



*Seminar at the
Department of Psychology at the University of Freiburg*

Cognitive Enhancement at the workplace and in study: Prevalence, causes and ethical issues

Course Outline

The use of substances in order to increase the mental ability e.g. concentration and memory - also known as Cognitive Enhancement or Brain doping - is an issue that is being widely medial and scientifically discussed. Research on this subject is characterized by interdisciplinarity (of psychology, sociology, medicine, pharmacology, neuroethics, etc.). Amongst other, the workplace conditions, but also personality traits and influences of the social environment are theoretically discussed to be risk factors for the revenue of potential enhancement substances and further on are tested empirically.

The seminar aims to consider the distribution of the use of enhancing medication in different populations, taking into account problems with the prevalence measurement. In addition, psychological, socio-psychological, sociological, and criminological theories to explain the substance use are discussed and empirically determined individual and contextual predictors are presented which are lying behind the use decision. Additionally, students can get to know the problems associated with the ethical problems of the use of enhancing medication and as well the preventive measures. The seminar includes interactive elements such as discussions and research-oriented group work.

Day 1	
13:00-14:00	Introduction to the subject, description of the seminar objectives, topics and requirements
14:00-14:05	Break*
14:05-14:55	<p>1. Session: Overview of prescription substances for Cognitive Enhancement, CE (<i>Lecture time approx. 30 minutes</i>)**</p> <p>Which prescription substances are discussed as potential enhancer for which cognitive functions? Present the substances (such as Modafinil and Methylphenidate). What are they actually prescribed for? Can the effects and side effects of the substances (positive and negative) be proved?</p> <p><u>Note</u> Preliminary it should be mentioned why these questions are of relevance. This session should be concentrated on the prescription of substances (e.g. not caffeine or Ginkgo, which will be presented in the next session) and the increase in cognitive performance (Cognitive Enhancement). The 'improvement' in moral/social behavior (Moral Enhancement and Enhancement of Social Interactions) and Mood Enhancement should not be presented. Do not provide information on bio-chemical processes as well as on the distribution of Cognitive Enhancement. If you use less familiar technical terms, please "translate" them (eg. possible side effects of cognitive enhancers such as tachycardia).</p> <p><u>Basic literature</u> Normann C, Boldt J, Maio G, Berger M (2010) Möglichkeiten und Grenzen des pharmakologischen Neuroenhancements. <i>Nervenarzt</i> 81: 66-74. Franke AG, Lieb K (2010) Pharmakologisches Neuroenhancement und „Hirndoping“. <i>Bundesgesundheitsblatt</i> 53: 853–860.</p> <p><u>Additional literature</u> Repantis D, Schlattmann P, Laisney O, Heuser I (2010) Modafinil and methylphenidate for neuroenhancement in healthy individuals: a systematic review. <i>Pharmacological Research</i> 62: 187-206. Battleday RM, Brem AK (in press) Modafinil for cognitive neuroenhancement in healthy non-sleep-deprived subjects: A systematic review. <i>European Neuropsychopharmacology</i>. Smith ME, Farah MJ (2011) Are Prescription Stimulants “Smart Pills”? The Epidemiology and Cognitive Neuroscience of Prescription Stimulant Use by Normal Healthy Individuals. <i>Psychological Bulletin</i> 137: 717-741.</p>
14:55-15:05	Break*
15:05-15:55	<p>2nd Session: Overview of legal substances and non-pharmacological methods for Cognitive Enhancement (<i>Lecture time approx. 35 minutes</i>)**</p> <p>Which legal substances and which non-pharmacological methods are discussed in the context of Cognitive Enhancement and which effects can be detected in the cognitive functions?</p> <p><u>Note</u> Preliminary it should be mentioned why these questions are of relevance. Here it should also only be about Cognitive Enhancement. The substances or methods may be caffeine, ginkgo or flavonoids or deep brain stimulation or memory training and meditation, etc. Potential side effects can be addressed here. If you use less familiar technical terms, please "translate" them (eg. possible side effects of cognitive enhancers such as tachycardia).</p> <p><u>Basic literature</u> Bostrom N, Sandberg A (2009) Cognitive enhancement: methods, ethics, regulatory challenges. <i>Science and Engineering Ethics</i> 15: 311-341. Dresler M, Sandberg A, Ohla K, Bublitz C, Trenado C, et al. (2013) Non-pharmacological cognitive enhancement. <i>Neuropharmacology</i> 64: 529-543.</p> <p><u>Additional literature</u> Fox KCR, Nijeboer S, Dixon ML, Floman JL, Ellamil M, Rumak SP, et al. (2014) Is meditation associated with altered brain structure? A systematic review and meta-analysis of morphometric neuroimaging in meditation practitioners. <i>Neuroscience & Biobehavioral Reviews</i> 43: 48-73. Nehlig A (2010) Is caffeine a cognitive enhancer? <i>Journal of Alzheimers Disease</i> 20(Suppl 1): 85-94. Nurk E, Refsum H, Drevon CA, Tell GS, Nygaard HA, et al. (2009) Intake of Flavonoid-Rich Wine, Tea, and Chocolate by Elderly Men and Women Is Associated with Better Cognitive Test Performance. <i>The Journal of Nutrition</i> 139: 120-127. Supplementary: http://jn.nutrition.org/content/suppl/2008/12/19/jn.108.095182.DC1/nut095182ST01.pdf</p>
15:55-16:20	Break*

16:20-16:55	<p>3rd session: Distribution of Cognitive Enhancement and origin of the substances (<i>Lecture time approx. 30 minutes</i>)**</p> <p>How common is Cognitive Enhancement in different populations and wherefrom do users obtain the substances? (Following comprehension questions on the lecture can be asked immediately, the general discussion on the distribution takes place after the input by the next block.)</p> <p><u>Note</u> Preliminary it should be mentioned why these questions are of relevance. The dissemination of Cognitive Enhancement should be displayed here as well as the problems in the measurement and the comparability of data in different studies. Factors influencing the use of cognitive enhancers should not be presented here (as this will be done in the following sessions).</p> <p><u>Basic literature</u> Marschall J, Nolting H-D, Hildebrandt S, Sydow H. (2015) Gesundheitsreport 2015. Analyse der Arbeitsunfähigkeitsdaten. Update: Doping am Arbeitsplatz. (<u>only pages 54-62 and 81-82 and 107-117!!</u>). Berlin/Hamburg: DAK/IGES. Sattler S (in press) Cognitive enhancement in Germany: Prevalence, attitudes, terms, legal status, and the ethics debate. In Jotterand F, Dubljević V (Eds.), <i>Cognitive enhancement: Ethical and policy implications in international perspectives</i>. Oxford: Oxford University Press.</p> <p><u>Additional literature</u> Dietz P, Striegel H, Franke A, Lieb K, Simon P, et al. (2013) Randomized response estimates for the 12-month prevalence of cognitive-enhancing drug use in university students. <i>Pharmacotherapy</i> 33: 44-50. Hoebel J, Kamtsiuris P, Lange C, Müters S, Schilling R, von der Lippe E (2011) <i>Ergebnisbericht: KOLIBRI-Studie zum Konsum leistungsbeeinflussender Mittel in Alltag und Freizeit</i>.(start from page 83!) Ragan CI, Bard I, Singh I (2013) What should we do about student use of cognitive enhancers? An analysis of current evidence. <i>Neuropharmacology</i> 64: 588-595. Singh I, Bard I, Jackson J (2014) Robust Resilience and Substantial Interest: A Survey of Pharmacological Cognitive Enhancement among University Students in the UK and Ireland. <i>PLoS One</i> 9: e105969.</p>
16:55-17:30	Input from current research (Sattler) and discussion on 3rd session: How widespread is Cognitive Enhancement? Measurement of the prevalence of Cognitive Enhancement using special procedures.
17:30-17:35	Break*
17:35-18:50	Practice on chores and general requirements
18:45-18:50	Break*
18:50-19:25	Future-Workshop I: Group work on future research questions (presentation of the results takes place on day 3)
19:25-19:30	Organizational matters, contemporary questions and questions about the next meeting
Day 2	
10:00-11:00	<p>4th session: Factors influencing the use of Cognitive Enhancement substances – Part 1 (<i>Lecture time approx. 35 minutes</i>)**</p> <p>Part 1: From an empirical perspective, which characteristics of the substance influence the use? Are there psychological, individual and social factors influencing the use of cognitive enhancers and how can the influence of these factors be explained theoretically?</p> <p><u>Note</u> Preliminary it should be mentioned why these questions are of relevance. Here it is expected that existing explanatory factors are presented. Which theories, theoretical assumptions and mechanisms explain the intaking decision of cognitive enhancers? A consultation with Group 4 might be useful in order to avoid duplication, e.g. in the discussion of underlying theories.</p> <p><u>Basic literature</u> Maier IJ, Wunderli MD, Vonmoos M, Römmelt AT, Baumgartner MR, Seifritz E, et al. (2015) Pharmacological Cognitive Enhancement in Healthy Individuals: A Compensation for Cognitive Deficits or a Question of Personality? <i>PLoS ONE</i> 10: e0129805. Marschall J, Nolting H-D, Hildebrandt S, Sydow H. (2015) Gesundheitsreport 2015. Analyse der Arbeitsunfähigkeitsdaten. Update: Doping am Arbeitsplatz. (<u>pages 63-77!!</u>). Berlin/Hamburg: DAK/IGES. Wolff W, Brand R, Baumgarten F, Lösel J, Ziegler M (2014) Modeling students' instrumental (mis-) use of substances to enhance cognitive performance: Neuroenhancement in the light of job demands-resources theory. <i>BioPsychoSocial Medicine</i> 26: 12.</p> <p><u>Additional literature</u> Sattler S, Wiegel C (2013) Test anxiety and cognitive enhancement: the influence of students' worries on their use of performance-enhancing drugs. <i>Substance Use & Misuse</i> 48: 220-232. Wolff W, Baumgarten F, Brand R (2013) Reduced self-control leads to disregard of an unfamiliar behavioral option: an experimental approach to the study of neuroenhancement. <i>Substance Abuse Treatment, Prevention, and Policy</i> 8:41.</p>

11:00-11:25	Input from current research (Sattler): The relationship between perceived occupational stress, the willingness and intake of performance-enhancing drugs among university teachers in Germany
11:25-11:35	Break*
11:35-12:35	<p>5th Session: Factors influencing the use of Cognitive Enhancement substances - Part 2 (<i>Lecture time approx. 35 minutes</i>)**</p> <p>Part 2: From an empirical perspective, which characteristics of the substance influence the use? Are there psychological, individual and social factors influencing the use of cognitive enhancers and how can the influence of these factors be explained theoretically?</p> <p><u>Note</u> Preliminary it should be mentioned why these questions are of relevance. Here it is expected that existing explanatory factors are presented. Which theories, theoretical assumptions and mechanisms explain the intaking decision of cognitive enhancers? A consultation with Group 4 might be useful in order to avoid duplication, e.g. in the discussion of underlying theories.</p> <p><u>Basic literature</u> Ford JA, Ong J (2014) Non-medical use of prescription stimulants for academic purposes among college students: A test of social learning theory. <i>Drug and alcohol dependence</i> 144: 279-282. Ponnet K, Wouters E, Walrave M, Heirman W, Van Hal G (2015) Predicting Students' Intention to use Stimulants for Academic Performance Enhancement. <i>Substance use & misuse</i> 50: 275-282. Sattler S, Sauer C, Mehlkop G, Graeff P (2013) The Rationale for Consuming Cognitive Enhancement Drugs in University Students and Teachers. <i>PLoS One</i> 8: e68821.</p> <p><u>Additional literature</u> Caviola L, Mannino A, Savulescu J, Faulmüller N (2014) Cognitive biases can affect moral intuitions about cognitive enhancement. <i>Frontiers Systems in Neuroscience</i> 8: 195. Ford JA, Schroeder RD (2009) Academic strain and non-medical use of prescription stimulants among college students. <i>Deviant Behavior</i> 30: 26-53. Sattler S, Mehlkop G, Graeff P, Sauer C (2014) Evaluating the drivers of and obstacles to the willingness to use cognitive enhancement drugs: the influence of drug characteristics, social environment, and personal characteristics. <i>Substance Abuse Treatment, Prevention, and Policy</i> 9: 8.</p>
12:35-13:35	Lunch break*
13:35-14:35	<p>6th Session: Assessment of Cognitive Enhancement (<i>Lecture time approx. 35 minutes</i>)**</p> <p>Which individual, social and ethical issues are identified by opponents of Cognitive Enhancement and what counter-arguments do proponents have?</p> <p><u>Note</u> Preliminary it should be mentioned why these questions are of relevance. Here it is expected that various pro and contra arguments regarding the application of Cognitive Enhancing substances will be presented and discussed. The special status of children will be discussed in session 7. Please do not provide any political implications as this will be done in session 7.</p> <p><u>Basic literature</u> Farah MJ, Illes J, Cook-Deegan R, Gardner H, Kandel E, et al. (2004) Neurocognitive enhancement: what can we do and what should we do? <i>Nature Reviews Neuroscience</i> 5: 421-425. Galert T, Bublitz C, Heuser I, Merkel R, Repantis D, et al. (2009) Das optimierte Gehirn. <i>Gehirn&Geist</i> 11: 40-48. Greely H, Sahakian B, Harris J, Kessler RC, Gazzaniga M, et al. (2008) Towards responsible use of cognitive enhancing drugs by the healthy. <i>Nature</i> 456: 702-705. Sahakian B, Morein-Zamir S (2007) Professor's little helper. <i>Nature</i> 450: 1157-1159.</p> <p><u>Additional literature</u> Forlini C, Racine E (2009) Autonomy and coercion in academic "cognitive enhancement" using methylphenidate: perspectives of a pragmatic study of key stakeholders. <i>Neuroethics</i> 2: 163-177. Metzinger T (2012) Zehn Jahre Neuroethik des pharmazeutischen kognitiven Enhancements – Aktuelle Probleme und Handlungsrichtlinien für die Praxis. <i>Fortschritte der Neurologie, Psychiatrie</i> 80: 36-43.</p>
14:35-14:40	Break*

14:40-15:15	<p>7th Session: Assessment of Cognitive Enhancement in children <i>(Lecture time approx. 20 minutes)**</i> Ethical debate on Cognitive Enhancement in children: Do children owe a special position? What has to be taken into account? Who is responsible?</p> <p><i>Note</i> Preliminary it should be mentioned why these questions are of relevance. Here it is expected that various pro and contra arguments regarding the application of Cognitive Enhancing substances in children will be presented and discussed. What are the differences and similarities to Cognitive Enhancement in adults?</p> <p><i>Basic literature</i> Ball N, Wolbring G (2014) Cognitive enhancement: perceptions among parents of children with disabilities. <i>Neuroethics</i>7: 345-364. Graf WD, Nagel SK, Epstein LG, Miller G, Nass R, Larriviere D (2013) Pediatric neuroenhancement: ethical, legal, social, and neurodevelopmental implications. <i>Neurology</i> 80: 1251-1260.</p> <p><i>Additional literature</i> Flanigan J (2013) Adderall for All: A Defense of Pediatric Neuroenhancement. <i>HEC Forum</i> 25: 325-344. Gaucher, N.; Payot, A.; Racine, E. Cognitive enhancement in children and adolescents: Is it in their best interests?, <i>Acta Paediatrica</i>. 2013, 102, 1118-1124.</p>
15:15-15:30	Break*
15:30-16:20	<p>8th session: Prevention and regulation of Cognitive Enhancement <i>(Lecture time approx. 35 minutes)**</i> What are the practical implications that can be drawn from the research on Cognitive Enhancement?</p> <p><i>Note</i> Preliminary it should be mentioned why this question is of relevance. Here one should discuss preventive measures and the political regulation of consumption. Please mind that in this session it is not about to discuss the general pros and cons for and against Cognitive Enhancement (this will be done in session 6).</p> <p><i>Basic literature</i> Dubljevic V (2013) Prohibition or Coffee Shops: Regulation of Amphetamine and Methylphenidate for Enhancement Use by Healthy Adults. <i>The American Journal of Bioethics</i> 13: 23-33. Glaeske G, Merchlewicz M, Schepker R, Soellner R, Böning J, et al. (2011) <i>Hirndoping. Die Position der Deutschen Hauptstelle für Suchtfragen e.V. (DHS)</i>. Online: http://www.dhs.de/fileadmin/user_upload/pdf/news/2011-06-20_Positionspapier_Hirndoping.pdf [assessed: Nov. 10, 2013]. Franke AG, Northoff R, Hildt R (in press) The Case of Pharmacological Neuroenhancement: Medical, Judicial and Ethical Aspects from a German Perspective. <i>Pharmacopsychiatry</i>.</p> <p><i>Additional literature</i> Dubljevic V (2014) Response to Open Peer Commentaries on “Prohibition or Coffee Shops: Regulation of Amphetamine and Methylphenidate for Enhancement Use by Healthy Adults?”. <i>The American Journal of Bioethics</i> 14: W1-W8. Maslen H, Douglas T, Cohen Kadosh R, Levy N, Savulescu J (2014) The regulation of cognitive enhancement devices: extending the medical model. <i>Journal of Law and the Biosciences</i> 1: 68-93.</p>
16:20-16:25	Break*
16:25-17:30	Future-workshop II: Result presentation of group work on future research questions takes place on Day 3
17:30-17:35	Break*
17:35-19:25	Inspection and assessment of the posters
19:25-19:30	Organizational matters, contemporary questions and questions about the next meeting
Day 3	
10:00-11:55	Discussion on pros and cons from the perspective of different stakeholders (eg. doctors and parents)
11:55-12:00	Break*
12:00-13:00	Future-workshop III: Result presentation of group work on future research questions
13:00-14:00	Lunch break*
14:00-15:30	Future-workshop IV: Result presentation of group work on future research questions
15:30-16:00	Presentation of the Best-Poster-Awards; Final discussion on the seminar, on open questions regarding the topic and on questions concerning the preparation of the term paper; evaluation of the seminar

* Times and lengths of breaks may vary** Lengths of sessions are advisory