

TURKISH REPUBLIC

MARMARA UNIVERSITY

INSTITUTE OF HEALTH SCIENCES

# **THE EFFECTS OF CANNABIDIOL ON COGNITION FUNCTIONS IN PATIENTS WITH CHRONIC SCHIZOPHRENIA**

AYŞE GÜLER

DOCTOR of PHYLOSOPHY THESIS

SUPERVISOR

PROF. ZEYNEP GRIFFIN

PHARMACOLOGY PhD PROGRAM

CO-SUPERVISOR

PROF. ALİ KOÇAK

İSTANBUL- 2023



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| **APPROVAL**This thesis has been deemed by the aforementioned jury in accordance with the relevant articles of “Marmara University Graduate Education and Examination Regulations” and has been approved by Administrative Board of Institute with decision dated ...................................... and numbered .................................................Prof. Dr. Feyza ARICIOĞLU Director of Institute of Health Sciences |

**STATEMENT**

Hereby I declare that this thesis study is my own work, I had no unethical behavior in any stage from planning of the thesis until writing it, I have obtained all the information in this thesis within the academic and ethical rules, I have cited all the information and comments that are not obtained with this thesis study, and these sources are also included in the list of references, I hereby declare that I have no infringement of patents and copyrights during the study and writing of this thesis.

Name and Surname of the Student

Signature

**ACKNOWLEDGMENT**

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**ABBREVIATIONS LIST**

|  |  |  |
| --- | --- | --- |
| ACTH | : | Adrenocorticotropic hormone |
| BH4 | : | Tetrahydrobiopterin |
| CRP | : | C-reactive protein |
| CSF | : | Cerebrospinal fluid |
| iNOS | : | Inducible nitric oxide synthase  |
| CNS | : | Central nervous system |
| NF-κB | : | Nuclear factor kappa B |
| NLRP | : | NOD-like receptor protein |
| NMDA | : | N-methyl-D-aspartate |
| ODC | : | Ornithine decarboxylase |

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1. **ÖZET**

**Tezin başlığı :** Kronik Şizofreni Hastalarında Kannabidiolün Bilişsel Fonksiyonlar Üzerine Etkileri

**Öğrencinin Adı Soyadı :** Ayşe Güler

**Danışmanın Adı Soyadı :** Prof. Dr. Zeynep Griffin

**Programın Adı :** Farmakoloji Doktora Programı

**Amaç:**…………………………………………………………………………………………...

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**Anahtar Kelimeler:** Şizofreni, kannabidiol, bilişsel fonksiyon, hipokampus, BDNF

**2. SUMMARY**

**Title of Thesis:** Effects of Cannabidiol on Cognitive Functions in Patients with Chronic Schizophrenia

**Student Name, Surname:** Ayşe Güler

**Supervisor Name :** Prof. Zeynep Griffin

**Program Name :** Pharmacology PhD Program

**Objective:** ………………………………………………………………………………………

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**Conclusion:** …………………………………………………………………………………….

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**Keywords:** Schizophrenia, cannabidiol, cognitive function, hippocampus, BDNF

**3. INTRODUCTION and OBJECTIVE**

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**4. BACKGROUND**

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**5. MATERIALS and METHODS**

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**6. RESULTS**

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**7. DISCUSSIONS and CONCLUSION**

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**8. REFERENCES**

**EXAMPLES**

**Article**

Grady, J. S., Her, M., Moreno, G., Perez, C., & Yelinek, J. (2019). Emotions in storybooks: A comparison of storybooks that represent ethnic and racial groups in the United States. *Psychology of Popular Media Culture*, 8(3), 207–217. <https://doi.org/10.1037/ppm0000185>

Jackson, L. M. (2019). The psychology of prejudice: From attitudes to social action (2nd ed.). *American Psychological Association*. https://doi.org/10.1037/0000168-000

Sapolsky, R. M. (2017). Behave: The biology of humans at our best and worst. Penguin Books.

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**Book Section**

Aron, L., Botella, M., & Lubart, T. (2019). Culinary arts: Talent and their development. In R. F. Subotnik, P. Olszewski-Kubilius, & F. C. Worrell (Eds.), *The psychology of high performance: Developing human potential into domain-specific talent* (pp. 345–359). American Psychological Association. https://doi.org/10.1037/0000120-016

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**Proceeding**

Duckworth, A. L., Quirk, A., Gallop, R., Hoyle, R. H., Kelly, D. R., & Matthews, M. D. (2019). Cognitive and noncognitive predictors of success. *Proceedings of the National Academy of Sciences*, USA, 116(47), 23499–23504. https://doi.org/10.1073/pnas.1910510116

**Websites**

National Institute of Mental Health. (2018, July). *Anxiety disorders*. U.S. Department of Health and Human Services, National Institutes of Health. https://www.nimh.nih.gov/health/topics/anxiety-disorders/index.shtml

Please visit this link for additional examples https://apastyle.apa.org/style-grammarguidelines/references/examples

**9. CURRICULUM VITAE**

|  |  |  |  |
| --- | --- | --- | --- |
| Name |  | Surname |  |
| Place of Birth |  | Date of Birth |  |
| Nationality |  | Phone |  |
| E-mail |  |  |  |

**Educational Level**

|  |  |  |
| --- | --- | --- |
|  | Name of the Institution where he/she was graduated | Graduation year |
| Postgraduate/Specialization |  |  |
| Masters |  |  |
| Undergraduate |  |  |
| High school |  |  |

**Job Experience**

|  |  |  |
| --- | --- | --- |
| Duty | Institution | Duration (Year - Year) |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Foreign Languages** | **Reading comprehension** | **Speaking\*** | **Writing\*** |
|  |  |  |  |
|  |  |  |  |

|  |
| --- |
| **Foreign Language Examination Grade\*** |
| YDS | ÜDS | IELTS | TOEFL IBT | TOEFL PBT | TOEFL CBT | FCE | CAE | CPE |
|  |  |  |  |  |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Math** | **Equally weighted** | **Non-math** |
| ALES Grade |  |  |  |
| (Other) Grade |  |  |  |

**Computer Knowledge**

|  |  |
| --- | --- |
| Program | Use proficiency |
|  |  |

**\***Evaluate as very good, good, moderate, poor.

**10. SCIENTIFIC ACTIVITIES**

**EXAMPLES**

**Article**

Grady, J. S., Her, M., Moreno, G., Perez, C., & Yelinek, J. (2019). Emotions in storybooks: A comparison of storybooks that represent ethnic and racial groups in the United States. *Psychology of Popular Media Culture*, 8(3), 207–217. <https://doi.org/10.1037/ppm0000185>

**Book**

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Sapolsky, R. M. (2017). *Behave: The biology of humans at our best and worst*. Penguin Books.

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**Book Chapter**

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Dillard, J. P. (2020). Currents in the study of persuasion. In M. B. Oliver, A. A. Raney, & J. Bryant (Eds.), *Media effects: Advances in theory and research* (4th ed., pp. 115–129). Routledge.

Thestrup, K. (2010). To transform, to communicate, to play—The experimenting community in action. In E. Hygum & P. M. Pedersen (Eds.), *Early childhood education: Values and practices in Denmark.* Hans Reitzels Forlag. <https://earlychildhoodeducation.digi.hansreitzel.dk/?id=192>

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Evans, A. C., Jr., Garbarino, J., Bocanegra, E., Kinscherff, R. T., & Márquez-Greene, N. (2019, August 8–11). Gun violence: An event on the power of community [Conference presentation]. APA 2019 Convention, Chicago, IL, United States. <https://convention.apa.org/2019-video>

**Project**

Griffin, Z. & Güler, A. Kannabisin bilişsel fonksiyonlar üzerine etkisi. TÜBİTAK 1002 (SBAG-xxxxxxx), 2020-2022.

Griffin, Z. & Güler, A. Kannabisin bilişsel fonksiyonlar üzerine etkisi. Marmara Üniversitesi Bilimsel Araştırma Projeleri Koordinasyon Birimi (SAG-C-DRP-xxxxxx-xxxx), 2020-2022.

**12. APPENDICES**