications of this deprivation are in emotional regulation and social interaction, considering that the affected area is a process as delicate as emotional recognition. Sleep is a vital function, and its deprivation may be associated to several causes, social costs, financial issues and even health problems (Durmer & Dinges, 2005). If we know that one of the consequences is the increase of risk of human error, it is necessary to understand the extent of the limitation of sleep deprivation and act in order to, at least, try and compensate some of the existing deficits with adequate skill training.

REFERENCES

Balkin T., Rupp T., Picchioni D. & Wesensten N. (2008). Sleep loss and sleepiness: Current issues. Chest, 134 (3), 653-660;

Banks S. & Dinges DF. (2007) Behavioral and Physiological Consequences of Sleep Restriction. J Clin Sleep Med. 2007;3:519-28.

Barboza J., Moraes E., Pereira E. & Reimão R. (2008). Avaliação do padrão de sono dos profissionais de enfermagem dos plantões noturnos em unidades de terapia intensiva. Einstein, 6 (3), 296-301;

Boonstra T., Stins J., Daffertshofer A. & Beek P., (2007). Effects of sleep deprivation on neuronal functioning: An integrative review. Cellular and Molecular Life Science, 64, 934-946;

Bráz C., (2009). O comportamento criminal feminino e disfunção executiva. Tese de Mestrado. Faculdade de Psicologia e Ciências da Educação, Universidade do Porto;

Brito F., (2012).O Sono e as funções executivas. Tese de Mestrado. Universidade Católica Portuguesa, Instituto de Ciências da Saúde;

Cirelli C., 2014. Definition and consequences of sleep deprivation. Section Editor.

Colten, H. & Altevogt, B. (Eds.) (2006). Sleep disorders and sleep deprivation: An unmet public health problem. Committee on Sleep Medicine and Research. Acedido

Damásio, A. (2003). Ao encontro de Espinosa: as emoções sociais e a Neurologia do sentir. Lisboa: Europa-América.

Dubois B., Slachevsky A., Litvan I., & Pillon B. (2000). The FAB. A frontal assessment battery at bedside. Neurology, 55, 1621-162;

Ekman P., (1992). An Argument for Basic Emotions: Cognition and Emotion. 6(3/4): 169-200 (1992);

Ekman, P. (1993). Facial Expression and Emotion. American Psychologist, 48, 4, 384-392.

Ginani G. et al., (2009). Sleep deprivation selectively effects working memory capacity. Abstracts of 3rd international congress of the Association of Sleep Medicine (WASM) / Sleep Medicine 10, Suppl. 2, S1–S83;

Goleman D., (2000). Trabalhar com Inteligência Emocional. Lisboa: Temas e Debates. (Obra original publicada em 1995).

Goleman D.,(2003). Inteligência Emocional. Lisboa: Temas e Debates. (Obra original publicada em 1998).

Harding, S. & Hawkins, J. (2001). What is necessary knowledge base for sleep professionals? Sleep and Breathing, 5(3), 101-107;

Henriques C., (2013). Dormir bem é fundamental. SAÚDE.

Hsieh, S., Cheng, I. & Tsai, L. (2007). Immediate error correction process following sleep deprivation. J. Sleep Res, 16, 137-147;

Keltner D. & Ekman P. (2002) Emotion: an overview. Encyclopedia of Psychology, 162-166.

Killgore WDS, Kahn-Greene ET., Lipizzi EL., Newman RA., Kamimori GH & Balkin TJ. (2007a). Sleep deprivation reduces perceived emotional intelligence and constructive thinking skills. Elsevier B.V. doi:10.1016/j.sleep.2007.07.003;

Killgore WDS., Killgore DB., Day LM., Li C., Kamimori GH & Balkin TJ., (2007b). The effects of 53 hours of sleep deprivation on moral judgment. SLEEP 2007;30(3):345-352;

Kornacki SA, & Caruso DR., (2007). In J. Ciarrochi & J. D. Mayer (Eds.). Applying Emotional Intelligence (pp.53-88). New York: Psychology Press.

Lawrence L., Nabi D. & Charlton J., (2011). The BARTA (University of Bolton Affect Recognition Tri---Stimulus Approach): 'A systematic journey from emoticons to humans via toontown'. Presented at: the Annual Conference on British Psychological Society, Glasgow. May 2011.

Law K S., Wong C-S., & Song LJ., (2004). The construct and criterion validity of emotional intelligence and its potential utility for management studies. Journal of Applied Psychology, 89,483–496.

Lima C., Meireles L., Fonseca R., Castro S. & Garrett C. (2008). The Frontal Assessment Battery (FAB) in Parkinson's disease and correlations with formal measures os executive functions. Journal of Neurology;

Liu, H. (2008). Effects of sleep deprivation on cognitive functions. Neurosci Bull, 24(1), 4548;

Lopes, PN., Salovey P., & Straus R., (2003). Emotional intelligence, personality, and the perceived quality of social relationships. Personality and Individual Differences, 35, 641–658.

Lopes PN., Brackett MA., Nezlek J., Schutz A., Sellin I., & Salovey P., (2004). Emotional intelligence and social interaction. Personality and Social Psychology Bulletin, 30, 1018–1034.

Lopes PN., Salovey P., Côté S., & Beers M., (2005). Emotion regulation abilities and the quality of social interaction. Emotion, 5, 113–118.

Maccari L., Martella D., Marotta A., Sebastiani M., Banaj N., Fuentes L & Casagrande M., (2014). Effects of sleep loss on emotion recognition: a

dissociation between face and word stimuli. Exp Brain Res (2014) 232:3147–3157. DOI 10.1007/s00221-014-3995-9

Maxwell Fraser, Russell Conduit & James G. Phillips., (2013). Effects of sleep deprivation on decisional support utilisation, Ergonomics, 56:2, 235---245, DOI: 10.1080/00140139.2012.760754.

Mayer JD., Salovey, P. & Caruso DR., (2002). Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) User`s Manual. Toronto: Multi-Health Systems.

Mayer JD., (2006). A New Field Guide to Emotional Intelligence In J. Ciarrochi, J. P. Forgas, & J. D. Mayer (Eds.). Emotional Intelligence in Everyday Life (pp. 3-26). New York: Psychology Press.

Muzur A., Pace-Schott E. & Hobson A., (2002). The prefrontal cortex in sleep. Trends in Cognitive Sciences, 6(11), 475-481;

Orzel-Gryglewsa, J. (2010). Consequences of sleep deprivation. International Journal of Occupational Medicine and Environmental Health, 23(1), 95–114

Rente P. & Pimentel T., (2004). O Sono normal. In A patologia do sono. Lousã: Edições Técnicas Lda.;

Salovey P., & Mayer, JD., (1990). Emotional intelligence. Imagination, Cognition, and Personality, 9, 185–211.

Schröder C. Commentary on van der Helm et al. Sleep deprivation impairs the accurate recognition of human emotions. Sleep 2010;33:335-342.

Schnyer DM., Zeithamova D., & Williams V., (2009). “Decision-Making under Conditions of Sleep Deprivation: Cognitive and Neural Consequences.”Military Psychology21 (1): 36–45

Shepard, J. et al., (2005). History of the development of sleep medicine in the United States. J. Clin. Sleep Med, 1(1), 61-82;

Stone, A. & Valentine, T. (2007). Angry and happy faces perceived without awareness: a comparison with the affective impact of masked famous faces. European Journal of Cognitive Psychology, 19, 2, 161-186.

Tucker, A., Whitney, P., Belenky, G., Hinson, J. & Van Dongen, H. (2010). Effects of sleep deprivation on dissociated components of executive functioning. SLEEP, 33(1), 47-57;

Thomas M., Sing H., Belenky G., Holcomb H., Mayberg H., Dannals R., Wagner H., Thorne D., Popp K., Rowland L., Welsh A., Balwinski S & Redmond D., (2000). Neural basis of alertness and cognitive performance impairments during sleepiness. I. Effects of 24 h of sleep deprivation on waking human regional brain activity. J Sleep Res. 2000 Dec;9(4):335-52;

Van der Helm E., Gujar N & Walker MP., (2010). Sleep deprivation impairs the accurate recognition of human emotions. SLEEP 2010;33(3):334-342.

ANEXOS

ANEXO I

Normas para submissão na Revista *Acta Neuropsychologica*

Acta Neuropsychologica

Instructions for Authors

Acta Neuropsychologica seeks to publish innovative papers concerned with all aspects of the brain-behavior relationship, including (but by no means limited to):

– neurobehavioral disturbances, including diagnosis and treatment, social and legal consequences, ethical and moral problems, etc.

– the brain/mind problem;

– general or specific theories of brain function and development, cognitive and emotional processes, speech and language functions, etc.

Authors are encouraged to submit manuscripts on theoretical and clinical topics in neuropsychology, broadly understood; interdisciplinary studies that explore issues not previously regarded as strictly neuropsychological are particularly welcome.

Acta Neuroopsychologica publishes articles of several types:

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– theoretical essays;

– reviews (normally by invitation of the Editors, but unsolicited submissions of particular value can be considered);

– letters to the editor (at the Editors' discretion, these can be published as commentary articles);

– book reviews.

From time to time the Editors may also organize a Clinical Forum, which will feature an invited lead paper accompanied by 3-5 commentaries by independent researchers active in the same field, and the original author's response to the commentaries. Readers are cordially invited to submit requests, proposals, suggestions, and nominations for review and clinical forum articles.

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The essential features of a structured abstract for a clinical or empirical research study are given below.

Background: Describe the background to the study, including the central problems or issues and their importance, the aims and objectives of the study, research questions or hypotheses advanced, etc.

Material and methods: Outline the research subjects/participants with relevant demographics and clinical information, the basic tests and parameters, and the experimental design, including statistical methods if different from routine tests and measures.

Results: Outline the important and relevant results generated by the experiment in general terms, without undue specificity of data.

Conclusions: The most important conclusions and implications of the study, with particular emphasis on any implications for clinical practice.

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