The Neuroscientific Promise of Salvation. The Alliance of Neuroscience and Neoliberalism in the Decade of the Brain (1990-2000)

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Abstract

Neuroscience has since its institutionalization in the 19th century directed its scientific promise of the discovery of the relationship between the brain and mind and with it the explanation of mental illnesses and disorders to range of political actors. Where neuroscientists in the first decades after the Second World War failed to claim a position of scientific expertise, by the late 1980s the social and political context had changed in their favor with the rise of Neoliberal governance. During the 1990s Decade of the Brain, neuroscience's promise of the 'cure for mental illness' was turned into a national project, first by the Bush administration in the United States and then followed up by nations around the globe. Neuroscientific reductionist explanations of mental illness were so successful because they aimed at and resembled neoliberal discourses on individual responsibility and the inability of governmental interference in the social environment. Where neuroscientists and governmental officials in the first years of the Decade mentioned social factors as causes for mental illness and disorders, by the beginning of the 21th century mental illness had become a 'no-fault brain illness', a neurobiological phenomenon without external causes and therefore also solutions. The consequences of this alliance between neuroscience and neoliberalism have been topic of many critical studies in the past decade, yet the Decade of the Brain until now have almost completely been ignored. This master thesis is the first step towards an understanding of the interplay between the local and global dimensions of this Decade and thereby also a step towards understanding the way mental health issues are seen and treated in the present. This understanding at the same time is meant to open up the possibility to imagine much needed change in the future.

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Introduction

'The brain is the last and grandest biological frontier, the most complex thing we have yet to discover in our universe', wrote Nobel prize winner for discovery of the DNA-structure and director of the prominent Cold Spring Harbor Laboratory James D. Watson, in the foreword of the 1992 government commissioned book 'Discovering the Brain'.[1] In war-like rhetoric, Watson argued that neuroscientists in the 1990s Decade of the Brain had not just set out as 'discoverers', but also as 'fighters on the front lines' against the 'diseases that disrupt brain functions'.[2] In this fight they were armed with 'new weapons and ideas tested by experimentation and purchased using federal dollars' as FMRI-scanning machines. Watson's statements are exemplary for the public discourse of many leading neuroscientists at the time. Seemingly endless confidence in scientific progress, that neuroscience would soon 'discover the working of the brain' and thereby who 'we are', was combined with a clear promise of salvation. A promise however not so much directed to the 'millions of people suffering from mental illness', but more so to the governments that were increasingly worried about the rising 'burden' of mental health care costs.[3] Where Watson concluded that the symposium - that formed the basis of the in 1990 Decade of the Brain campaign - was 'a political event with a scientific purpose', this thesis will show that the Decade itself, and the promise underlying it, instead was a scientific event with a clear political, neoliberal, purpose.

More than just a study of the Decade of the Brain campaign the question that leads this thesis is why this neuroscientific promise of salvation specifically in the 1990s became so appealing. How did the historical, temporal, conditions of this decade, shaped both the ways it took place as well as how people made sense of it. That is to say that it is not just neuroscience itself that produces what Donna Haraway - following Foucault - called situated knowledges, or knowledge which is 'reflective of the conditions in which it is created'. Rather, the negotiation of scientific knowledge, how we make sense of what it means for us, is determined by the historicity of our own being as well. How does our own historicity, as Nima Bassiri (2017) writes, shape the 'ways in which neurological discourses become predominant frameworks according to which we make sense of and tell the truth of who we are'?[4]

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1 Ackerman, S., *Discovering the Brain* (Washington 1992) iii.
2 Ackerman, S., *Discovering the Brain* (Washington 1992) iii.
3 Congress, Rising health care costs. Causes, implications and strategies by Congressional budget office (April 1991) and Trautmann S., Rehm, J., Wittchen H.U., 'The economic costs of mental disorders. Do our societies react appropriately to the burden of mental disorders?', in: *EMBO Rep* 17.9 (2016) 1245-1249. Druss BG., 'Rising mental health costs. What are we getting for our money?', in*: Health Aff Millwood)* 25.3 *(May* 2006) 614-22.
4 As Nima Bassiri asks: 'Why did it become medically necessary, epistemological possible even legally or politically acceptable to reimagine the contours of the modern subject through recourse to neural accounts?', See: Bassiri, N., 'Who Are We, Then, If We Are Indeed Our Brains? Reconsidering a Critical Approach to Neuroscience', in: De Vos, J., Ed Pluth, E., (eds.) *Neuroscience and Critique Exploring the Limits of the Neurological Turn* (London 2015) 45.

I. Writing a useful history of the Decade of the Brain

The 1990s have by many scholars been declared as the beginning of the 'Neuro-Turn', the moment when neuroscientific knowledge began its rise to the public, cultural, political and scientific explanatory dominance that it, allegedly, occupies today. The impact of this turn is traced by historians, sociologists, political economists and anthropologists to representatives of mental health care, public policy and governance, economy, art, spirituality and the sciences itself.[5] In Melissa Littlefield and Jenell Johnson's *The Neuroscientific Turn* (2012), scholars from various backgrounds give an overview of the 'aftermath of the Decade of the Brain' in their respective scientific fields.[6] Although the authors note the importance of the campaigns that according to them 'undoubtedly served to organize and intensify discourses of the brain and mind', they say very little about what actually happened.[7] The effects of this Decade have further been traced by scholars to the natural sciences (Pedersen 2011) cultural sociology (Smith 2020), education and pedagogical theory (Lalancette 2017) and obviously neuroscience itself (Mahfoud 2014, Littlefield (2017).[8] More recent studies, as Jon Leefmann and Elisabeth Hildt's 'Human Sciences after the Neuro-Turn' (2017) and the collection of philosophical articles in Jan De Vos and Ed Pluth bundle 'Neuroscience and critique. Exploring the limits of the neurological turn' (2015) similarly almost exclusively focus on the deemed effects of the turn.[9]

What most existing studies have in common is that they thus do not examine the neuro-turn, but only its perceived effects, making the turn and the Decade of the Brain appear as what Sergio Sismondo called a black box.[10] Sismondo used this metaphor to describe explanations that present science as an 'in and output device' that highlights an outcome, while the inner workings, the process, is left unexplained.[11] Science and technology according to him 'produces black-boxes, or fact and artifacts that are taken for granted' making it seem as if 'their histories are irrelevant after facts and artifacts are established'.[12] The same can

5 Lynch, Z., *The Neuro Revolution. How Brain Science is Changing Our World* (New York 2009) 7.
6 Littlefield, M.M., Johnson, J.M., *The Neuroscientific Turn. Transdisciplinarity in the Age of the Brain* (Ann Harbor 2012).
7 Littlefield, M.M., Johnson, J.M., *The Neuroscientific Turn* 10.
8 As Mahfoud writes: 'The main argument is that neuroscience research and the context within which it is taking place has changed since the 1990's—specifically with the launch of "big science" projects such as the Human Brain Project (HBP) in the European Union and the BRAIN initiative in the United States. But doesn't show how it changed, and uses the decade more as a reference point then as a temporal existing entity causing change', in: Mahfoud, T., 'Extending the mind. A review of ethnographies of neuroscience practice', in*: Frontiers in Human Neuroscience* (June 2014) Lalancette, H., 'On the Neuro-Turn in Education. From Inside Out', *PhD dissertation Simon Fraser University* (2017) http://summit.sfu.ca/item/17055 and Smith, P., 'The neuro-cognitive turn in cultural sociology from 1.0 to 2.0', in: *American Journal Cultural Sociology* 8 (2020) 1-2.
9 Also see the Dutch NWO (Dutch National Research Council) research project 'The neuro-turn' in European Social Sciences and Humanities'. De Vos, J., Pluth, E., *Neuroscience and critique. Exploring the limits of the neurological turn* (Abingdon 2016). https://www.nwo.nl/en/research-and-results/research-projects/i/38/7038.html
10 Sismondo, S., *Introduction to Science and Technology Studies* (Singapore 2002) 97.
11 Sismondo, S., *Introduction to Science and Technology Studies* (Singapore 2002) 97.
12 Sismondo, S., *Introduction to Science and Technology Studies* (Singapore 2002) 97.

nevertheless also be said about how many critical social studies of science that are still written and especially studies of the effects of the neuro-turn.[13]

Various historiographies of neuroscience might not explicitly start from the perceived effects of the neuro-turn in present day society, but often implicitly do so in their attempt to either critically uncover the present's past, or offer an account of successful progress, as Rose and Abi Rached rightfully observe.[14] These histories thereby roughly follow the 'divide' in the history and philosophy of science between 'internalist' and 'externalist' perspectives. Whereas the former is dedicated to 'ideas', 'practices' and the 'cumulative progress' of science, the latter is concerned with the external social-political and cultural historical context of scientific actors, norms, institutions and language.[15] As the 'debate' between historian and sociologist Joelle Abi-Rached and neuroscientists Robert Balazs and Edward Reynolds about the founding (and implications) of the British Brain Research Foundation in the 1960s shows, both approaches have fundamental differences and can even collide.[16] Balazs and Reynold for example accused Abi-Rached of 'speculation on the basis of frail memories and philosophical inclinations' while they argued that the history of neuroscience 'should be similar to that of neuroscience itself, that is, based exclusively on the evidence and the documented facts'.[17]

Neuroscientists such as Balazs and Reynolds writing the 'history' of their own discipline and scholars working in Science and Technology-studies, indeed usually opt for an internalist perspective, while the externalist perspective is typically taken on by historians, sociologists, philosophers and anthropologists. Stanley Finger's *Origins of Neuroscience* (1994) and *Minds Behind the Brain. A History of the Pioneers and Their Discoveries* (2000) are, as the titles might indicate, good examples of this internalist linear history.[18] As Cooter (2014) and Della Rocca (2017) note, externalists also aim to trace the 'long past of the discipline' but more so in order to delegitimize neuroscientific discourses in the present.[19]

Fernando Vidal and Francisco Ortega (2017) have for example argued that the 'cultural history of the cerebral subject' should be treated as 'largely independent from the history of brain science', as well as that the idea of brainhood, that we are essentially our brains, can be

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13 Sismondo, S., *Introduction to Science and Technology Studies* (Singapore 2002) 97, 120-122.
14 Abi-Rached J.M., Rose N., 'The birth of the neuromolecular gaze', in: *History of the Human Sciences* 23.1 (2010) 11-36, 14.
15 Chang H., 'Who cares about the history of science?', in: *N&R Royal Society* 71.1 (2016) 91–107, 94.
16 Fitzgerald, D., Matusall, S., Skewes, J., & Roepstorff, A., 'What's so critical about Critical Neuroscience? Rethinking experiment, enacting critique', in: *Frontiers in human neuroscience* 8 (2014) 1-12.
17 Balazs R, Reynolds EH., 'Letter to the editor and authors' response. Reaction to Abi-Rached JM (2012) From brain to neuro. The brain research association and the making of British neuroscience, 1965-1996', in: *Journal of the History of the Neurosciences* 21 (2012) 189-213 and *Journal of the History of Neuroscience* (2013) 199-207.
18 Rosner, R., 'Dialogues in Historiography-historiography and Historians of Neuroscience: Towards Diversity in the ISHN', in: *Journal of the History of the Neurosciences* 8.3 (1999) 264–8 and Soderqvist, T., 'Neurobiographies. Writing Lives in the History of Neurology and the Neurosciences', in: *Journal of the History of the Neurosciences* 11.1 (2002) 38–48. Abi-Rached J.M., Rose N., 'The birth of the neuromolecular gaze' 14. Stanley Finger's *Origins of Neuroscience* (Oxford 1994).
19 Della Rocca, M., 'Histories of the Brain. Towards a critical interaction of the humanities and the neurosciences', in Leefman, J., Hildt, E. (eds.), *The Human Sciences after the Decade of the Brain* (Amsterdam 2017) 61–77. Cooter, R., 'Neural Veils and the Will to Historical Critique. Why Historians of Science Need to Take the Neuro-Turn Seriously', in: *Isis: A Journal of the History of Science* 105.1 (2014) 145-154, 147-148.

traced back to Enlightenment philosophy and thereby 'predates' modern neuroscience.[20] Similarly, Justine Murison (2012) located the neuro-turn in 19th-century medical thought in the United States and Anne Harrington conceptually traces it back to Weimar Germany where the cultural background and political ideas of scientists played a huge role as they 'searched for God in the nervous system'.[21] In her more recent book *Mind Fixers* (2019) she shows how the 'search for the Biology of Mental Illness', despite present day neuroscientists conviction, was not a linear process, but from its start in the 19th century was one of discontinuities and failed attempts.[22] In more linear chronological fashion, Stephen Casper's *The Neurologists* (2014) constructs a history of the profession of brain researchers and medical experts in Britain, but gives remarkably little attention to the 1990s.[23] German philosophers and historians of science Olaf Breidbach and Michael Hagner already in 1997 published each separately conceptual, yet still mostly chronological, histories of the development of the (German) neurosciences. Despite its novelty and appearing years before most other histories of the neurosciences, these accounts - as many German written histories - received remarkably little international attention.[24]

Some critics have questioned the meaningfulness of externalist genealogies of neuroscience and specifically the anachronistic use of terms as 'neuroscience', 'neuro-turn' and 'brainhood'.[25] While the above discussed studies are undeniably useful contributions to historiographical debates about the development of the field of neuroscience, it seems as if most historical studies are ignored in what Littlefield and Johnson note is increasingly a multidisciplinary debate about the impact of neuroscientific knowledge in the present.[26] Rose and Abi-Rached for this reason concluded that critical historical accounts are 'necessary' but also 'increasingly becoming unproductive'.[27] An important reason is that these critiques usually fail to demonstrate why and how these historical 'externalisms' matter today, let alone for the future. Is this because, as Bassiri (2018) rightly writes, they fail to 'answer the crucial

20 Vidal, F., Ortega, F., 'brainhood, Anthropological Figure of Modernity' 22, 35.
21 Murison, J.S., 'The Paradise of Non-Experts. The Neuroscientific Turn of the 1840s United-States', in: Littlefield, M.M., Johnson, J.N., (eds.) *The Neuroscientific Turn* (2012). Harrington, A., *Reenchanted Science. Holism in German Culture from Wilhelm II to Hitler* (Priceton 1996).
22 Harrington, A., *Reenchanted Science. Holism in German Culture from Wilhelm II to Hitler* 72-98. Harrington A., 'How to house a mind inside a brain. Lessons from history', in: *EMBO Report* 1 (2007) 12-15.
23 Casper, S.T., *The Neurologists. A history of medical speciality in Britain 1789-2000* (Manchester 2014).
24 Breidbach, O., *Die Materialisierung des Ichs. Zur Geschichte der Hirnforschung im 19. und 20. Jahrhundert* (Frankfurt 1996). Hagner, M., *Homo Cerebralis. Der Wandel vom Seelenorgan zum Gehirn* (Berlin 1997) and Hagner, M., 'Das ende vom Seelenorgan. Über einige Beziehungen von Philosophie und Anatomie im frühen 19. jahrhundert', in: Florey, E., Breidbach, O., Das Gehirn. Organ der Seele? Zur Ideengeschichte der Neurobiologie (Berlin 1993) 3-21.
25 Farah M.J., 'Brain images, babies, and bathwater. Critiquing critiques of functional neuroimaging', in: *Hastings Center Reports* March-April (2014) Bassiri, N., 'Review of Being Brains. Making the Cerebral Subject', in: *Journal of the History of the Neurosciences* (2018).
26 Littlefield, M.M., Johnson, J.M., *The Neuroscientific Turn* 10.
27 Rose, N., Abi-Rached, J., 'Governing through the Brain. Neuropolitics, Neuroscience and Subjectivity', in: *Cambridge Anthropology* 32.1 (2014) 3-23, 17.

question how this science of the past constitutes a past for the science of today?'[28] As I argued, it is therefore crucial for historians

That historians have difficulties with answering this question is hardly surprising. After all, they themselves have first posed this question as they disconnected the past from the present and future, made it into a motionless 'foreign country' with them as gatekeepers or judges to prevent any anachronistic misrepresentations.[29] As I have argued elsewhere as well, rather than drawing linear lessons from the past for the present or searching the direct 'causes' of the present by tracing A to B, historians should opt for a philosophical perspectival understanding of the past.[30] This means, following the German philosopher Friedrich Nietzsche, Walter Benjamin and the French philosopher Michel Foucault, a focus on 'the surfaces of emergence', the conditions in which practices and ideas came to be and thereby showing that it also could have been different.[31] As Foucault argues, in both 'historical analysis and political critique' we 'do we have to put ourselves under the sign of a unitary necessity'.[32] History then becomes about 'uncovering' or 'recovering' the 'failed potentials' of the past, about the 'moments' of discontinuity, ambivalence and uncertainty. Showing that the present was not the inevitable result of progress and neither is the future.[33] Ultimately, the question how the present could have been different is not necessarily a question historians need to answer, it is rather a question that we need to show to exist.[34] For the posing of the question opens up the possibility to imagine new futures in the present.

II Approach, methodology and sources

This thesis is about past futures.[35] About the promises of brain scientists and neuroscientists to 'discover' the brain and mind, the temporal social and political contexts in which these promises were outed and the potentials and meaning which were attributed to it.[36] As German historian Cornelius Borck has argued, recovering these past futures is however as much about

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28 Bassiri, N., 'Who Are We, Then, If We Are Indeed Our Brains? Reconsidering a Critical Approach to Neuroscience', 45.
29 Lowenthal, D., *The past is a foreign country* (Cambridge 1985).
30 De Cock, W., 'On the uses of history in modernity. Understanding the historicity of Being and the ability to imagine change', on: Djehoety.wordpress (June 7 2020). https://djehoety.wordpress.com/2020/06/07/on-the-uses-of-history-in-modernity/
31 Abi-Rached J.M., Rose N., 'The birth of the neuromolecular gaze' 15-17 and Garland D., 'What is a "history of the present"? On Foucault's genealogies and their critical preconditions', in: *Punishment & Society* 16.4 (2014) 365-384, 381.
32 Foucault, M., 'Questions of Method (interview original title "Round Table of 20 May 1 978")' (1980) and Lemke, T., *A Critique of Political Reason. Foucault's Analysis of Modern Governmentality* (London 2019) 370.
33 Greenberg, A., 'Making Way for Tomorrow. Benjamin and Foucault on History and Freedom', in: *Journal of Political Thought* 2.1 (2019) 18-39.
34 Abi-Rached J.M., Rose N., 'The birth of the neuromolecular gaze' 15 and Jacyna, L.S., 'Book Review. Discoveries in the Human Brain: Neuroscience Prehistory, Brain Structure, and Function', in: *Bulletin of the History of Medicine* 73.2 (1999) 325-6.
35 Koselleck, R., *Futures Past. On the Semantics of Historical Time* (Frankfurt am Main 1979).
36 As they write: 'A promise of the future, that is based not just on the present but also dependent on the ignorance of the past, on historical amnesia', in: Borup, M., Brown, N., Konrad, K., Van Lente, H., 'The sociology of expectations in science and technology', in: *Technology Analysis & Strategic Management* 18.3, 4 (2006) 285-298, 290.

the historical brain science as it is about the present and future neurosciences.[37] The recovering or uncovering of the 'epistemological and intellectual potential that once was attributed to neuroscientific discoveries' even though these ultimately failed, not just 'serve to kindle modesty' of present neuroscientists promising idealized futures, but also can inform our understanding of the functioning of (neuro)science itself and its relationship with politics. Where Borck has primarily reconstructed the past potentials of technology that mapped the brain and thereby mind, this thesis arguably goes one step further and primarily looks at the promise of discovery itself.[38] As this thesis - following scholars as Fuller - suggests, the brain sciences historically did not so much promise technological advancements in itself, as other scientific fields arguably do, but rather through - often not yet finalized technologies - promised a future where as Fuller writes 'the brain is central to everything'.[39] Although Fuller urges neuroscientists and all of us to think about 'which worldviews are licensed' once this historical promise is fulfilled, the content of a promised future already contains a distinctive worldview on the past and present that can be studied.

In both historical studies of science as in Science and Technology Studies (STS) there has generally been little attention to how scientific promises function both inside a scientific field and more so, how they relate to the historical social, cultural and political context.[40] Although prominent scholars as Ludwik Fleck, Robert Merton and Thomas Kuhn, who laid the foundation of the modern historical and philosophical study of science, suggested that promises or expectations are constitutive of a scientific field, they explained them mostly as functioning internally. Fleck does not specifically name promises in his essay, but they can be applied to his concept of 'Denkkollektive' or thought collective. This concept highlights how scientists in a discipline share a 'Denkstil', a 'mode' of thinking and speaking.[41] Fleck argues that as scientific collectives or fields historically evolved through education and institutions, this made scientists, who also often share cultural and social backgrounds, grow to use the same words, concepts and methods and one could add, share in the same scientific promise and idealized political potentials.[42]

Kuhn in his influential *Structure of Scientific Revolutions* (1962) held that scientific promises are constitutive of a scientific paradigm or 'the accepted set of concepts, methods and

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37 Brock, C., 'How we may think. Imaging and writing technologies across the history of the neurosciences', in*: Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences* 57 (June 2016) 112-120.
38 Brock, C., 'How we may think. Imaging and writing technologies across the history of the neurosciences', in*: Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences* 57 (June 2016) 112-120.
39 Fuller, S., 'Neuroscience. Neurohistory, and the history of science. A tale of two brain images', in: *Isis* 105 (March 2014) 100-9.
40 Mülberger, A., Navarro, J., 'The promises of science. Historical perspectives', in: *Centaurus Journal of the History of Science and its Cultural Aspects* 59.3 (2017) 167-172.
41 Fleck, L., 'Das Problem einer Theorie des Erkennens' (1936) in: eds. Schäfer, L., and Schnelle, T., *Erfahrung und Tatsache: gesammelte Aufsätze* (Berlin 1983) 85-126.
42 Fleck, L., 'Das Problem einer Theorie des Erkennens' (1936) in: eds. Schäfer, L., and Schnelle, T., *Erfahrung und Tatsache: gesammelte Aufsätze* (Berlin 1983) 85-126.

standards', in the sense that they one hand 'offers a puzzle to be solved' as well the means to 'realize that promise'.[43] Prominent sociologist Robert Merton's concept of self-fulfilling prophecy highlights the rhetorical elements of scientific promises, but as Porter argues is lacking for it 'invites the interpretation that any vision if handled and communicated by enough reliable and trusted actors could become true'.[44] He rightly notes that Merton's concept ignores both the 'content'; the 'work involved in producing expectations', as well as the context, the historical conditions of space and time, in which a promise is formed, functions and has its effects.[45]

In the last decennia, STS-scholars as Mads Borup and Nik Brown have initiated a study program into the 'sociology of expectations', in which scientific promises and expectations are defined as the 'state of looking forward' or 'as real-time representations of future technological situations and capabilities'.[46] They see promises or expectations as 'performative' and thereby 'constitutive' of scientific fields, as they 'attract the interest of necessary allies in innovation networks and investors' and define the role of scientists and 'build mutually binding obligations and agendas'.[47] Yet, as Brigitte Nerlich rightly notes, in the Sociology of Expectations 'nobody 'makes' a promise', rather, this 'promise' is seen as being 'inherent to technology and science' itself.[48] Thus, while Borup and Brown take into account that scientific 'expectations', 'visions' and 'promises' can theoretically have a 'subjectively normative character' and are at least partly 'wishful enactments of a desired future', they generally - as Porter notes in his critique - insufficiently 'engage with concepts as space and time'.[49]

In their formulation of a historical approach to the study of scientific promises, Mülberger and Navarro (2017) rightly note that historians should nevertheless be wary of approaching promises as purely 'rhetorical strategies strategy for scientists to "sell" their projects and capture attention of the wider public'.[50] Instead they at least partly follow Borup and Brown in their claim that scientific promises are 'constitutive of science itself'.[51] That is to say that promises are understood to 'guide the research activities', methodologies and conceptualizations of scientists as well as 'provide structure and legitimation, attract interest and foster investment' and open 'new research lines, scientific fields, and institutions'.[52] Their

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43 Kuhn, T.S., *The Structure of Scientific Revolutions. Second Edition* (Chicago 1964, 1970) 23, 24, 126.
44 Porter, J.J., and Randalls, S., 'Politics of expectations. Nature, culture and the production of space', in: Geoforum 52 (2014) 200-207, 201.
45 Porter, J.J., and Randalls, S., 'Politics of expectations. Nature, culture and the production of space', in: Geoforum 52 (2014) 200-207, 201.
46 Borup, M., Brown, N., Konrad, K., Van Lente, H., 'The sociology of expectations in science and technology', 288.
47 Borup, M., Brown, N., Konrad, K., Van Lente, H., 'The sociology of expectations in science and technology', 288.
48 Promise Brigitte Nerlich https://blogs.nottingham.ac.uk/makingsciencepublic/2017/12/28/promises-promises-promises/
49 Porter, J.J., and Randalls, S., 'Politics of expectations. Nature, culture and the production of space', 201.
50 Mülberger, A., Navarro, J., 'The promises of science. Historical perspectives', in: *Centaurus Journal of the History of Science and its Cultural Aspects* 59.3 (2017) 167-172.
51 Mülberger, A., Navarro, J., 'The promises of science. Historical perspectives', 166-169.
52 Mülberger, A., Navarro, J., 'The promises of science. Historical perspectives', 168.

historical approach, which this thesis follows, more than the STS-approach is attentive to the social-cultural and political causes and effects of scientific promises.[53] That means that promises are seen as at least partly as a response to factors 'outside' of science, be it to attract funding or the scientists' own concerns with social, political and cultural matters. More so, promises are not just able to shape a scientific field, but also influence social-cultural thinking and legitimize political rhetoric and action without direct involvement from the scientists making the promise.[54]

It further can be argued that in modern society it is the promise itself which receives most of the attention, rather than the eventual, often more nuanced and less far reaching, outcome. Borup (2006) and Brown (2005) have shown that in the case of clinical biotechnology the 1990s for example saw a gradually 'shift' in scientific promises 'from a discourse characterized by present-day evidences, facts, or proofs' to one of 'future-oriented abstractions, premised on desire, imagination, and the will to the yet "not present".[55] In the case of neuroscience specifically, this change was further strengthened by a sharp increase in media coverage. As Steven Woloshin and Lisa Schwartz show, media reporting on neuroscience from the 1990s onwards mostly focused on pre-finalized research as presented in neuroscientific conferences, press releases and pre-publication papers. Only a small share (27%) of these 'promises' were eventually published in peer-reviewed 'high-impact journals' and a small but significant part were not published at all.[56]

Scientific promises thus do not necessarily have to be based on realistic expectations of the future to have animpact. Their successes are, unlike some more radical Foucauldian approaches to the history of science might suggest, however also not exclusively made up and dependent on social and political factors.[57] Scientific developments such as new technologies, ideas and indeed 'discoveries' undeniably represent an important constitutive factor of scientific promises that both shapes how promises are communicated and tried to be fulfilled,

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53 The STS-approach usually fails to pay enough attention to the historical context in which scientific promises are outed, and either rejected or embraced by both the scientific community as well outside world. Porter, J.J., and Randalls, S., 'Politics of expectations. Nature, culture and the production of space', 204. Nerlich, B., 'Promises, Promises, Promises', (2017) https://blogs.nottingham.ac.uk/makingsciencepublic/2017/12/28/promises-promises-promises/ Brown, N., Michael, M., 'Sociology of Expectations. Retrospecting Prospects and Prospecting Retrospects', in: *Technology Analysis and Strategic Management* 15.1 (2003 3-18. Michael, M., 'Futures of the present. From performativity to prehension', in: eds. Brown, N,, Rappert B., Webster, A., *Contested Futures. A Sociology of Prospective Techno-Science* (Aldershot 2000).

54 Borup, M., Brown, N., Konrad, K., Van Lente, H., 'The sociology of expectations in science and technology', 288, 295.

55 Borup, M., Brown, N., Konrad, K., Van Lente, H., 'The sociology of expectations in science and technology', 292-295. Brown, N., Shifting tenses. Reconnecting regimes of truth and hope', in: *Configurations* 13.3 (2005) 331–355.

56 Of the studied papers that were presented at conferences of the Society for Neuroscience, 27% would end up in high end journals, this is compared to the 64% for Clinical Oncology papers relatively little. See: Woloshin S., Schwartz LM., 'Media reporting on research presented at scientific meetings: More caution needed', in: *Medical Journal Australia* Jun 5 184 (2006) 576-80 and Schwartz L.M., Woloshin, S., Baczek, L., 'Media coverage of scientific meetings: too much, too soon?', in: *JAMA* Jun 5. 287.21 (2002) 2859-63 and O'Connor, C., Rees, G., Joffe, H., 'Neuroscience in the Public Sphere' in: *Neuron* 74.2 (2012) 220-226 and Van Atteveldt, N.M., Van Aalderen-Smeets, S.I., Jacobi, C., & Ruigrok, N., 'Media reporting of neuroscience depends on timing, topic and newspaper type', in: *PloS one* 9.8 (2014).

57 Fuller S., 'Neuroscience, neurohistory, and the history of science. A tale of two brain images', in: *Isis* 105.1 (March 2014) 100-109.

but also makes the promise attractable and believable for both the scientists outing them as the public interpreting them.

To summarize, this thesis approaches scientific promises from four interrelated aspects. Firstly and most importantly, scientific promises are seen as constitutive of a scientific field and its corresponding paradigm. Secondly, promises come into existence and are given meaning to in a dynamic multidimensional process of both 'internal' factors as scientific developments, 'discoveries' and technological inventions as well as 'external' contextual, social, cultural and political factors. Thirdly, promises do not need to have a concrete scientific basis to attract political usage or influence how people socially and culturally think of themselves. Ultimately, promises shape the relationship between a scientific field's past, its present and future.[58] Only by naming what is old, scientists can promise what's new and often only by forgetting, by - as Borup and Brown argue - collective 'historical amnesia', by erasing 'continuities with the past from promissory memory', a scientific field can uphold this promise over time.[59]

The neuroscientific promise in the Decade of the Brain campaign from 1990 to 2000 will be examined in three parts. The first part: 'The Promise of Salvation' will construct a historical genealogy of brain research and the promises that were related to it, until the 1990s.[60] This part mostly relies on an analysis of secondary literature. The second part focuses on the first Decade of the Brain campaign as launched by the US congress in 1990, and is primarily based on a study of previously unused archival material of the US Congress as well as publications and documents of various neuroscientific organizations and Neuroscientific Interests Groups within governmental health institutes. Due to the COVID-19 crisis and the closure of many archives as well as the impossibility of international travel, it was however not possible to access some non-digitalized archival material. Although other national campaigns and discourses largely followed the American example, and the American campaign had in its scale and reach the most impact on the international field of neuroscience, paragraph 2.8 will examine follow-ups in Europe and other parts of the world. The 2.9 paragraph specifically examines the case of the Netherlands to see how global and local dimensions of this promise interacted in one of the most extensive yet divergent follow-ups of the American project. The final part of this thesis ultimately deviates from the common structure of most other master thesis in that the conclusion is replaced with an epilogue. Here, the past critiques on the

58 Borup, M., Brown, N., Konrad, K., Van Lente, H., 'The sociology of expectations in science and technology', 290.
59 Borup, M., Brown, N., Konrad, K., Van Lente, H., 'The sociology of expectations in science and technology', 288-293.
60 Della Rocca, M., 'Histories of the Brain. Towards a critical interaction of the humanities and the neurosciences', in Leefman, J., Hildt, E. (eds.), *The Human Sciences after the Decade of the Brain* (Amsterdam 2017) 61–77.

neuroscientific promise in the Decade of the Brain are connected to our present and future and suggestions are made for a different kind of socially-engaged neuroscience.

Chapter 1. The science and politics of the brain (1800-present)

On 14 August 1872 Emil Du Bois-Reymond, one of the most prominent German natural scientists of the time, gave his famous lecture on the 'limits of knowledge on nature' (Über die Grenzen des Naturerkennens) for a gathering of doctors and natural scientists of the Versammlung Deutscher Naturforscher und Ärtze (VDNA) in Leipzig.[61] Likely to the disbelief of many, his speech was not a promise of how these borders would be expanded by upcoming discoveries, but rather that there were two clear boundaries to all scientific knowledge that could not be crossed. That of the nature of matter and, for this thesis most importantly, the 'connection between consciousness and the brain'.[62] Even if they would gain 'astronomical knowledge of the brain', of its 'material conditions', he argued that this would 'discloses nothing but matter in motion', and 'mental phenomena' would 'remain as unintelligible as they are now'.[63] 'Ignoramus et ignorabimus! We do not know and will not know!', he famously concluded.[64]

That these words came from a prominent scientist at a time that was generally regarded as one of great progress in the scientific understanding of the brain and thereby mind; both in the recent past as more importantly, the imagined future, made it especially impactful.[65] It was a break in what German historian of science Cornelius Borck has called 'the constantly postponed promise' of the modern brain sciences that the near future will bring a 'definitive understanding of mind and brain'.[66] A promise, that as he argues, has been a 'persistent and recurring pattern' since its institutionalization in the 19th century and evolvement into one distinctive discipline of neuroscience in the middle of the 20th century.[67]

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61 Finkelstein, G., *Emil du Bois-Reymond. Neuroscience, Self, and Society in Nineteenth-Century Germany* (Cambridge 2013) and Beiser, F.C., 'The Ignorabimus Controversy', in: *After Hegel. German Philosophy, 1840–1900* (Priceton 2014) 97-132, 100-104 and Veit-Brause I., 'Scientists and the cultural politics of academic disciplines in late 19th-century Germany. Emil Du Bois-Reymond and the controversy over the role of the cultural sciences', in: *History of the Human Sciences*14.4 (2001) 31-56.
62 Beiser, F.C., 'The Ignorabimus Controversy', in: *After Hegel. German Philosophy, 1840–1900* (Priceton 2014) 97-132, 102.
63 Du Bois Reymond, E., 'Limits of our Knowledge of Nature', translated by J. Fitzgerald in: *Popular Science Monthly* 5 (May 1874).
64 Du Bois Reymond, E., 'Limits of our Knowledge of Nature', translated by J. Fitzgerald in: *Popular Science Monthly* 5 (May 1874).
65 The resulting controversy came to be known as the Ignorabimus-Streit and as Frederick Beiser shows, at the center were ideas about (the nature of) scientific progress, the limits of knowledge and the position of the knowledge produced by the Humanities (Geisteswissenschaft) in relation to the limits set to 'scientific knowledge' by Bois-Reymond. That these were at the center did not mean not a political component was involved. The battle between Catholics and Protestants about the identity of Germany, the attempted integration of Catholics by Bismarck, made it so that the state (and its scientists) did not want to create unnecessary tension, thus removing theories about evolution from the school curriculum. In other words, the debate was not so much about the limits of knowledge in scientific sense; but about the limits of knowledge in political sense; at what point knowledge had negative effects on society, by fueling tensions. As Hacking notes, Bois-Reymond and other of his prominent colleagues as Ernst Wilhelm Ritter von Brücke (1819-1892) Hermann Ludwig Ferdinand von Helmholtz (1821-94) 'held that the workings of the brain will be fully understood by the theory of electricity'. See: Hacking, I., 'Nineteenth Century Cracks in the Concept of Determinism', in: *Journal of the History of Ideas* 44.3 (1983) 455-75, 456.
66 Borck, C., 'Through the Looking Glass. Past Futures of Brain Research', in: *Medicine Studies* 1.4 (2009) 329-338, 331. and Hagner, M., *Homo cerebralis. Der Wandel vom Seelenorgan zum Gehirn* (Berlin 1997).
67 Borck, C., 'Through the Looking Glass. Past Futures of Brain Research', 331.

1.1 The brain as symbolic object of representation

To understand the impact of neuroscience and the neuroscientific promise it is not sufficient to study the contemporary context alone. As John Pickstone argued in *Ways of Knowing*, scientific knowledge is constructed by the adding of new ideas, approaches and practices rather than the sudden replacement of an old scientific paradigm (a set of concepts, practices and ideas) by a new one in a 'scientific revolution'.[68] At the same time, it is complicated to trace the meaning of ideas over time. As historian of ideas Quentin Skinner observed, it is likely that historians in their reconstruction of the past 'origins' of ideas, would base their attempt on 'expectations about what the author must be saying'.[69] Following the Austrian philosopher Ludwig Wittgenstein, Skinner therefore argued that rather than 'studying the supposed meaning of words', historians of ideas should 'look at how they are used'.[70] That is to say, paying attention to the contexts in which expressions were made' and which 'questions it was thought to answer'.[71] And it is this historical context that changes the meaning of the brain itself.

Thinking about the relation between the 'mind' or 'consciousness' and its 'material basis or location' in the body, can be found throughout human history and transcends different cultures and traditions of thinking.[72] In ancient Egyptian, Chinese and Greek philosophy the mind was located in the body, albeit in different parts ranging from the liver to the heart and brain. In other strains of thinking as Buddhism and that of the Akan people in present day Ghana, this relationship was seen as holistic or interconnected, dynamic and inseparable.[73] The

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68 Pickstone, J., *Ways of Knowing. A New History of Science, Technology and Medicine* (Manchester 2000) xi, 2,7.

69 As he rightly notes it is already questionable if historians can 'credit a doctrine', a set of ideas as in this case Brainhood, to the 'text or words of someone' in the past who 'failed to articulate the doctrine with which they are being credited'. Similarly, Ludwik Fleck has pointed out as well that its logical but ultimately false to 'unconsciously apply the presentist definition' on old scientific texts and concepts, as the meaning of these concepts and words change in the evolution of scientific fields over time. Skinner, Q., 'Meaning and Understanding in the History of Ideas', in: *History and Theory* 8.1 (1969) 3-53, 6, 10. Fleck, L., 'Das Problem einer Theorie des Erkennens' (1936) 100, 107-108.

70 As Skinner writes: 'We may perhaps learn that the expression was used at different times to answer a variety of problems. But what we still cannot learn - to cite Collingwood's very important point is: 'what questions the use of the expression was thought to answer, and so what reasons there were for continuing to employ it', see: Skinner, Q., 'Meaning and Understanding in the History of Ideas' 37.

71 Skinner, Q., 'Meaning and Understanding in the History of Ideas', 38, 39.

72 There are nevertheless some clear limitations when tracing the meaning of concepts as 'soul', 'mind' and 'consciousness' over time and through different cultural and linguistic contexts. For the sake of comprehension, it is best to understand translated terms as for instance the old Greek nous (νοῦς), which is usually translated to 'mind', as only being roughly similar to the way we conceptualize 'mind' today. That is, the set of faculties or ideas as 'self-awareness', the 'ability to think rationally' and other related cognitive abilities. The Arabic equivalent to Nous (νοῦς) is most commonly seen as Aql (عقل). Stanford Encyclopedia of Philosophy, 'Arabic and Islamic Psychology and Philosophy of Mind' (12 April 2008) online link: https://plato.stanford.edu/entries/arabic-islamic-mind/

73 In ancient Egyptian thinking, it was the heart that was seen as both the location and symbolically representing 'consciousness' and the 'soul'. It was the heart that in ancient Egypt contained the memories of one's good and bad deeds, was left in the body in the process of mumification while the brains were taken out and disposed, and eventually it was the heart that was weighted and 'judged' by the God Anubis after death. Similarly, in Chinese philosophy the heart was seen as the 'organ of thinking, reasoning and feeling', the 'faculty of cognition', as Edward Slingerland notes. In other strains of thinking, there was not one specific organ designated as 'seat of the mind and soul', and in for instance Buddhism and the well-documented philosophy of the Akan people in present day Ghana, the relationship between the 'mind' and body was seen as completely holistic, or interconnected, dynamic and inseparable. That is to say that in classical Greek, Aristotelian philosophy, Galen's humoral theory. In the Renaissance, and even with the introduction of systematic Arabic commentaries on Greek medical treaties on the brain, cognition and the senses, the brain in Western thinking was seen as 'only' one of several important organs, and Renaissance philosophers still debated if 'higher functions of intelligence' were to be located in the brain at all. Santoro, G., Wood, M.D., Merlo, L., Anastasi, G.P., Tomasello, F., Germanò, A., 'The anatomic location of the soul from the heart, through the brain, to the whole body, and beyond. A journey through Western history, science, and philosophy', in: *Neurosurgery* 65.4 (October 2009) 633-43, 643. Also see: Green C.D., 'Where did the ventricular localization of mental faculties come from?', in: *Journal of History of Behavioral* Sciences 39.2 (2003) 131-42. Dolan, B., 'Soul searching. Abrief history of the mind/body debate in the neurosciences', in: *Neurosurgery Focus* 23.1 (2007) E2. Russell G.A., 'Chapter 6: after Galen Late Antiquity and the Islamic world', in: *Handbook Clinical Neurology*

Western formulation of the mind-body 'problem', or the question what the relation is between mental states and the body hence also not a necessary or inevitable development, neither was its spread around the globe.

Until the 17th century, the European medical and philosophical conceptualization of the mind and body was based on Aristotelian frameworks and Galen's humor theory that saw 'four humors' or 'temperaments' and blood flows in the whole body as central to human character, thinking and cognition.[74] In the middle of the 17th century, the period known as the Enlightenment, the soul or the fundamental human characteristic, gradually became redefined as the 'mind' while at the same time, there were increasing attempts to 'localize' this mind into the brain.[75] This can be found in Descartes's famous dualism which conceptualized the body as a machine that could be mechanically explained, while the mind was located mostly symbolically, at the 'center' of this machine in the pineal gland in the brain where it 'pulled the levers'.[76]

For Descartes it was however unclear 'how these levers were pulled', let alone, if and how this could be 'scientifically' studied.[77] With some notable exceptions, he and most other (natural) philosophers at that time thought of the mind as a substance of its own, immaterial, and not mechanically explainable.[78] Personhood, or what it meant to be human became for this reason gradually 'desubstantialized and psychologised' and as Vidal writes, 'bodies became

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(2010) 61-77, Finger, S., *Origins of Neuroscience* 24-28. See: Russell G.A., 'Chapter 6: after Galen Late Antiquity and the Islamic world', in: *Handbook Clinical Neurology* (2010) 95, 61-77. Stelmarck, R., Stalikas, A., 'Galen and the humour theory of temperament', in: *Personality and Individual Differences* 12.3 (1991) 255-263 and Vidal, F., Ortega, F., *Being Brains* 30-37.

74 These frameworks were continued in Neoplatonic thinking which held the mind (νοῦς) as ontologically prior to the physical body (the mind as Plato famously argued being 'superior but trapped in the body') as well as the Christian 'doctrine of the resurrection' that believed the spirit or soul to be a immaterial substance located, but not bound to the body. Santoro, G., Wood, M.D., Merlo, L., Anastasi, G.P., Tomasello, F., Germanò, A., 'The anatomic location of the soul from the heart, through the brain, to the whole body, and beyond.A journey through Western history, science, and philosophy', in: *Neurosurgery* 65.4 (October 2009) 633-43, 643. Stelmarck, R., Stalikas, A., 'Galen and the humour theory of temperament', in: *Personality and Individual Differences* 12.3 (1991) 255-263 and Vidal, F., Ortega, F., *Being Brains* 30-37. Russell G.A., 'Chapter 6: after Galen Late Antiquity and the Islamic world', in: *Handbook Clinical Neurology* (2010) 61-77, Finger, S., *Origins of Neuroscience* 24-28.

75 Vidal, F., 'brainhood, Anthropological Figure of Modernity', 7, 11, 13, 31, and Vidal, F., 'Person and Brain. A Historical Perspective from within the Christian Tradition', in: *Pontifical Academy of Sciences, Scripta Varia,* 109 (2007) 3–14, 10.

76 Lokhorst, G., 'Descartes and the pineal gland', in *Stanford Encyclopedia of Philosophy* (2005). Vidal, F., 'Brainhood, Anthropological Figure of Modernity' 33.

77 The Pineal Gland is a tiny organ in the brain. It is important to note Descartes knowledge of the brain was even according to the knowledge of the brain at his own time, false. Lokhorst, G., 'Descartes and the pineal gland', in *Stanford Encyclopedia of Philosophy* (2005).
Lokhorst, G., 'Descartes and the pineal gland', in *Stanford Encyclopedia of Philosophy* (2005). Vidal, F., 'brainhood, Anthropological Figure of Modernity' 30-35.

78 That does not mean however that there were no increasing scientific inquiries into the brain, as the research into the brain anatomy by Thomas Willis (1621-1675) and the priest Nicolaus Steno (1638-1686) highlights. Steno's Discourse on the Anatomy of the Brain (Discours sur l'anatomie du cerveau 1669) is especially interesting for it rejects Descartes and Willis attempted mental function localization in the brain as 'speculation' that has no 'empirical basis in the brain'. These empirical inquiries into brain anatomy should be seen in the light of larger changes in the study of nature in this period that is known as the heavily contested 'scientific revolution'. Although historians of science as Steven Shapin have criticized the idea of a 'scientific revolution', he and others have shown that in the 16h to 17th century some important changes occurred. Parent, C.F.A., 'Niels Stensen. A 17th Century Scientist with a Modern View of Brain Organization', in: *Canadian Journal of Neurological Sciences* 40 (2013) 482-492, 486. 488. Wolfe C.T., 'From Locke to Materialism. Empiricism, the Brain and the Stirrings of Ontology', In: Bodenmann S., Rey, AL., (eds) *What Does it Mean to be an Empiricist? Empiricisms in Eighteenth Century Sciences* vol 331 (2018) 235-263. Stevin Shapin famously showed that there occurred no such thing as a 'revolution', as much of the thinking was still based on previous, medieval, religious, conceptions, let alone that science emerged as a 'single coherent cultural entity called science'. Also see: Adrault, R., 'Human Brain and Human Mind. The Discourse on the Anatomy of the Brain and Its Philosophical Reception', in: eds. Adrault, R., Laerke, M., *Steno and the Philosophers* (Leiden 2018) 87-112 and Shapin, S., The scientific revolution (Chicago 1996) 1-8, 13.

things we have, not things we are'.[79] This is exemplified by John Locke who wrote that 'if my consciousness is located in my little finger, and this finger were cut off', it would be 'evident' that the 'finger' is the 'same person' and the 'self' would 'have nothing to do with the rest of the body'.[80]

As Vidal and Ortega write, for Locke - and most others at the time - it was however clear that the 'Presence room', the symbolic 'location' of the human mind, was in the brain.[81] This does however not mean that they are right when they argue that his and other philosophical thought experiments constitute to 'exactly the same idea of brainhood', that we, our character, behavior and thinking, 'are' essentially the result of neurochemical processes in our brain, as is argued by some neuroscientists since the 1990s.[82] As Freeborn rightly points out, they make that argument without discussing the 'relationship between theoretical innovation in the brain sciences [in the 19th and 20th century] and cerebral ideology'.[83] While ideas that hold the brain as the location of mental faculties undeniably have 'emerged independently of neuroscientific research', that does not mean that later scientific and political contexts did not fundamentally change the meaning of these concepts.

1.2. Biologizing the brain. The brain as epistemic object of causal explanation (1800-1945)

In the early 19th century thinking about the relationship between the brain and the mind and the way this aspect was studied changed significantly. Where the brain before was thought of and treated as asymbolic object, it gradually changed and became an object of causal explanation of the mind.[84] As Harrington writes, the brain was reconceptualized as a 'machine that generated complex mental processes directly from primitive non-thinking processes'.[85] The brain thereby changed to what German historians of science Hagner and Rheinberger call an

79 Vidal, F., 'Person and Brain. A Historical Perspective from within the Christian Tradition', 10-12. Vidal, F., 'Brainhood, anthropological figure of modernity', 7, 13.
80 Locke, J., *Essay Concerning Human Understanding* (1694) book 2, chapter 27 Via Vidal, F., 'Person and Brain 13-14.
81 It is nevertheless important to note, as Cooter does, that while the 'mind' was increasingly located in the brain, other cognitive and mental faculties as emotions were until roughly the late 18th century, still thought to be located in other organs in the body as the heart, spleen and liver. Locke, Essay: 2.3.1. Vidal, F., 'brainhood, Anthropological Figure of Modernity' 22. Cooter R., *The Cultural Meaning of Popular Science. Phrenology and the Organization of Consent in Nineteenth-Century Britain* (Cambridge 1984) 3, 5-8. And McVeigh R., 'The neurosociology of Auguste Comte', in: *Social Science Information* 59.2 (2020) 329-354, 332.
82 Their argument is that Enlightenment philosophy in fact predates and made possible neuroscientific thinking and 'cerebral ideology' that linked personhood and all human character to the brain. Vidal, F., 'brainhood, Anthropological Figure of Modernity' 30-35.
83 Freeborn, A., 'The history of the brain and mind sciences', in: *History of the Human Sciences* 32.3 (2019) 145-154, 149.
84 That is to say that where before the brain was thought of the location where the Cartesian 'bodily center of the 'human soul' ('Wohnsitz der Seele' or the 'Seelenorgan') could be find and symbolized rather than materially represented the 'connection between body and mind'. Rheinberger, H.J., 'Experiment, difference, and writing. Tracing protein synthesis', in: *Studies in the History and Philosophy of Science* 23 (1992) 305–331. For Hagner the publication of Samuel Thomas Soemmerring *Über das Organ der Seele* (1796) is important for it indicates the happening of this shift. Hagner, M., 'Aufklärung über das Menschenhirn', In: Schings HJ. (eds) *Der ganze Mensch. Anthropologie und Literatur im 18. Jahrhundert* (Stuttgart 1994) 146-152 and Hagner, M., 'Das ende vom Seelenorgan. Über einige Beziehungen von Philosophie und Anatomie im frühen 19. jahrhundert', in: Florey, E., Breidbach, O., *Das Gehirn. Organ der Seele? Zur Ideengeschichte der Neurobiologie* (Berlin 1993) 3-21. G See also: Wolfe, C.T., 'Naturalization, localization. A remark on brains and the posterity of the Enlightenment', (2016).
85 Harrington, A., 'How to house a mind inside a brain. Lessons from history', in: *EMBO Report* 1 (2007) 14.

'epistemic object', or a 'not yet fully determined object of scientific inquiry'. This mean that the meaning of a epistemic object as the brain is interwoven and changes with the 'conceptual and experimental context' in which it is employed.[86]

The 'start' of changing meanings of the brain are commonly traced to the Viennese physician Franz Joseph Gall (1758-1828), although his Schädellehre or phrenology is more the result of a cumulation of thinking then some sort of 'original idea'.[87] Gall, working as a private physician, applied his knowledge of the psychological categories by which patients in Vienna's 'asylum, schools and local prisons' were classified, in his 'empirically study' of the skull.[88] The logic behind this approach was that as the skull was shaped by the brain, it provided the knowledge of the underlying brain and mind, as a map showing the territory.[89] Where Gall (and neuroscientific research after him) might claim to start with the 'empirical study of biological basis', Harrington rightly notes that in reality they rather set out from universal 'conventional psychological categories and hoped that these would represent discrete natural entities in the brain'.[90]

Gall's first book on the 'ill and healthy conditions of humans' (1791) shows that his conviction that he had found a 'new empirical natural science in human nature' was combined with a rejection of the 'old speculation' of German (natural) philosophers.[91] His promise was therefore not just to offer knowledge on the nature of human behavior, but also - characteristic of Enlightenment thinking at the time - one of scientific progress.[92] Of the replacement of old speculation with a 'hard', mathematical and empirical 'science' and the idea that everything could and eventually would be causally understood.[93]

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86 Laubichler, M.D., 'Review of Michael Hagner's Homo Cerebralis: Der Wandel vom Seelenorgan zum Gehirn', in: *Isis* 91.1 (March 2000) 140-141. And Santoro, G., Wood, M.D., Merlo, L., Anastasi, G.P., Tomasello, F., Germanò, A., 'The anatomic location of the soul from the heart', 642-644.

87 Gall still followed Kant's idea of universal apriori categories. See: Van Wyhe, J., 'The Authority of Human Nature. The "Schädellehre" of Franz Joseph Gall', in: *The British Journal for the History of Science* 35.1 (2002) 17-42. 40 and Clarke, E., Jacyna L.S., *Nineteenth-Century Origins of Neuroscientific Concepts* (Berkeley 1987).

88 As German historian Wolfgang Fischer (1984) highlighted, Gall and his students additionally argued that this scientific approach that located mental illness in the skull, would 'free the patient of guilt', indeed promising 'therapeutic relieve'. Fischer, W., ‚Franz Joseph Gall und Johann Kaspar Spurzheim. Vorläufer einer biologischen Psychiatrie', in: *Psychiatrie, Neurologie und Medizinische Psychologie* 36.7 (1984) 433–437.

89 Mc, Veigh, 332 and Young R.M., *Mind, Brain and Adaptation in the Nineteenth Century. Cerebral Localization and Its Biological Context from Gall to Ferrier* (Oxford 1970).

90 Harrington, A., 'How to house a mind inside a brain', 12.

91 Full original title of Gall his work: Philosophisch-medicinische Untersuchungen uber Natur und Kunst im kranken und gesunden Zustande des Menschen. See also: Hagner, M., *Der Geist bei der Arbeit. Historische Untersuchungen zur Hirnforschung* (Göttingen 2006).

92 Hagner, M., 'Das ende vom Seelenorgan. Über einige Beziehungen von Philosophie und Anatomie im frühen 19. jahrhundert', in: Florey, E., Breidbach, O., Das Gehirn. Organ der Seele? Zur Ideengeschichte der Neurobiologie (Berlin 1993) 3-21.

93 As one of the first scientists at his time, Gall promoted this promise more through public speeches and lectures for both scientific as lay audiences throughout several European countries, then in the around the time increasingly important scientific journals. Where many German professional scientists, philosophers and public intellectuals as Goethe were skeptical of Gall for this reason, or saw him as an threat to their public position and claim of knowledge, Wyhe shows that Gall's promise especially outside Germany was impactful on the thinking and self-conceptualization of many lay people. Spadafora, D., *The Idea of Progress in Eighteenth-Century Britain* (New Haven 1990) and Špelda, D., 'Veritas filia temporis. The origins of the idea of scientific progress', in: Annals of Science 73.3 (2016) 375-391 and for a German overview see: Mertz D.R., 'Ursprung, Wesen und Werdegang der Idee der Wissenschaft', in: *Versicherungsmedizin* 1.56.4 (2004) 145. Finger, S., Eling, P., *Franz Joseph Gall. Naturalist of the Mind, Visionary of the Brain* (Oxford 2019) 239-245. Wyhe, J., 'The Authority of Human Nature. The "Schädellehre" of Franz Joseph Gall', 45-50. and Finger, S., Eling, P., *Franz Joseph Gall. Naturalist of the Mind, Visionary of the Brain* (Oxford 2019) 239-245 and Kesselring, J., 'Helmholtz and Goethe. Controversies at the birth of modern neuroscience', in: European Neurology 69.3 (2013) 152-7.

Scientific inquiries into the brain were from Gall onwards strongly characterized by what Hagner and Borck call an 'outspokenly futuristic mode'.[94] That is to say that it were not so much 'scientific discoveries' itself but rather the promise thereof, that shaped thinking about the brain.[95] As Jean Decety and John Cacioppo (2011) highlight, from the moment it became thinkable that 'human behavior is related to brain functions', brain research moreover became interwoven with what were seen as the 'social consequences' of differences in the brain as 'criminality, immorality, gender and racial differences'.[96] Future knowledge of the brain was accordingly politically imagined to offer a direct 'comprehensive basis for the management of society, including education, religion, and law' in the present.[97]

This increasing connection between the brain and the management of society, can also be found in the ideas of Auguste Comte (1798-1857).[98] Comte was the founder of the doctrine of Positivism, which held that true knowledge can (and could) be achieved by empirical observation alone and is considered as the father of modern Sociology. He was convinced that Gall's phrenology and other 'empirical' inquiries in brain pathology, served as the 'first basis of a truly rational theory of human nature'.[99] As phrenology took 'tangible organs, whose hypothetical attributes admit of positive verification' as the basis rather than the 'speculation of philosophy', Comte, as McVeigh shows, more so believed that it could serve to legitimize his own 'science of the social' as what himself liked to call 'social physics'.[100]

But Comte's positivism was not merely a scientific movement but also one of political practice as his first work 'Plan for the Scientific Work Necessary to Reorganize Society' highlights.[101] Under the creed of 'order and progress', he, and the governments adapting his ideas, combined the belief in the necessity and inevitability of scientific progress with the conviction that this should be regulated through centrally organized political power.[102] Science was to reshape society, but to do so under a clear political lead.[103] His proposal to remodel pedagogy and education on the basis of brain science, shows he mostly meant to support the status-quo in France by as McVeigh writes 'naturalizing social stratification'.[104] On the one

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94 Hagner, M., & Borck, C., 'Mindful Practices. On the Neurosciences in the Twentieth Century', in: Science in Context, 14(4), 507-510, 508.
95 Hagner, M., & Borck, C., 'Mindful Practices. On the Neurosciences in the Twentieth Century', 506-510.
96 As Claudio Pogliano writes in his book *Brain and Race* (2020), the biggest 'implications' of this 'transformation' were indeed political. Pogliano, C., *Brain and Race. A History of Cerebral Anthropology* (Leiden 2020) 6-7, 8-10.
Decety, J., Cacioppo, J.T., *The Oxford Handbook of Social Neuroscience* (Oxford 2011) 10.
97 From the moment that it became possible to think of the brain as a site of social intervention, the meaning of the brain moved beyond its scientific context and became an object of social and political imagination. Hagner, M., & Borck, C., 'Mindful Practices' 507-510.
98 Bourdeau, M., 'Auguste Comte', The Stanford Encyclopedia of Philosophy (Spring 2021 Edition).
https://plato.stanford.edu/archives/spr2021/entries/comte/
99 McVeigh R., 'The neurosociology of Auguste Comte', in: *Social Science Information* 59.2 (2020) 329-354, 332, 333.
100 McVeigh R., 'The neurosociology of Auguste Comte', in: *Social Science Information* 59.2 (2020) 329-354, 333.
101 Bourdeau, M., 'Auguste Comte', The Stanford Encyclopedia of Philosophy (Spring 2021 Edition).
102 Comte, A., 'Plan of the Scientific Operations Necessary for the Reorganization of Society', (1822).
103 'From science comes prevision, from prevision comes action', as Comte himself famously put it. McVeigh R., 'The neurosociology of Auguste Comte', 330-334..
104 McVeigh R., 'The neurosociology of Auguste Comte', 334.

hand this happened through the metaphors that brain science provided; Comte argued that the 'division of society in three active classes' was a natural reflection on the 'tripartite division of the brain', but also by linking empirical 'evidence' on the differences in brains to social, occupational, differences.[105] As McVeigh argues, brain science for Comte and his followers represented the undeniable prove that:

> 'Social life followed the dictates of natural law. It denied the tabula rasa view that granted the external environment unlimited power in shaping human character and showed instead that social classes stemmed naturally from differences in neurophysiology. There were simply things beyond our immediate control, both naturally and socially'.[106]

In 19th century Britain as well, brain scientists quickly became influential social and political imagination.[107] Phrenology was adapted by the new middle class intelligentsia for whom it served as an 'anticlerical message' as it made 'mental activities naturally explainable', and as a promise of 'self-improvement', in the 'rearing of families, and securing of good health'.[108] Stimulated by middle class philanthropists who subsidized the spread of phrenological books and pamphlets, the working class that had emerged after the rapid industrialization adapted phrenological ideas as well.[109] According to Cooter, phrenology in Victorian Britain thereby served to 'naturalize emergent structures and relations of industrial capitalism by casting them into the descriptive and explanatory languages of mental organization and mental function'.[110] As he writes, it 'encouraged workers to explain their problems in terms of their own pathology rather than in terms social problems'.[111]

It were from the middle of the 19th century especially German physicians, neurologists and other natural scientists who began criticizing phrenology and started to research the brain solely in the paradigm of the emerging natural, physical, sciences.[112] Scientists as the earlier

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105 Comte and many at his time believed that the observation of natural phenomena (that functioned in laws) could be applied to society directly. McVeigh writes that Comte saw sociology and the brain sciences as able to socially intervene and shape society, as he portrayed society itself as a brain, with 'indispensable 'organs'; 'the affective, intellectual and active classes'. McVeigh R., 'The neurosociology of Auguste Comte', 334. And Barbara J-G., 'Auguste Comte and the brain physiology of his time', in: *Revue d'histoire des sciences* 65.2 (2012) 213–236, 335, 337.

106 McVeigh R., 'The neurosociology of Auguste Comte', 338

107 It were initially mostly young scientists from lesser social backgrounds who used phrenology and the promises it offered as a 'social vehicle' to improve their own social and scientific standings. Cooter, R., *The cultural meaning of popular science. Phrenology and the organization of consent in nineteenth century Britain*, (Cambridge 1984) via Turner, F.M., 'The Cultural Meaning of Popular Science Phrenology and the Organization of Consent in Nineteenth-Century Britain. By Roger Cooter', in: *The Journal of Modern History* (1987) 59.3 (1987) 574-576.

108 Cooter, R., *The cultural meaning of popular science* 14-23.

109 Examples are George Combe's 'The Constitution of Man' (1828). Parssinen, T.M., 'Popular Science and Society. The Phrenology Movement in Early Victorian Britain', in: *Journal of Social History* 8.1 (1974) 1–20, 13.

110 Cooter, R., *The cultural meaning of popular science*, 113.

111 Cooter, *The cultural meaning of popular science* and Parssinen, T.M., 'Popular Science and Society', 1-20.

112 Borck, C., 'Through the Looking Glass. Past Futures of Brain Research'. Wolfe C.T., 'From Locke to Materialism. Empiricism, the Brain and the Stirrings of Ontology', In: Bodenmann S., Rey, AL., (eds) *What Does it Mean to be an Empiricist? Empiricisms in Eighteenth*

mentioned Emil Du Bois-Reymond came to see the brain as the sole neurochemical causal-active producer of the mind and behavior.[113] While Gall might have seen the brain as the site of clarification, this new strain of thinkers saw it increasingly as open to causal explanation and thereby modification.[114]

Firstly, an important factor in this further biologization of the brain and mind were technological developments and the related new scientific techniques and methodologies in with what Cunningham and Williams (2002) have called the 'laboratory revolution'; the growing importance of laboratory experiments in scientific explanations.[115] Secondly, the development of new microscopes made the discovery of cell biology possible and allowed the brain to be studied on cellular level. With these new microscopes, the Spanish scientist Ramon y Cajal (1852-1934) conceptualized the so-called Neuron doctrine, the idea that the nervous system is made out of individual nerve cells instead of a big network without separation between cells (Reticular theory) and British brain scientist Charles Scott Sherrington (1857-1952) showed that Synapses formed the connections between these cells.[116] Thirdly, the formulation of the first law of thermodynamics, that states that energy forms are equivalent and can be transformed from one form into another, influenced and inspired new inquiries into the causes and functioning of the mental faculties in the brain.[117] Otto Loewi's (1873-1961) discovery of the neurotransmitter (acetylcholine) that showed that electricity as well as chemicals made neurons (through Synapses) communicate, further strengthened the believe that the brain, and thereby mind and behavior, functioned and could be studied and explained completely similarly to other physical, natural, sciences.[118]

Similar to experiments in the physical sciences, Du-Bois Reymond began conducting experiments with humans (that he just like Gall demonstrated in various European countries) that proved the electrical functioning of the nervous system.[119] Although experiments on the

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Century Sciences vol 331 (2018) 235-263 and Harrington, A., *Reenchanted Science. Holism in German Culture from Wilhelm II to Hitler* (Priceton 1997) 10-19, Harrington, A., *Mind Fixers. Psychiatry's Troubled Search for the Biology of Mental Illness* (Norton 2019).

113 Other notable scientists are Du-Bois his student Julius Bernstein, but also Hermann von Helmholtz and Karl Ludwig. De Palma, A., Germana, P., 'Bernstein's Long Path to Membrane Theory. Radical Change and Conservation in Nineteenth-Century German Electrophysiology', in: *Journal of the History of the Neurosciences* 20:4 (2011) 306-337, 310-312.

114 They thereby completely rejected both the Cartesian dualism that proposed a duality in explanations of body and mind, as well as the Kantian idea that there could be a multitude of causes and functions of mental activity. Outside of Germany is the French anatomist and anthropologist Paul Broca (1824-1880) a good example of this research that linked the brain with specific functions of human behavior. Others prominent German scientists who did similar research are as Borck notes Gustav Fritsch and Eduard Hitzig. See: Borck., C., ‚Brave neuro-worlds', in: *Neue Rundschau* 110.3 (1999) 70–88.

115 Cunningham, A., Williams, P., (Eds.)., *The laboratory revolution in medicine* (Cambridge 2002) 155-160.

116 López-Muñoz, F., Boya, J., & Alamo, C., 'Neuron theory, the cornerstone of neuroscience. On the centenary of the Nobel Prize award to Santiago Ramón y Cajal', in: *Brain Research Bulletin, 70* (2006) 4-6. and Santoro, G., Wood, M.D., Merlo, L., Anastasi, G.P., Tomasello, F., Germanò, A., 'The anatomic location of the soul from the heart, through the brain, to the whole body, and beyond', 640.

117 Collell G., Fauquet J., 'Brain activity and cognition. A connection from thermodynamics and information theory', in: *Frontiers of Psychology* 6.8 (2015).

118 Valenstein, E., 'The Discovery of Chemical Neurotransmitters', in: *Brain and Cognition* 49.1 (2002) 73-95. Llinás RR., 'The contribution of Santiago Ramón y Cajal to functional neuroscience', in: *Nature Reviews Neuroscience* 4.1 (2003) 77-80.

119 These experiments were according to Finkelstein characterized by on the one hand a new strong 'reductionist methodology' and on the other hand the dependence on the above discussed 'new innovations in laboratory technology and instruments'. Yet, interestingly, where Du Bois-Reymond managed to convince his German colleagues of the electrical nature of the nervous system, his attempt to do the same in 1850 to present to the French Academy of Science failed as Finkelstein shows. Finkelstein G.M., 'Du Bois-Reymond goes to Paris', in: *The British Journal for the History of Science* 36 (2003) 261-300. Finkelstein, G.M., *Emil du Bois-Reymond. Neuroscience, Self, and Society in*

brains of animals were already conducted before, by the late 1880s these intensified and specifically monkey brains, which in the new evolution theory of Darwin were deemed as closely related to humans, increasingly became objects in neuroscientific experiments.[120] These developments gradually shaped a paradigm which, as Rees argues, had a 'remarkable conceptual continuity' from the late 19th century to the late 20th century, on the one hand with the nervous system as 'building blocks' of the brain, and on the other hand the brain as being 'fixed', 'static' and 'unchanging' in human adulthood allowing experiments to take place with a universalist claim.[121]

At the same time, two contextual factors played an important role in the formalization and spread of this paradigm across the industrialized world. Firstly, brain science was institutionalized in national research institutes and universities as the 'Kaiser-Wilhelm-Institut für Hirnforschung' (KWI for Brain Research) in Germany in 1911 and similar initiatives in France, England and the United States.[122] Secondly, the late 19th century was a time of arguably unprecedented scientific and social progress, making the neuroscientific promise that the brain would soon be 'discovered' believable. This technological progress also provided the metaphors which made the conceptualization of the brain as a mechanically functioning machine and the neural system as for example telegraph lines thinkable.[123]

These developments of institutionalization and optimism in the possibilities of scientific progress made the science of the brain increasingly seen as able to address matters of social, cultural and political concern.[124] It was especially successful in addressing the

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Nineteenth-Century Germany (Cambridge MA 2013) Finkelstein, G.M., 'Emil du Bois-Reymond on "The Seat of the Soul', in: *Journal of the History of the Neurosciences* 23:1 (2014) 45-55. For more on his Du Bois Reymond his student Bernstein see for example De Palma, A., Pareti, G., 'Bernstein's Long Path to Membrane Theory. Radical Change and Conservation in Nineteenth-Century German Electrophysiology', in: *Journal of the History of the Neurosciences* 20.4 (2011) 306-337. Parent A., Aldini, G., 'from animal electricity to human brain stimulation', in: *Canadian Journal of Neurological Sciences* 31.4 (2004) 576-584.

120 In the 1880s, British neurologists Edward Albert Schäfer (1850-1935) and Victor Horsley (1857-1916) for instance began experimenting on the brains of 76 living monkeys by stimulating specific areas with electric shocks and eventually even removing parts of the brain of living monkeys under narcosis. For earlier 18th century studies of animal brains see: Parent A., Aldini, G., 'from animal electricity to human brain stimulation', in: *Canadian Journal of Neurological Sciences* 31.4 (2004) 576-584. Franco N.H., 'Animal Experiments in Biomedical Research. A Historical Perspective', in: *Animals open access journal from MDPI* 3.1 (2013) 238–273. Raichle ME., 'A brief history of human brain mapping', in: *Trends in Neuroscience* 32.2 (2009) 118-126. And Browne, J., Charles Darwin. The Power of Place (London 2003) 2, 4-7. Cunningham, A., Williams, P., (Eds.)., *The laboratory revolution in medicine* (Cambridge 2002) 157 and Horsley, V., 'A Record of Experiments Upon the Functions of the Cerebral Cortex' (London 1888).

121 Rees, T., 'Being Neurologically Human Today. Life and Science and Adult Cerebral Plasticity (An Ethical Analysis)', in: *American Ethnologist* 37.1 (2010) 150-166, 153, 155, 156.

122 It is telling of the significance that was attributed to brain science by the political powers in Germany, that this institute was founded as one of the first dedicated research institutes within the just three years earlier founded overarching Wilhelm Society for the Advancement of Science. Finkelstein G., 'Mechanical neuroscience. Emil du Bois-Reymond's innovations in theory and practice', in: *Frontiers in Systems Neuroscience* 9 (2015). Shapin, S., ‚Woher stammte das Wissen der wissenschaftlichen Revolution?', in: Hagner, M., *Ansichten der Wissenschaftsgeschichte* (Frankfurt am Main 2001) 43-61.

123 As Casper among others have argued 'Metaphors change how science is done, by licensing new interpretations or inspiring new experiments', and As Harrington similarly writes: this can be exemplified by medical physiologist Rudolf Virchow who wrote in a letter around the time that: 'the same kind of electrical process takes place in the nerve as in the telegraph line' and further compared bodily processes to that of the 'factory' See: Casper, S., 'Neuroscience needs some new ideas A history of the metaphors behind brain research faces a dark past and disquieting future', in: *Nature* (30 March 2020) https://www.nature.com/articles/d41586-020-00913-9 and Harrington, A., 'How to house a mind inside a brain' 13.

124 Demandt, A., 'Fortschritt', In: Jordan, S., *Lexikon Geschichtswissenschaft. Hundert Grundbegriffe* (Stuttgart 2010) 94-97. Gradmann, C., ‚Unsichtbare Feinde. Bakteriologie und politische Sprache im deutschen Kaiserreich', in: Sarasin, S., eds. *Bakteriologie und Moderne* (Frankfurt am Main 2007) 324-363. Miguel F.A., 'Violence, mental illness, and the brain. A brief history of psychosurgery: Part 2 From the limbic system and cingulotomy to deep brain stimulation', in: *Surgical Neurology International* 1 (2013) 75.

widespread fear under intellectuals and political leaders in Europe and America that large parts of the population would not manage to keep up with the rapid progress and would become mentally ill in a period what contemporaries called the 'age of nervousness'.[125] Scientific inquiries into the brain and mind were, as Casper notes, not just 'biologically deterministic', but also 'informed by 'developmental metaphors - recapitulation, degeneration - that permeated European society and marked its civilizing burden'.[126]

Brain scientists also handily used this context to present their science to both private as public investors as 'allowing the saving of a maximum of social, intellectual and psychical energy from being wasted'.[127] The invention of electroencephalography (EEG) by the German psychiatrist Hans Berger in the 1920s, was for example hailed by newspapers and magazines as the 'X-Ray machine of the soul' that made possible new therapeutic practices.[128] In Britain, Germany and the United States especially, this technology was used in 'employment counseling' as well as presented by neuroscientists to be able to 'read neurologic and psychiatric diseases' and thereby make cures possible in the 'near future'.[129]

As Stahnisch in his recent book *Psychiatry and the Legacies of Eugenics* (2020) argues brain scientists were also 'especially prone to accept the scientific and social offers of the eugenic tradition'.[130] And it was this tradition that as Valenstein (1986), Singh, Hallmayer and Illes (2007) and Stahnisch show, 'firstly in Germany and the United States, then in Canada and other European countries', ultimately led to some neuroscientists, psychologist and

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125 Uimonen, M., *The age of nervousness. The neuroses in the late nineteenth and the early twentieth century Finnish medicine* (Helsinki 2000) 192-200. Cowan, M.J., *Cult of the Will. Nervousness and German Modernity* (Philadelphia 2008) 1-8.

126 American physician Samuel Spahr Laws for instance argued in 1874 for the founding of neuro-psychology to study how 'social and moral facts resulted from nervous activity'. As Casper argues Laws was convinced that 'physiology belonged to the "sisterhood of liberal and progressive sciences" that stands on the "broad, fundamental principles of universal knowledge," and that neurology and psychology would settle forever "man's positions in nature, and his destiny'. Casper, 'History and Neuroscience', 125-126.

127 Diagnoscopy for instance, was adapted by many, especially young, psychologists and psychiatrists and promoted as 'economically beneficial and individually rewarding form of counseling' and although these technologies from the beginning received critique, not least from other brain scientists, at the same time they reached an important status in the social and political imagination. In Employment counseling phrenological testing had been common in the 19th century, especially in the United States. As Borck writes: 'young psychologists, envisioning an economically beneficial and individually rewarding form of counseling. Borck, C., 'Electricity as a medium of psychic life. Electrotechnological adventures into psychodiagnosis in Weimar Germany', in: *Science in Context* 14.4 (2001) 565-90, 570-576, and Borck, C., 'Throught the looking glass' 334. Borck, C., *Hirnströme. Eine Kulturgeschichte der Elektroenzephalographie* (Göttingen 2005) Borck, C., 'Writing brains. Tracing the psyche with the graphical method', in: *History of Psychology* 8 (2005) 79–94.

128 Berger's technological method that measured electrical activity in the brain was publicly displayed and as Borck argues, made an object of public attention by Nobel laureate Edgar Douglas Adrian in 1934. As Borck highlights, technologies as electroencephalography, were hailed by newspapers at the time as a 'mind-reading device' and diagnoscopy'. Borck, C., 'Through the Looking Glass. Past Futures of Brain Research', 334. Finkler, W., ‚Die elektrische Schrift des Gehirns', in: *Neues Wiener Journal*, July 4 (1930) 7. Borck C., 'Electricity as a medium of psychic life. Electrotechnological adventures into psychodiagnosis in Weimar Germany', in: *Science Context* 14.4 (2001) 565-590. Cowie SE. A place in history: Paul Broca and cerebral localization. J Invest Surg. 2000 Nov-Dec;13(6):297-8. Borck, C., 'Through the Looking Glass. Past Futures of Brain Research', 330-337.

129 Advances through technology in itself were increasingly presented as being the objective true reflection of reality because they minimalized subjective involvement for which Gall and phrenologists were increasingly blamed. Casper, 'History and Neuroscience', 126. For an account of changing notions of objectivity and the influence of technology of mapping see: Borck, C., 'Throught the looking glass' 334. Finkler, W., ‚Die elektrische Schrift des Gehirns', (1930). Daston, L., Galison, P., *Objectivity* (New York 2007).

130 Stahnisch, F.W., *Psychiatry and the Legacies of Eugenics Historical Studies of Alberta and Beyond* (Edmonton 2020) 10-12, 16. Kaufmann, D., ‚Eugenik, Rassenhygiene, Humangenetik. Zur lebenswissenschaftlichen Neuordnung der Wirklichkeit in der ersten Hälfte des 20. Jahrhunderts', in: Richard van Dülmen (eds) *Erfindung des Menschen. Schöpfungsträume und Körperbilder 1500-2000* (Wien 1998) 345, 347, 360-365.

psychiatrists to promote psychosurgery of the prefrontal lobes in the brain as a ‘treatment’ for mental illness and disorders.[131]

It is a simplification to argue that neuroscientists were also directly responsible for the appliance of their promise in the Nazi euthanasia programs. Yet, their widespread involvement, as Karenberg and Fangerau show, was not a coincidence either.[132] Indeed, it were neuroscientists at the Kaiser Wilhelm Institute for Brain Research who in the 1930s actively helped legitimize Nazi rhetoric by promises to research the ‘microstructure and brain architecture of healthy and "elite" brains’, and it were neuroscientists who would later study the brains of hundreds of people diagnosed with ‘brain illnesses’ who were killed in the Nazi euthanasia programs.[133]

1.3 The institutionalization of neuroscience as a discipline and the return of old promises (1960-1990)

Despite employment of this field by the Nazi-regime, the brain sciences never came under as much scrutiny in the postwar period as other scientific disciplines, such as eugenics and biosociology, which for long were identified with the Nazi atrocities as well as for instance with Social Darwinist thinking.[134] In Germany the old Wilhelm Institute for Brain Research was reformed into the Max Planck Institute for Brain Research in 1948, partly with the intention to make scientists more independent from the state. Although Stahnisch notes that the scientists working in these institutes additionally made ‘efforts’ in dealing with the past (Vergangenheitsbewaeltigung), it would take until the 1990s until these institutes would cut off all links with the Nazi era.[135]

In other European countries as France and the United Kingdom, the direct postwar Period similarly saw the creation of national neuroscientific research institutes, in which

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131 Valenstein ES., *Great and Desperate Cures. The Rise and Decline of Psychosurgery and Other Radical Treatments for Mental Illness* (New York 1986) And Singh, J., Hallmayer, J., and Judy Illes, J., ‘Interacting and paradoxical forces in neuroscience and society’, in: *National Review of Neuroscience* 8.2 (2007) 153-60. and Valenstein ES., ‘The history of lobotomy. A cautionary tale’, in: *Michigan Quarterly Review* 27 (1988) 417–437.

132 Martin, M., Karenberg, A., Fangerau, H., ‘Neurowissenschaftler am Kaiser-Wilhelm-Institut für Hirnforschung im „Dritten Reich. Oskar Vogt – Hugo Spatz – Wilhelm Tönnis’, in: *Nervenarzt* 91.1 (2020) 89-99.

133 Martin, M., Karenberg, A., Fangerau, H., ‘Neurowissenschaftler am Kaiser-Wilhelm-Institut für Hirnforschung im „Dritten Reich‘ 89-99. And Schmuhl, H., ‚Brain Research and the Murder of the Sick. The Kaiser Wilhelm Institute for Brain Research 1937–1945’, in: S. Heim, C. Sachse, & M. Walker eds. *The Kaiser Wilhelm Society under National Socialism* (Cambridge 2009) 99-119.

134 Stahnisch, F.W., *A New Field in Mind. A History of Interdisciplinarity in the Early Brain Sciences* (Montreal 2019). In the 1980s research showed that the brains of about 700 Euthanasia and Jewish victims of the Holocaust, were kept in former German brain research institutes where they were used in experiments until at least the late 1960s and likely even longer. In the 1990s these would eventually symbolically be buried in Munich. See: NBC Left Field, 'Hunting for the Victims of Nazi Brain Experiments: NBC Left Field | After Truth', (2017) Youtube: https://www.youtube.com/watch?v=f92PrgnG6p0&feature=emb_title Stahnisch, F., 'Bringing Back Neurology Following WWII', in: *World Neurology* (October 2017) online: https://worldneurologyonline.com/article/bringing-back-neurology-following-wwii/

135 Haaretz, 'Munich Scientific Institute Finds Remains of Brains From Nazi Experiments on Humans' (September 2016) https://www.haaretz.com/jewish/munich-scientific-institute-finds-remains-of-huamn-brains-from-nazi-experiments-1.5433746 and Kim, B.K., 'Unraveling the Mysteries of Nazi Brain Research', on: *Labroots* (2017): https://www.labroots.com/trending/neuroscience/7032/unraveling-mysteries-nazi-brain-research

several disciplines were combined.[136] In the United States, Professor in biology at Boston's Massachusetts Institute of Technology (MIT) Francis Schmitt's (1903-1995), a son of German immigrants, already during the war had begun formalizing a new multidisciplinary research approach into the brain.[137] Directly after the war, he travelled through Europe and especially Germany to re-establish contacts with neuroscientists, biophysical chemists and molecular biologists. Some of these were later recruited in the new American Neuroscience Research Program (NRP) that was institutionalized at the MIT in 1962.[138]

This new research institute formed a key moment in the formalization of the neurosciences in one distinctive discipline, as various scholars as Stahnisch and Borck as well as Rose and Abi-Rached have noted.[139] What united these scientists coming from various backgrounds was, as involved biologist and later Nobel Prize winner Gerald Edelman remembered, 'the conviction that understanding the brain was not only feasible but essential for the future of humanity'.[140] In order to uncover the relationship between the brain and the mind, the new institute under Schmitt's ideal of the 'Unity of science movement', aimed to combine molecular biology, neurology and psychology.[141]

As Borck notes, the MIT institute 'served as a role model' for other Western nations and multinational neuroscientific research institutes as the European Society of Neurosciences (ESN) and the International Brain Research Organization (IBRO), as well as played a large role in the creation of dedicated journals as the MIT Neurosciences Research Bulletin the founding of the Society for Neuroscience in 1969.[142] This influence can be mostly traced back to the so-called 'intensive study programs' (ISP's) in which international cooperation and exchange through grants and scholarships were stimulated.[143] German neuroscientists according to Stahnisch took part in these programs in 'comparatively high proportions', but

136 Abi-Rached, JM, Rose, N., 'The birth of the neuromolecular gaze' 29 and Debru, C., Barbara, J.-G. and Cherici, C., eds *Neurosciences, Son essor de 1945 à 1975* (Paris 2008) and Barbara, J.G., *Le paradigme neuronal* (Paris 2010).
137 Adelman G., 'The neurosciences research program at MIT and the beginning of the modern field of neuroscience', in*: Journal of the History of Neuroscience* 19.1 (2010 2010) 15-23.
138 Adelman, G., 'The neurosciences research program at MIT and the beginning of the modern field of neuroscience', in*: Journal of the History of Neuroscience* 19.1 (2010) 15-23.
139 Abi-Rached, JM, Rose, N., 'The birth of the neuromolecular gaze' 29 and Stahnisch, F., 'Bringing Back Neurology Following WWII', in: *World Neurology* (October 2017) and Borck, 'How we may think', 112. For the account of Schmitt himself, see: Schmitt, F.O., *The Never-ceasing Search. Memoirs of the American Philosophical Society* (Philadelphia 1990) 189-200, 201-213.
140 Adelman, G., 'The neurosciences research program at MIT and the beginning of the modern field of neuroscience', in*: Journal of the History of Neuroscience* 19.1 (2010) 15-23, 18, also see: Edelman G., 'Molecular recognition on the immune and nervous systems', in: Worden FG, Swazey JD, and Adelman G, eds., *The Neurosciences: Paths of Discovery* (Cambridge 1975) 70-75.
141 Thereby it also, as Stahnisch summarizes, 'united the three scientific traditions', of previous research into the relationship between mind and the brain, that of 'functional localization' of which strains can be traced back to Antiquity, that of physics in the nineteenth century and that of chemistry in the early 20th century. Adelman, G., 'The neurosciences research program at MIT and the beginning of the modern field of neuroscience', 16. Borck, 'How we may think', 113-115. Valenstein E.S., *The War of the Soups and the Sparks. The Discovery of Neurotransmitters and the Dispute Over How Nerves Communicate* (New York 2005).
142 Borck, 'How we may think', 112. See also: Quarton, G.C., Melnechuk, T., and Schmitt, F.O., eds *The Neurosciences. A Study Program* (New York 1967).
143 Marshall, L.H., Rosenblith, W.A., Gloor, P., Krauthemer, G., Blakemore, C., and Cozzens, S., 'Early History of IBRO. The Birth of Organized Neuroscience', in: *Neuroscience* 72.1 (1996) 283–306 and Stahnisch, F., 'Bringing Back Neurology Following WWII', in: *World Neurology* (October 2017)

they also saw a large number of scientists from Western-European states and Japan being involved.[144]

From 1962 onwards, the MIT Neuroscience Institute furthermore would organize various 'Neuroscience Study Programs' which as Edelman remembers had the goal to 'bring together major neuroscientists and define the areas and parameters of neuroscience'.[145] Together these scientists discussed what research efforts on 'brain/mind/behaviour' were required to 'achieve what humankind had never been able to do – to understand the basis of mind and behaviour, and even of human nature'.[146] As Schmitt himself would write in 1963 they shared a certain 'urgency' in gaining this 'understanding of the mind':

> 'Not only as an academic exercise of scientific research; not only to understand and alleviate mental disease, the most crippling and statistically significant of all diseases; not only to create an entirely new type of science through vastly improved intercommunication between minds and hence to survive this present world crisis and advance to a new quantum jump in human evolution; but perhaps through an understanding of the mind to learn more about the nature of our own being'.[147]

While these ambitions sound abstract and futuristic and far from a concrete methodological program at first, their influence on how neuroscience would be conceptualized and legitimized both internally, scientifically, as well as externally, to the public, should not be underestimated. For example, as Stahnisch highlights, during the 1970s and 1980s 'nearly everyone who got a professorship in West-German neurosciences had actively taken part' in these meetings and was therefore likely to subscribe to these ambitions.[148]

Rose and Abi-Rached have rightly pointed out that Schmitt's 'reference to the problem of mental disease', does not mean that neuroscientific research by then was 'already' focused on finding cures for mental illness.[149] While this is true, Schmitt's promise that the neurosciences would be able to 'alleviate mental disease' as well as him legitimizing this as a necessity by referring to it as the 'most crippling and statistically significant of all diseases',

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144 Despite the Cold War, neuroscientists from the Soviet Union and Eastern Europe, interacted with their Western colleagues in the 1958 The Moscow Colloquium on Electroencephalography, as well through organizations as the, partly by UNESCO funded, International Brain Research Organization that was founded in 1961. Stahnisch, F., 'Bringing Back Neurology Following WWII', in: *World Neurology* (October 2017). See: Lichterman, B.L., 'The Moscow Colloquium on Electroencephalography of Higher Nervous Activity and Its Impact on International Brain Research', in: *Journal of the History of the Neurosciences* 19:4 (2010) 313-332.
145 Adelman, G., 'The neurosciences research program at MIT and the beginning of the modern field of neuroscience', 20.
146 Adelman, G., 'The neurosciences research program at MIT and the beginning of the modern field of neuroscience', 20.
147 Schmitt himself would formulate it in the fourth study program of 1979, how to study the 'complex system known to science, the human brain, as well as to make progress in achieving the highest ultimate aim of neuroscience, to understand human selfhood and psyche'. See: Swazey, J.P., 'Forging a Neuroscience Community. Brief History of the Neurosciences Research Program', in F. G. Worden, J. P. Swazey and Adelman G., eds *The Neurosciences: Paths of Discovery* (Cambridge 1975) 529.
148 Stahnisch, F., 'Bringing Back Neurology Following WWII', in: *World Neurology* (October 2017).
149 Rose, Abi-Rached 'The birth of the neuromolecular gaze' 23.

remains significant.[150] On the one hand - as Rose and Abi Rached note as well - it meant that the early focus on the mapping of the 'normal brain' was still shaped by the ambition that this would eventually 'shed more light on mental abnormalities and illness'.[151] By mapping what was 'normal', it also ambitioned to define what was 'abnormal'. On the other hand, Schmitt's statement shows that the neuroscientific promise of future knowledge, arguably rather than actual research, was used to mobilize funding from governmental institutes as the National Institute of Health in the United States. This funding, as Schmitt recalled in his memoires, formed the 'catalysis' in the 'formation and advance of this new community of scholars'.[152]

It is important to recognize that whereas neuroscience already in the 1960s was shaped by the promise of future knowledge, this did not receive as much attention as it did earlier in the 19th century or later in the 1980s. That does not mean that neuroscientists in the postwar period did not attempt to claim relevance in 'addressing questions of wider political and cultural importance', as Casper observes as well.[153] As Abi-Rached, Rose and Mogoutov (2010) highlight, from the 1950s there was in fact a large growth in neuroscientific literature compared to other related disciplines as psychology and psychiatry and as Maasen (2007) analyzed, many of these studies addressed concepts as 'mind' and 'consciousness'.[154] As Becker shows in his case-study of the explanation of criminal behavior, neuroscientists in the initial postwar period were however unsuccessful in their 'defense' of neurobiological explanatory models, against increasing pressure from social scientists.[155] In practice, the areas where neuroscientists managed to gain (or hold) an expertise position from the 1950s until 1980s, seem to be mostly medically applied.[156]

There are several reasons why neuroscientists failed to claim a prominent expertise position before the late 1980s. Firstly, controversies that occurred around sociobiology in most Western countries in the 1960s and 70s show that research into the biological (in that case mostly genetic) basis of human behavior for many in the public was still associated with the Nazi atrocities and ideology of social Darwinism.[157] The publication of E.O. Wilson's

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150 Rose, Abi-Rached 'The birth of the neuromolecular gaze' 23.
151 Rose, Abi-Rached 'The birth of the neuromolecular gaze' 20-26.
152 Rose, Abi-Rached 'The birth of the neuromolecular gaze' 18. Schmitt, F.O., *The Never-Ceasing Search* (Philadelphia 1990) 196-198.
153 Casper, S.T., *The Neurologists. A history of medical speciality in Britain 1789-2000* 155. Schmitt, F.O., *The Never-Ceasing Search* (Philadelphia 1990) 196-198.
154 Maasen, S., 'Selves in turmoil. Neurocognitive and societal challenges of the self', in: *Journal of Consciousness Studies* 14 (2007) 252-270 and O'Connor, C., 'The Brain in Society. Public Engagement with Neuroscience', *Thesis submitted for the degree of Doctor of Philosophy University College London* (London 2013) 16 and Abi-Rached, J. M., Rose, N., & Mogoutov, A., 'Mapping the rise of the new brain sciences', in: *BIOS Working Paper BIOS, London School of Economics and Political Science* 4 (2010).
155 Becker, P., 'The Neurosciences and Criminology. How New Experts Have Moved into Public Policy and Debate', in: Brückweh, K., Schumann, D., Wetzell, R.F., Ziemann, B., eds. *Engineering Society. The Role of the Human and Social Sciences in Modern Societies* (1880-1980) 119-141, 119-121.
156 In the case of Britain for instance, Casper shows that neuroscientists were successful in lobbying for 'boxing regulations' and also involved in the organization of 'major international sporting competition for disabled people in the 1960s'. Additionally, they contributed to the formalization of 'the brain-dead criteria' and the creation of guidelines of 'when organ are allowed to be extracted for donation'. Casper, S.T., *The Neurologists* 155. Segerstrale, U., 'Colleagues in conflict. An 'in vivo' analysis of the sociobiology controversy', in: *Biology & Philosophy* 1 (1986) 53–87.
157 Rosenfeld, A., 'Sociobiology Stirs a Controversy over Limits of Science', in: *Educational Horizons* 59.2 (1981) 70-74. Blute, M., 'Sociobiology. The New Synthesis by Edward O. Wilson', in: *Contemporary Sociology* 5.7 (1976) 727–731.

Sociobiology. The New Synthesis in 1975 for instance led to a large controversy in American media, politics and inside university departments, not just between sociologists and natural scientists, but also between biologists themselves about the social responsibility and limits of scientific research.[158]

Secondly, as Dutch sociologist Jan Willem Duyvendak among others has argued, the initial postwar period in most Western nations was characterized by the strong involvement of social scientists in state planning under the ideal of the 'makeable society'.[159] Brückweh, Kerstin, Wetzell, Richard and Becker similarly highlight that this period saw an increased involvement of social scientists in the construction of policy and governance.[160] As Becker summarizes, the postwar period saw a 'shift from 'biological-eugenic defense against 'breakdown of society' to a behavioristic-cum- sociological approach of social engineering'.[161]

Thirdly, and specifically in the United States and Germany, from the late 1930s the explanation and treatment of mental illness and disorders was increasingly taken up by psychiatrists who were trained in the paradigm of Freudian psychoanalysis, as Shorter and Rose and Abi-Rached note.[162] As Joy Damousi and Mariano Ben Plotkin show in the case of the United States, these psychoanalysts by the Post War period had managed to claim a prominent position in the public sphere as well as spread their knowledge claims about human behavior under policy makers and governmental officials.[163] For neuroscientists it was therefore close to impossible to spread their own models of explanation, and this might partly explains why they in the 1970s had such a strong focus on criticizing and delegitimizing Freudian psychiatry.

These 'shifts' in the involvement of scientific experts can be understood in the framework of 'scientization of the social' of German historian Lutz Raphael.[164] This tradition of conceptual history, inspired by the writing of philosophers like Jürgen Habermas, traces the

158 These debates, which also occurred throughout many European countries, were not just between sociologists and biologists but also between biologists under each other about the possible limits of science: should everything that can be researched also be researched. Similarly in and in the Netherlands research of for instance Buikhuisen into the biological causes of criminality was halted and prominent evolutionary biologist Frans de Waal who moved to the USA according to himself due to the hostile climate towards sociobiological research in Europe. Holtzmans E., 'The Sociobiology Controversy', in: *International Journal of Health Services* 7.3 (1977) 515-527.
159 Duyvendak, J.W., De Haan, I., 'De liberale herkomst van de maakbare samenleving', in: *Maakbaarheid. Liberale wortels en hedendaagse kritiek van de maakbare samenleving* (Amsterdam, 1997) and Wittrock, B., Wagner, P., and Wollmann, H., 'Social Science and the Modem State. Policy Knowledge and Political Institutions in Western Europe and the United States', in P. Wagner et. al. (eds), *Social Sciences and Modem States. National Experiences and Theoretical Crossroads* (Cambridge, 1991).
160 Brückweh, K., Schumann, D., Wetzell, R.F., Ziemann, B., eds. *Engineering Society* 41-59.
161 Becker, P., 'The Neurosciences and Criminology. How New Experts Have Moved into Public Policy and Debate' 119 and Duyvendak, J.W., De planning van ontplooiing. Wetenschap, politiek en de maakbare samenleving and Brückweh, K., Schumann, D., Wetzell, R.F., Ziemann, B., eds. *Engineering Society. The Role of the Human and Social Sciences in Modern Societies* (1880-1980) 1-21.
162 Shorter, E., *A History of Psychiatry. From the Era of the Asylum to the Age of Prozac* (New York 1997). Rose, Abi-Rached, 'the birth of the neuromolecular gaze' 27.
163 Damousi, J., Plotkin, M.B., *Psychoanalysis and Politics. Histories of Psychoanalysis under Conditions of Restricted Political Freedom* (Oxford 2012).
164 Raphael, L., ‚Embedding the Human and Social Sciences in Western Societies, 1880–1980. Reflections on Trends and Methods of Current Research' in: in: Brückweh, K., Schumann, D., Wetzell, R.F., Ziemann, B., eds. *Engineering Society. The Role of the Human and Social Sciences in Modern Societies* (1880-1980) 41-59, Raphael, L., 'Die Verwissenschaftlichung des Sozialen als methodische und konzeptionelle Herausforderung für eine Sozialgeschichte des 20. Jahrhunderts', in: *Geschichte und Gesellschaft* 22 (1996) 165–193 and Wittrock, B., Wagner, P., and Wollmann, H., 'Social Science and the Modem State. Policy Knowledge and Political Institutions in Western Europe and the United States', in P. Wagner et. al. (eds), *Social Sciences and Modem States. National Experiences and Theoretical Crossroads* (Cambridge, 1991).

(changing) involvements of the social and human sciences and the use of knowledges they produce in political thinking and policy approaches to societal problems.[165] Raphael has argued that there can be a broad, although not generally applicable categorization and one with many national exceptions, in the involvement of scientists in politics and the structuring of the social sphere in most Western countries from the late 19th century.[166]

According to Raphael, from the 1880s to the First World War the involvement of scientists took place mostly under the banner of the social reform movement. Scientists provided 'social inquiries and quantitative social data' of for instance injuries in factories, which eventually contributed to states intervening with regulations and social policy.[167] By the end of the First World War the return of veterans had caused an increased emphasis in intellectual and governmental circles on the (mental) health of the population.[168] This, as Raphael argues, increased the influence of both psychoanalytical psychiatry as well as brain scientists in the thinking about the necessity and means of social engineering.[169] Both authoritarian and non-authoritarian states increasingly linked (mental) health disorders and illnesses, as well as 'intelligence' and social behavior, to the health and well-being of the community and nation state.

That this was seen as a problem by large parts of this population itself as well, can be seen in the earlier discussed public influence of brain scientists.[170] After the Second World War, this model definitively shifted to what Raphael calls 'Planned Modernization', with the further extension of the Welfare State under the influence of social scientists and by the incorporation of these scientists in new governmental institutes. In Europe, and as Hannah Decker shows especially in the United States, most 'department chairs of psychiatry in the 1960s were held by psychoanalysts' who believed only 'psychoanalysis could alleviate most mental illnesses'.[171] Although cracks had already began appear in the optimism about the possibilities and reach of this idealized planned modernization in the 1970s, by the late 1990s it was clear that a totally new paradigm had emerged, that what Raphael calls the 'Age of Therapy'.

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165 Although both the early 19th century brain science as well as the later unified discipline of neuroscience often positioned itself closer to the physical and even chemistry sciences, its ambitious promise as well as scientific claims arguably fall inside the human sciences.
166 Raphael, L., ‚Embedding the Human and Social Sciences in Western Societies, 1880–1980', 42-47.
167 Raphael, L., 'Die Verwissenschaftlichung des Sozialen als methodische und konzeptionelle Herausforderung für eine Sozialgeschichte des 20. Jahrhunderts' 167-170.
168 Decker, H.S., ‚How Kraepelinian was Kraepelin? How Kraepelinian are the neo-Kraepelinians? from Emil Kraepelin to DSM-III', in: *History of Psychiatry, SAGE Publications* 18.3 (2007) 337-360, 342.
169 Östlund, D., 'A knower and friend of human beings, not machines. The business career of the terminology of social engineering, 1894–1910', in: *Ideas in History* 2.2 (2007) 43–82.
170 Borck C., 'Electricity as a medium of psychic life' 565-590.
171 Decker, H.S., ‚How Kraepelinian was Kraepelin?', 340-342.

1.4 Neoliberalism and the neuroscientific promise from the 1980s

From the late 1980s neuroscientists were increasingly able to claim public and political influence in explaining consciousness, behavior and mental illness, and as Becker writes, successfully portray themselves as the 'heralds of a new scientific age, about to solve the last riddle of mankind'.[172] Yet, as the genealogical reconstruction above has showed, this promise itself was far from new, and as Becker rightfully notes, this raises the question what exactly 'made the insights and arguments' of neuroscientists suddenly 'sufficiently attractive to gain public and political acceptance?'.[173] Why were neuroscientists from the late 1980s and especially 1990s increasingly able to convince policy makers and governments and shape the public conception about what it meant to be mentally healthy and unhealthy, as well as how to treat mental illness?[174]

One of the developments that is generally regarded by scholars as Dumit (2003) Beaulieu (2001), Pickersgill (2012) and Becker (2012) as crucial in the growing importance of the neuroscience in the 1980s, is the introduction of 'new' technologies as PET Positron Emission and Functional magnetic resonance imaging or fMRI.[175] These technologies map oxygenated blood flows in the brain and on the basis of statistical calculations compare the researched brain with a 'control' brain, thereby producing colorful images of apparent (both external and intrinsic) cognitive mental activity in the brain.[176] The images were portrayed by many neuroscientists - but especially the media - as the empirical proof of the neuroscientific promise that, as Haueis (2014) writes, 'the mind is what the brain does'.[177]

The development and improvement of these neuro-technologies alone however cannot explain why neuroscientific expertise managed to gain such a prominent position in the 1990s.[178] Imaging techniques were already developed from the 1950s, and while non-invasive FMRI-scans were a big improvement, Borck and Hagner show that it was far from the 'technological or conceptual breakthrough' that neuroscience hailed it to be.[179] The

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172 Becker, P., 'The Neurosciences and Criminology' 121-123.
173 Becker, P., 'The Neurosciences and Criminology' 121.
174 Frazetto, G., and Anker, S., 'Neuroculture', in: *Nature Reviews Neuroscience* 10.11 (2009) 815–821.
175 Pickersgill, M., Cunningham-Burley, S. & Martin, P., 'Constituting neurologic subjects. Neuroscience, subjectivity and the mundane significance of the brain', in: *Subjectivity* 4 (2011) 346–365, 347, Beaulieu A., 'Voxels in the Brain. Neuroscience, Informatics and Changing Notions of Objectivity', in: *Social Studies of Science* 31.5 (2001) 635-680 and Becker, 'The Neurosciences and Criminology' 119. Also: Dumit, J., *Picturing Personhood. Brain Scans and Biomedical Identity* (Princeton 2004).
176 In her pathbreaking PhD-thesis *The space inside the skull* Beaulieu's (2000) examined the digital and biological conceptualization, functioning and effects of these tools in the 1990s, while Dumit in his *Picturing Personhood* (2003) highlights the subjective assumptions of neuroscientists employing these tools, as well as the impact on societal discourse and thinking. Meloni, M., Cromby, J., Fitzgerald, D., Lloyd, S. (Eds.) *The Palgrave Handbook of Biology and Society* (London 2018) 444-448 and Racine, E., Bar-Ilan, O., Illes, J., 'fMRI in the public eye', in: *Nature Reviews Neuroscience* 6.2 (2005) 159-64. Raichle ME., 'A brief history of human brain mapping', 118-126. And Magnetic resonance, 'Functional Imaging', (11-04) online accessible on: https://www.magnetic-resonance.org/ch/11-03.html
177 Haueis, P., 'Meeting the brain on its own terms', in: *Frontiers in human neuroscience* 8 (2014) 815.
178 Hagner, M., & Borck, C. 'Mindful Practices. On the Neurosciences in the Twentieth Century' 507-510, 509.
179 Especially, when compared to scientific breakthroughs as the discovery of DNA-structure in other 'branches in the life sciences such as molecular biology'. As Raichle shows in his overview of the history of brain mapping, PET and FMRI indeed came alongside and after other techniques as the earlier discussed electroencephalography (EEG) but also 'electrocorticography (ECoG), magnetoencephalography (MEG) and optical imaging with infrared spectroscopy (NIRS)'.Thus far the neurosciences, as Borck and Hagner note have had 'no scientific equivalent of Watson and Crick's discovery and modelling of the DNA structure', arguably apart from the Neuron Doctrine.

popularization of FMRI and PET technologies in both politics and the media, should therefore be understood in the context of wider increasing optimism about technological advancements.[180] The 1990s saw the rise of a movement of techno-utopianism that seeing it rose and was especially strong in the United States has been fittingly described Barbrook (1995) as the Californian Ideology.[181]

How then did neuroscientists, according to the appropriate description of Becker manage to 'emerge from their labs and enter debates on agency, violence, and education'?[182] Firstly, an important factor was the growth and changing discourse of the anti-psychiatry movement, which increasingly criticized Freudian psychoanalysis. It based this critique on psychoanalysis being both unscientific and unfit solving the individual problems.[183] Parts of this movements in the 1980s were increasingly open to alternatives in treatment and representatives of neuroscience lobbied and eventually managed to fill that gap. Secondly, Raphael and Duyvendak have noted that social scientists themselves in the early 1980s became increasingly skeptical about the 'goals' of social intervention and argued for the 'protection of minorities and empowering socially weaker and economically poorer clients' through the 'new opportunity society and economy'.[184]

Thirdly, there occurred more general changes in the economy, as well as in social and political thinking that proved a fertile ground for the neuroscientific promise of salvation.[185] By the late 1970s several economic recessions had led to economic stagnation and unprecedented levels of unemployment for the postwar period.[186] Through intensifying processes of globalization and related changes in the industrial production, the Keynesian ideals of governmental planning and social regulations were increasingly seen by scientists, commentators as policymakers as rigid and paternalistic.[187] The idea that government was 'the problem rather than solution', was further promoted by neoliberal economists of the so-called Chicago School who founded institutions as semi-scientific think tanks and trained a new generation of governmental officials.[188]

Hagner, M., Borck, C. 'Mindful Practices. On the Neurosciences in the Twentieth Century' 507-510, 509. Raichle ME., 'A brief history of human brain mapping' 118-26.

180 Barbrook, R., Cameron, A., 'The California Ideology' in: *Science as Culture* 26.6.1 (1996) 44-72.

181 Barbrook, R., Cameron, A., 'The California Ideology' 44-72.

182 Becker, P., 'The Neurosciences and Criminology' 119.

183 Dain N., 'Critics and dissenters. Reflections on "anti-psychiatry" in the United States', in: *Journal of the History of Behavioral Sciences* 25.1 (1989) 3-25 and Crossley N.R.D., 'Laing and the British anti-psychiatry movement. A socio-historical analysis', in: *Social Science and Medicine* 47.7 (1998) 877-889.

184 Brückweh, K., Schumann, D., Wetzell, R.F., Ziemann, B., eds. *Engineering Society* 53.

185 Harvey, D., *A Brief History of Neoliberalism* (Oxford 2007) 2, 19-27.

186 Kotz, D., 'Neoliberalism and the US Economic Expansion of the 1990s', in: *Monthly Review* 54.11 (April 2003) 15-33 and Plehwe, D., *The Road from Mont Pèlerin. The Making of the Neoliberal Thought Collective* (Harvard 2009) 45–67 and Harvey, D., *A Brief History of Neoliberalism* (Oxford 2007) 2, 19-27.

187 Kotz, D., 'Neoliberalism and the US Economic Expansion of the 1990s', in: *Monthly Review* 54.11 (April 2003) 15-33.

188 Important to note that the neoliberal success stories only started with the middle of the 1990s and initially neoliberalism came under criticism as more state-planned economies as Japan and South-Korea seemed to fare much better. Kotz, D., 'Neoliberalism and the US Economic Expansion of the 1990s', 2 and Harvey, D., *A Brief History of Neoliberalism* (Oxford 2007).
By the 1980s, the governments as well as many intellectuals in Western countries, with Reagan in the United States and Thatcher in the United Kingdom as most obvious examples, opted for this new neoliberal framework to approach not just the economy, but also to redefine

Some scholars have argued that the term 'neoliberalism' is so frequently used as a 'buzzword for something unwanted' and as definitions usually widely vary, that it is better to not use the term at all.[189] Political scientists David Harvey has argued that rather than defining neoliberalism as a distinctive ideology it is therefore better to conceptualize it as a 'theory of political and economic practices'. These practices can be found in a 'widely varying group of governments, institutes and individuals' ranging from China to the United States and to institutions as the International Monetary Fund and the World Bank.[190] For this thesis it is mostly important to understand that neoliberal practices are based on the idea that 'human well-being can best be advanced by the maximization of entrepreneurial freedoms within an institutional framework characterized by strong private property rights, free markets and free trade'.[191] In practice, this means that neoliberal thinkers in governmental positions from the 1980s focus(sed) on the abandonment or weakening of social welfare programs and extending the market, mostly through privatization, to areas traditionally outside the economy as 'water management, education, environmental pollution' as well as for this thesis most relevant, (mental) healthcare and science itself.[192]

In the context of the eventual involvement of neuroscientific discourses of explanation in mental healthcare, it is important to understand neoliberalism in terms of what Foucault already in the late 1970s defined as a 'governmentality' or the idea and 'art' of government.[193] That is to say, the techniques, the 'organized practices' and 'power-structures', by and through which individual citizens or subjects are governed and shaped, in the case of neoliberal governmentality, into 'rational' individuals who see themselves as individually responsible for their own development and well-being; into 'Homo Economicus'.[194] Governments, think tanks and prominent media figures from the late 1970s began promoting a discourse of individual

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the role and very idea of government as well as what it meant to be a citizen. Borders, M., 'Neoliberalism. Making a Boogeyman Out of a Buzzword', in: *Foundation for Economic Education* (FEE) (26-06-2015) https://fee.org/articles/neoliberalism-making-a-boogeyman-out-of-a-buzzword/ Harvey, D., *A Brief History of Neoliberalism* (Oxford 2007) 2, 19-27.

189 By the 1980s, the governments as well as many intellectuals in Western countries, with Reagan in the United States and Thatcher in the United Kingdom as most obvious examples, opted for this new neoliberal framework to approach not just the economy, but also to redefine the role and very idea of government as well as what it meant to be a citizen. Borders, M., 'Neoliberalism. Making a Boogeyman Out of a Buzzword', in: *Foundation for Economic Education* (FEE) (26-06-2015) https://fee.org/articles/neoliberalism-making-a-boogeyman-out-of-a-buzzword/

190 Harvey, D., A Brief History of Neoliberalism (Oxford 2007) 2, 19-27. Thorsen, T.D., Amund Lie, A., 'What Is Neoliberalism?' *University of Oslo* (2009) 1-21.

191 These markets and market-interactions, are seen by neoliberals as being a true scientifically-objective reflection of (human) nature that gives signals (prices) but cannot be otherwise understood and managed apart from setting the rules in law. Harvey, D., *A Brief History of Neoliberalism* (Oxford 2007) .

192 Harvey, D., A Brief History of Neoliberalism (Oxford 2007) 2, 19-27. Thorsen, T.D., Amund Lie, A., 'What Is Neoliberalism?' University of Oslo (2009) 1-21.

193 Foucault, M., 'Naissance de la biopolitique. Course au Collège de France' (Paris 1979) 19. Hamann, T.H., 'Neoliberalism, Governmentality and Ethics' in: Foucault studies 6 (February 2009) 37-59, 38, Foucault, M., The Birth of Biopolitics. Lectures at the Collège de France 1978/79 (2008) 225..

194 Bröckling, U., *The Entrepreneurial Self. Fabricating a New Type of Subject* (2007) 21 and Rimke, H.M., 'Governing Citizens Through Self-Help Literature', in: *Cultural Studies* 14.1 (09 Nov 2010) 61-78 and Overwijk, J., 'Fantasies of Neoliberalism: From the Clerical to the Entrepreneurial Subject', in: *Krisis Journal for Contemporary Philosophy* (2018). https://krisis.eu/fantasies-of-neoliberalism-from-the-clerical-to-the-entrepreneurial-subject/

self-regulation and individual choice in selecting treatment similar as consumers on the market place.[195]

Especially in the United States, which from the 1980s diverged from Europe on the intensity of these trends, pharmaceutical companies and think tanks began marketing campaigns which promoted a return to sociobiological thinking that located the solution, but thereby also the problem, inside the individual.[196] In these campaigns they worked together with the earlier mentioned Chicago School of Economics and prominent neoliberal thinkers as Milton Friedman to lobby against government regulation of drugs. They targeted specifically the 1962 Amendments which had increased the role of the Food and Drug Administration (FDA) in controlling the drug market by introducing regulations and standardizations of testing in for instance clinical trial.[197] As Edward Nik-Khah shows, the Chicago School in the 1970s and 1980s organized conferences that brought together neoliberal economists, clinical pharmacologists, neuroscientists, legal scholars and representatives of the pharmaceutical industry to organize efforts to delegitimize governmental regulatory policies.[198]

As these critiques initially proved unsuccessful, this new alliance in 1976 created the Center for the Study of Drug Development (CSDD) think tank in order to give this discourse a more independent and scientific outlook. This think tank as Mirowski and Randalls have argued as well, should be understood as part of the neoliberal science management regimes that have risen to dominance in especially the United States and Britain since the 1980s.[199] These regimes promote the 'commercialization and privatization of knowledge' through a change of focus from governmental funded Universities to private research institutes under the idea of 'scientific freedom'.[200] Under the directorship of Louis Lasagna, who earlier took part in the Chicago School conferences, the newly formed CSDD began lobbying to place 'control, conduct and reporting of results' of drug research completely in the hands of pharmaceutical corporations'. It did so on the ground that 'academic clinical science was too expensive and too critical'.[201] Lasagna in various instances quoted neoliberal economists in defense of this argument:

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195 McKinlay, A., Pezet, E., *Foucault and Managerial Governmentality: Rethinking the Management of Populations, Organizations and Individuals* (New York 2017) 5-10. Foucault, M., 'The Subject and Power' in M Foucault, Power: Volume 3: Essential Works of Foucault 1954-1984 (J Faubion, ed; R Hurley, trs) (Penguin, London 2002) 326, 341.

196 As Esposito and Perez argued the cumulation of this thinking can be, at least symbolically, located in the 1980s that saw both the introduction of the DSM III as well as Reagan being elected. Esposito, L., Fernando M. Perez, M., 'Neoliberalism and the Commodification of Mental Health', in: *Humanity & Society* 38, no. 4 (November 2014) 414–422. N. Tomes, 'Patients or health-care consumers? Why the history of contested terms matters', in R. A. Stephens, C. E. Rosenberg, and L. R. Burns, eds., *History and health policy in the United States: putting the past back in* (New Brunswick, NJ, 2006), pp. 83–110. Foucault, M., 'The Subject and Power' in *Foucault, Power. Volume 3: Essential Works of Foucault 1954-1984* eds J Faubion, R Hurley (London 2002) 326, 341

197 Nik-Khah, E., 'Neoliberal Pharmaceutical Science and the Chicago School of Economics', in: *Social Studies of Science* 44.4 (2014) 489-517, 490.

198 Nik-Khah, E., 'Neoliberal Pharmaceutical Science and the Chicago School of Economics', in: *Social Studies of Science* 44.4 (2014) 489-517, 490.

199 Lave R, Mirowski P, Randalls S., 'Introduction: STS and Neoliberal Science', in: *Social Studies of Science* 40.5 (2010) 659-675.

200 Lave R, Mirowski P, Randalls S., 'Introduction: STS and Neoliberal Science', in: *Social Studies of Science* 40.5 (2010) 659-675.

201 Nik-Khah, E., 'Neoliberal Pharmaceutical Science and the Chicago School of Economics', in:) 489-517, 506-508.

> ‘Give each doctor and each patient the right and responsibility for making his own decisions freely in light of his own best knowledge (or ignorance) and judgement (or folly). Inevitably, some doctors and some patients will make some unwise decisions, But there is no possibility that the greatest harm these errors could do would even approximate the least harm that the government can do (Lasagna quoting neoliberal Chicago School economist Wilson Allen Wallis in 1976).[202]

What made these neuroscientific and pharmaceutical explanations so attractive for neoliberal governments was, as Becker explains, that neuroscientists unlike social scientists explained behavior and mental illness as the ‘outcome of processes that may be pathological in their outcomes but are not pathological in themselves’.[203] As Alex Mold has noted in his study of (mental) healthcare reforms that began under Thatcher, in practice this meant the deinstitutionalization and marketization of healthcare, and an emphasis in governmental discourse from the ‘collective needs of patient-consumers to the rights of individuals within increasingly marketized services’.[204] Although not as widespread as in Britain, and with local variations, many other Western nations from the Netherlands to Germany and Australia, would initiate similar healthcare reforms that would place the focus on the individual who, depending on one’s perspective, was free or forced to choose (and increasingly pay for) the treatment options on the marketplace.[205]

In the United States the Reagan government would initiate even more far reaching reforms in mental healthcare that were backed by trends in psychology and psychiatry. As Esposito and Perez note, 1980 saw both Reagan’s inauguration as the introduction of the DSM-III and its neo-Kraepelin diagnostic system that explained mental illness as a purely biological and medical condition.[206] The Reagan government’s new mental healthcare policy further connected federal funding to the treatment of specific diagnoses. In theory this would give individual patients more ‘choice’ in selecting the treatment for her or his diagnoses and provide

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202 Nik-Khah, E., ‘Neoliberal Pharmaceutical Science and the Chicago School of Economics’, 489-517, 490.
203 Becker Scientization of the social 119, 126 and Rose, N., ‘The Neurochemical Self and its Anomalies’, in *Risk and Morality* eds, R. V. Ericson and A. Doyle (Toronto 2003) 407-37, 418.
204 This vision was also shared by many neoliberal thinkers and was famously articulated by the British prime minister Margaret Thatcher who argued that ‘there's no such thing as society, there are individual men and women and there are families’. Mold A., ‘Making the Patient-Consumer in Margaret Thatcher's Britain’, in: *Historical journal* 54.2 (2011) 509–528. And Webster, C., *The National Health Service. A political history* (Oxford, 2002) 140–207.
205 Okma, Kieke & Crivelli, Luca & Ashton, Toni & Bolgiani, Iva & Cheng, Tsung-Mei & Chinitz, David & Lim, Meng-Kin & Meislin, Rachel & Maarse, Hans & Tenbensel, Tim. *Six Countries, Six Reform Models. The Healthcare Reform Experience of Israel, The Netherlands, New Zealand, Singapore, Switzerland and Taiwan* (2010).
206 Emil Kraepelin was an early 19th century German psychiatrist who argued that mental illness were biological in origin and proposed a system where, based on observations of individual cases, a 'typical' pattern of behaviors becomes characteristic of a diagnosis. The introduction of the DSM-III meant that mental disorders were classified in discrete categories, each with its own diagnosis based on the individual pathology rather than social, environmental, causes. Hoff, P., ‘The Kraepelinian tradition’, in: *Dialogues in clinical neuroscience* vol 17 (2017) 31-41. Commodification of Mental Health 422, Decker, H., ‘How Kraepelinian was Kraepelin? How Kraepelinian are the neo-Kraepelinians? - from Emil Kraepelin to DSM-III’, in: *History of Psychiatry* 18.3 (2007) 337-360.

a better quality of treatment through competition between facilitators. In practice nevertheless, these reforms meant unprecedented cuts in Medicaid expenditures (with 18%), the budgets of the National Health Departments (with 25%) and the deinstitutionalization of many mental healthcare facilities and hospitals, leaving an estimated 125,000 to 300,000 mental health patients homeless by 1988.[207]

207 Esposito, L., Fernando, M.P., 'Neoliberalism and the Commodification of Mental Health', in: *Humanity & Society* 38.4 (November 2014): 414–42, 434.

Chapter 2. The neuroscientific promise in the Decade of the Brain

On 17 July 1990 American president George Bush Senior officially proclaimed the next ten years to be the Decade of the Brain. In ten years, the '3-pound mass of interwoven nerve cells that controls our activity', the 'seat of human intelligence' and one of the 'most magnificent and mysterious wonders of creation', would at last be fully discovered.[208] If the proclamation of Bush did not show a feeling of urgent necessity, the underlying resolution adapted by the House a year earlier, clearly does. The 'people of the Nation' should be concerned' by how 'brain disorders and disabilities' represent a 'total economic burden of $305,000,000,000 annually' and be informed that 'research, treatment, and rehabilitation' of these 'brain diseases' not only soon will be a possibility, but also an economic necessity. Besides funding additional neuroscientific research to 'conquer brain disease' and relieve this 'burden', creating 'public awareness' for the brain, was therefore a central theme throughout the resolution, the proclamation and the Decade itself.[209] This chapter will explore the Decade of the Brain campaign from the perspective of the neuroscientists and organizations that initiated it. How and why did neuroscientists seek political support and which influence did this have on both the decade itself, the scientific projects that were initiated and the public thinking about the meaning of mental illness and disorders?

The Decade of the Brain might have officially started with the proclamation of Bush in the 1990s, but from 1985 there had been yearly initiatives in the Senate that failed due to a lack of political support.[210] Even when the proposal in 1989 had gathered just enough support in the senate, this was far from unanimous with 248 of the 435 votes.[211] Both inside and outside the House and Senate, there was criticism of the initiative that many viewed as just another 'irrelevant commemorative event'.[212] Claudine Schneider, Republican delegate of Rhode Island, for instance called it 'a poor use of Congressional resources' and The New York Times supported her in an article by noting that '38 of all laws passed last year celebrated a day, week, month or decade'.[213] Do 'lawmakers not have better things to do' then declaring a 'Dairy Goat Awareness Week' or a Decade of the Brain, the newspaper rhetorically asked.[214]

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208 Senate Proclamation 6158, 'Decade of the Brain 1990-1999' (17-06-1990) https://www.nap.edu/read/1785/chapter/13#167
209 Senate Proclamation 6158, 'Decade of the Brain 1990-1999' (17-06-1990) https://www.nap.edu/read/1785/chapter/13#167
210 Senate Resolution H.J.Res.301. 'A joint resolution to designate the decade beginning January 1, 1986, as the "Decade of the Brain', in: *99th Congress (1985-1986) online*: https://www.congress.gov/bill/99th-congress/house-joint-resolution/301?q=%7B%22search%22%3A%5B%22decade+of+the+brain%22%5D%7D&s=9&r=1
211 Notably, most votes came from democrats, under an republican president. See: 1989. H.J.Res.174 - To designate the decade beginning January 1, 1990, as the "Decade of the Brain". 101st Congress (1989-1990). https://www.congress.gov/bill/101st-congress/house-joint-resolution/174/text?q=%7B%22search%22%3A%5B%22decade+of+the+brain%22%5D%7D&r=6&s=9
212 New York Times, 'Topics of the Times. Pruning Prune Day, and Others' (Feb. 13, 1990).
213 New York Times, 'Topics of the Times. Pruning Prune Day, and Others' (Feb. 13, 1990).
214 New York Times, 'Topics of the Times. Pruning Prune Day, and Others' (Feb. 13, 1990).

2.1 Preparing an American Decade of the Brain

This chapter will look at the five major organizations behind the initial lobbying efforts and implementation of the Decade of the Brain. Of these, the National Institute of Neurological Disorders and Stroke (NINDS) and the National Institute of Mental Health (NIMH) as umbrella organizations of the National Institutes of Health (NIH) were by far the biggest involved governmental organizations. Additionally, non-governmental organizations, such as the Society for Neuroscience, the DANA Foundation and the National Alliance on Mental Illness (NAMI) were also involved.[215] They nevertheless largely worked independently, which partly can be explained with the fact that each focused on different areas of neuroscientific research.[216] Apart from these major organizations, several minor organizations from neuroscientists and related fields on brain research worked together in the National Committee for Research in Neurological and Communicable Diseases, but this will not be examined in this chapter.[217]

After several failed attempts to let Congress pass a resolution for a 'campaign for neuroscientific research and brain awareness', the heads of the NIMH and NINDS met several times in the first months of 1988 to discuss what had gone wrong. One of the conclusions was that they had to improve cooperation and work together for a 'national research endeavor' that would 'describe' and fund research of 'attainable neuroscientific objectives pertinent to health issues'. Despite this pledge of commitment they continued lobbying independently.[218] In July 1988, the Advisory Councils of the NINDS and the NIMH again tried to come up with a unified approach, but as director of the NINDS Murray Goldstein remembers this failed due to new disagreements.[219] The first disagreement was about what the 'identity of the unified effort' should be, what would most effectively 'sell' and take neuroscience 'to the public attention'.[220] As Goldstein remembered in an interview in 2000, at the NINDS they initially had been 'talking about stroke and head injury but neither was the catch'.[221]

Secondly, there seems to have been disagreements about if the effort should be similar to a 'format of an open-ended endeavor' like the 'War Against Cancer' (after Nixon's 1971 cancer act) or if it should emulate 'time-limited megaproject such as the Genome Project'. This

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215 Other organizations are for instance the in 1980 founded Women in Neuroscience (WIN) that promoted the professional advancement of female neuroscientists and organized conferences for them in the Decade of the Brain. See: Metitieri, T., Mele, S., 'Women in Neuroscience. A Short Time Travel', in: *Neuroscience and Biobehavioral Psychology* (2020).
216 Society for Neuroscience, *The Creation of Neuroscience. The Society for Neuroscience and the Quest for Disciplinary Unity (1969-1995)*
149. Online accessible at: https://www.sfn.org/about/history-of-sfn/1969-2019
217 Laws, Jr., E.R., 'The Decade of the Brain: 1990 to 2000', in: *Neurosurgery* 47.6 (December 2000) 1257.
218 Rowland, L.P., *NINDS at 50. An Incomplete History Celebrating the Fiftieth Anniversary of the NINDS* (New York 2003) 137-140.
219 Goldstein, M., 'Decade of the brain. An agenda for the nineties', In: *Neurology-From Basics to Bedside* [Special Issue] (1994) 161, 239-241, 239.
220 Rowland, L.P., *NINDS at 50. An Incomplete History Celebrating the Fiftieth Anniversary of the NINDS* (New York 2003) 137.
221 Laws, Jr., E.R., 'The Decade of the Brain: 1990 to 2000', in: *Neurosurgery* 47.6 (December 2000) 1257.

initiative that was launched around the same time had one clearly defined research objective, namely to map the Human DNA sequence within 10 to 15 years.[222] Lastly the organizations had different opinions about if they should opt for the government to lead the initiative through acts of legislation or if they instead should 'work outside of government' in a 'coalition of professional, scientific, and lay organizations' that each would 'mobilize its own forces to support the endeavor'.[223]

At the end of 1988 the NINDS and NIMH managed to come up with a unified plan for a 'national research endeavor' called the Decade of the Brain whichhad research on the cures for mental illnesses and disorders at its focus point. In practice, this campaign was designed to function as a middle way between The War on Cancer and the Genome Project.[224] That is to say that these organizations, as involved neuroscientist Edward R. Laws remembers, on the one hand planned to work together to lobby for 'common goals': the increase in 'funding' as well as 'federal involvement in neuroscience research., But they also opted to work independently to 'educate the public with regard to neurological and neurosurgical diseases'.[225] Instead of making one disorder or illness central, they agreed to formulate multiple ones so that every year would address a 'different aspect'.[226]

2.2 The 'burden' of mental illness and disorders

On the request of Congress, the NINDS and NIMH by late 1987 had already began planning independently on what should be 'achieved' in a possible campaign.[227] In January 1988, the NINDS sent its report 'Decade of the Brain: Answers Through Scientific Research', to the Senate, in which it outlined both recent developments in neuroscience as well as a future promise.[228] According to the report the rapid progress of the neurosciences in the past proved that in the near future 'neurological disorders-affecting millions of Americans could be 'prevented', 'cured', or 'alleviated' if 'research opportunities were fully exploited with adequate funding'.[229] The document, that was made in consultation with 'more than 200 professional neuroscientists and lay organizations', examined 'fourteen major disease

222 DeLisi C., 'Meetings that changed the world. Santa Fe 1986. Human genome baby-steps', in: *Nature* 455 (7215) (October 2008) 876–7.
223 Goldstein, M., 'Decade of the brain. An agenda for the nineties' 239.
224 Laws, Jr., E.R., 'The Decade of the Brain: 1990 to 2000', 1257.
225 Laws, Jr., E.R., 'The Decade of the Brain: 1990 to 2000', 1258-1261.
226 Laws, Jr., E.R., 'The Decade of the Brain: 1990 to 2000', 1260.
227 Goldstein, M., 'Decade of the brain. An agenda for the nineties' 239.
228 National Advisory Neurological and Communicative Disorders and Stroke Council, 'Decade of the Brain-Answers Through Scientific Research', in: US *Dept of Health and Human Services, National Institute of Neurological Disorders and Stroke-National Institutes of Health* (NINDS-NIH) publication No. 882957 (January 1989).
229 National Advisory Neurological and Communicative Disorders and Stroke Council, 'Decade of the Brain-Answers Through Scientific Research', and Neurology, 'Implementation plan for the decade of the brain: executive summary', in: *Neurology* 40.10 (1990) 1483-6. Annals of Neurology, 'Progress and promise 1992. A status report on the NINDS. Implementation plan for the decade of the brain', in: *Annals of Neurology* 33.3 (1993) 320-4.

categories' in which neuroscience was 'poised for a breakthrough' with enough funds.[230] The most important 'brain diseases' where the 'discovery of the causes would lead to new treatment and therapy' were Alzheimer, stroke, MS, but also the more general 'brain's hunger for addictive drugs'.[231]

Where the NINDS report was limited in size, the extensive NIHM report titled 'Approaching the 21st century. Opportunities for NIMH neuroscience research' that was sent to Congress in the same month had a stronger focus on the economic benefits of extra funding for neuroscientific research.[232] While the report was directed at lawmakers and politicians, it seems to have been widely distributed and likely also had patient organizations or even the public in mind. The main argument that was repeated throughout the document was that the 'benefits of an investment' in neuroscientific research would be the 'return to society and workforce of many of the millions of mentally ill Americans', and thereby reducing the 'burden', the 'economic toll' of over '40 billion clinical care and indirectly 50 billion dollar'.[233] Although the 'personal consequences' of mental illness were occasionally mentioned, it was always after, or before, the economic costs. [234] Costs, that, as the writers wanted 'Congress to realize' already 'threatened to exceed the capacities of many communities' and 'put a heavy burden on the community state criminal justice system and federal social security system', as could be seen by 'homeless being everywhere'.[235] The authors therefore note that 'while the required extra funding might seem high, they 'pale when compared to the costs of the disorders' this funding would 'help resolve':

> 'The 1987 NIHM budget of 30 million is less than 1 dollar per patient or 1 dollar for every 3000 dollar these disorders cost. Compared to research on other leading diseases that impose far less chronic burden on our population, research within the psychiatric and related disciplines affected by the neurosciences remain seriously underfunded'.[236]

The report argued that what neuroscience offered was, unlike other disciplines that were concerned with chronic illness or physical disability that in about ten years, in one 'Decade of

230 National Advisory Neurological and Communicative Disorders and Stroke Council, 'Decade of the Brain-Answers Through Scientific Research'.
231 National Advisory Neurological and Communicative Disorders and Stroke Council, 'Decade of the Brain-Answers Through Scientific Research', Neurology, 'Implementation plan for the decade of the brain: executive summary', in: *Neurology* 40.10 (1990) 1483-6. Annals of Neurology, 'Progress and promise 1992.
232 National Advisory Mental Health Council, 'Approaching the 21st Century. Opportunities for National Institute of Mental Health Neuroscience Research: Report to the Congress on the Decade of the Brain', in: *US Dept of Health and Human Services, Alcohol, Drug Abuse, and Mental Health Administration-DHHS publication No. (ADM) 89-1580* (1988) III, 1-10.
233 National Advisory Mental Health Council, 'Approaching the 21st Century. Opportunities for National Institute of Mental Health Neuroscience Research: Report to the Congress on the Decade of the Brain', 12-18.
234 National Advisory Mental Health Council, 'Approaching the 21st Century. Opportunities for National Institute of Mental Health Neuroscience Research: Report to the Congress on the Decade of the Brain', II-III.
235 National Advisory Mental Health Council, 'Approaching the 21st Century' III, 1, 6.
236 National Advisory Mental Health Council, 'Approaching the 21st Century' 6.

the Brain', a cure would be found.[237] The report repeatedly argued that neuroscience was on the 'brink of discovering the biological basis for many of the major mental illnesses' (28) that would help them 'design selective and site-specific drugs' (15, 29, 33) which could 'intervene in the many disease states' (33) and help to 'treat and prevent' mental illness and disorders (iii, 32).[238] Whereas the report acknowledges that 'environment and heredity are intertwined', in the end, it suggested that research into the 'biological basis' should be given the primacy, as it's here where most easily can be interfered. For after all, 'just as no two humans are equally likely to become to become depressed given the same change in their environment, animals differ in the likelihood that they will become depressed'.[239]

That the quantified and rationalized costs of mental illness took such a central place in the discourse of neuroscientists is hardly surprising. From the early 1980s there was a general trend in health care research and policy that attempted to quantify each variable of costs down to the individual patient, with the World Bank's Global Burden of Disease report that was first published in 1990 as defining example.[240] This report, which has heavily influenced the thinking and rhetoric of policy makers and public health officials since 1990, introduced the disability-adjusted life year (DALY), a specific metrics that quantified the 'burden' of mental illness in 'lost life years'.[241] That scientists working at this project argued that their measurements were not economically-laden, and that they did not assign monetary values to these lost years or specific conditions, neither did they define lost years as years on the labor market, mattered little in the end. As Bobadilla and Cowley note already in 1995, politicians and health care officials used these measurement and more so it's underlying logic, to decide which diseases, disabilities and mental illnesses were worth 'investing' in, what would save most money or give most DALY's back.[242] The measurement system itself was criticized by scholars such as Anand and Hanson (1997) for its arbitrary and 'irrelevant' variables as 'age and time period lost' and value-laden definition of 'burden', and also for the ignorance of the 'ethical dimensions of allocating resources among individuals'.[243]

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237 National Advisory Mental Health Council, 'Approaching the 21st Century' III.
238 National Advisory Mental Health Council, 'Approaching the 21st Century' III-IV, 33-40.
239 By focusing on the neuropathology of the brain and 'determining the basic neurophysiology of particular responses psychiatric syndromes', these syndromes can be 'dissected' or categorized into 'basic components', enabling 'treatment of patients to be directed at their 'particular array of symptoms rather than at a vague disorder in general' and eventually thereby cure or even 'prevent disabilities' National Advisory Mental Health Council, 'Approaching the 21st Century', 36, 38, 40, 48-49, 15.
240 Murray, C.J.L. & Lopez, A.D. (eds) 'The Global Burden of Disease. A comprehensive assessment of mortality and disability from diseases, injuries and risk factors in 1990 and projected to 2020', in: *GBD Series Vol. I. Harvard School of Public Health on behalf of the World Health Organization and the World Bank* (Cambridge, Massachusetts, 1996) and WHO, 'About the Global Burden of Disease (GBD) project', https://www.who.int/healthinfo/global_burden_disease/about/en/
241 As Rose write: 'The future of our brains has come to be framed in economic terms – the insupportable costs of health services, the consequences of days lost through illness, the productivity threatened, the competitiveness weakened, the human resources wasted', in: Rose, N., Abi-Rached, J., 'Governing through the Brain. Neuropolitics, Neuroscience and Subjectivity', in: *The Cambridge Journal of Anthropology* 32.1 (2014) 3-23, 4.
242 Bobadilla, J-L., Cowley, P., 'Designing and implementing packages of essential health services', in: *Health Policies in Developing Countries* 7.3 (May/June 1995) 543-554 and Gold, M.R., Stevenson, D., Fryback, DG., 'HALYS and QALYS and DALYS. Similarities and differences in summary measures of population health', in: *Annual Review of Public Health* 23 (2002) 115–34.
243 Anand S., Hanson K., 'Disability-adjusted life years. A critical review, in: Journal of Health Economics 16.6 (1997) 685-702, 687.

Others have offered a more fundamental and ideological critique. Katherine E. Kenny for instance argued that the focus on the quantification of the 'burden of health' should be seen in the light of the at the time increasingly dominant logic of the 'economization of life'.[244] This logic 'reimagines' human life as 'time' by 'disaggregating lifetimes into component units of time and reassembling life as a revenue stream to be maximized through practices of self-investment in one's own health'.[245] This can be seen in the fact that the experience of the individual is irrelevant in the measurement of 'burden', which is defined as the 'capability to function'. And functioning in modern Western societies, implicitly means both physical and mentally functioning on the job market.

Furthermore other scholars have argued that this logic implicitly, or in the case of the NIHM-reports explicitly, downplays the 'social realm', ignoring 'social, cultural, and economic dimensions', as it treats 'mental illness as a problem within the individual'.[246] This is probably most strikingly seen in the claim of the NIHM-report that the neurosciences will be able to move from treating a 'vague disorder' to curing a 'particular array of symptoms'.[247] Indeed, an ambition that fits in the trend that started with the introduction of the earlier discussed DSM-III manual for mental illnesses, which as Mayes and Horwitz (2005) show, introduced a 'new framework that focused on the symptoms of mental disorders rather than their causes and emphasized pharmacological treatments over talk therapy and behavioral changes'.[248] From this point it was a small step for both neuroscientists and policy makers to define both symptoms and design the treatment and drugs 'curing' them, in implicit economic terms as well. As Esposito and Perez argue, they reduced symptoms of mental illness to correspond to activities that fit with 'normative patterns of neoliberal agency' and, as this chapter will later show, this reduction defined 'recovery' solely as the ability to return to the work floor.[249]

2.3 Educating the public on the brain and neuroscience

Whereas Cngress eventually decided to largely adapt and follow the wording of both proposals from the NIMH and NINDS, in practice this did not directly lead to large increases in the budget of either these two or other non-governmental neuroscientific organizations.[250] Many neuroscientists were therefore disappointed and as NINDS director Goldstein remembered in

244 Kenny, KE., 'The biopolitics of global health. Life and death in neoliberal time', in: *Journal of Sociology* 51.1 (2015) 9-27, 22.
245 Kenny, KE., 'The biopolitics of global health. Life and death in neoliberal time', in: *Journal of Sociology* 51.1 (2015) 9-27, 22.
246 Esposito L, Perez FM. 'Neoliberalism and the Commodification of Mental Health', in: *Humanity & Society* 38.4 (2014) 414-442, 414.
247 38, 48-49, 15
248 Mayes R, Horwitz AV., 'DSM-III and the revolution in the classification of mental illness', in: *Journal of History of Behavior Science* 41.3 (2005) 249-67, 250, 258.
249 Esposito, L., Perez FM., 'Neoliberalism and the Commodification of Mental Health' 414-442, 416.
250 Goldstein, M., 'Decade of the brain. An agenda for the nineties' 239-242.

1994, he and others felt as if 'the Decade of the Brain was born but with a whimper rather than a lusty cry'.[251] For this reason, the director of the Cold Spring Harbor laboratory Jim Watson organized another meeting with a number of 'basic and clinical neuroscientists' and 'representatives of federal and private funding agencies' in 1992 to discuss 'why the proclamation of the Decade of the Brain had not led to additional support for brain science'.[252] One of these private funding agencies was the DANA-foundation, a private philanthropic organization. Under the leadership of millionaire David J. Mahoney this organization had shifted its attention completely to funding neuroscientific research.[253] Although the topic of the meeting was the lack of funding, the central theme soon became the lack of public interest for the neurosciences, as a prominent South-African neuroscientist and vice-president of the Howard Hughes Medical Institute Max Cowan recalls.[254]

In his speech David J. Mahoney made it clear that he believed that neuroscientists in the first two years of the Decade had not just failed to show congress, but more importantly, failed to show the public 'why their research matters to them'.[255] According to him, a big reason for this failure was that 'for most people the brain remains a mystery'.[256] Neuroscientific research might be a 'scientific success story', but, as Goldstein remembered, they had to admit that reaching the 'public and its leaders' had been an almost complete 'failure'.[257] As 'competition for research funding' was becoming more 'intense', most neuroscientific organizations therefore reached the conclusion that another strategy was needed. It seems as if this 1992 meeting resulted not just in the founding of the Dana Alliance for Brain Initiatives to search for funding in private capital, but also a change of strategy in general. Where the Decade of the Brain initially was 'sold' to Congress as a way to relieve the 'economic burden of diseases of the brain', from 1992 onwards the brain itself become the center point of the campaign. That is to say that the idea was that by making the brain itself an object in the public and political imagination, support for neuroscientific research was believed to evolve by itself.

This concern, that public awareness was necessary to ensure funding, was already felt earlier by private organizations such as the DANA Foundation and the Society for

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251 Goldstein, M., 'Decade of the brain. An agenda for the nineties' 240.
252 Goldstein, M., 'Decade of the brain. An agenda for the nineties' 240.
253 Substance Abuse and Mental Health Services Administration, 'ADAMHA News', Band 18, Ausgabe 2 (1992) 4, 14, 20.
254 Congressional Record 'Tribute to David Mahoney', in: Congressional Record Bound Edition Volume 146 part 11 (2000) 15811-15812. online: https://www.govinfo.gov/content/pkg/CRECB-2000-pt11/html/CRECB-2000-pt11-Pg15811.htm
255 Congressional Record 'Tribute to David Mahoney', in: Congressional Record Bound Edition Volume 146 part 11 (2000) 15811-15812. online: https://www.govinfo.gov/content/pkg/CRECB-2000-pt11/html/CRECB-2000-pt11-Pg15811.htm
256 Mahoney argued that: 'for most people the brain remains a mystery so they don't realize the degree of the problem or where advances in neuroscience might lead. Your goal of understanding the brain isn't good enough, people want to know what you can do for them. They don't want to hear about general 'research', they want to know what you can do to make their lives healthier and better, you have to offer them hope that means you have to go out on a limb and lay out your specific goals for treatment and cures'. or 'people not only want to know how and why research is done, they also want to know why it matters to them'. The Futurist, 'David Mahoney', in: *The Futurist* Band 26,Ausgabe 1 -Band 27 (1992) 56 and Dana Foundation, 'A Decade after The Decade of the Brain' (February 2010) accessible online at: https://dana.org/article/a-decade-after-the-decade-of-the-brain/
257 Goldstein, M., 'Decade of the brain. An agenda for the nineties' 240 and Society for Neuroscience, *The Creation of Neuroscience. The Society for Neuroscience and the Quest for Disciplinary Unity (1969-1995)* 65-70.

Neuroscience. The latter, mostly known for the largest annual scientific conference it organizes, had in the 1980s begun organizing educative events for the public.[258] The president of the SfN, Robert Wurtz, described this in an internal document in 1991 as the 'education of the voting public' in the 'methods, achievements and benefits of neuroscience' and argued that this was essential for the 'survival of our science'.[259] He and other neuroscientists were especially worried about the possibility that increased anti-testing sentiments in the American public opinion would lead to new regulations. To prevent this, the Society for Neuroscience worked together with the Committee on Animals in Research to 'produce special materials for elementary and high school teachers on the importance of animals in research'.[260] It is likely that this was also a central theme at the yearly symposium for members of Congress that the Society organized, as well as other private meetings that the SfN during this period held with the health aides of Senators and members of the House.[261]

There seemed to be primary three sort of educating activities that organizations as the NIHM and NINDS as well as the DANA Foundation for Neuroscience and the Society for Neuroscience undertook.[262] Firstly, they published a large number of books, documents, nota's and summaries aimed at both lay organizations, local and national as well as international politicians, lawmakers and the general public.[263] Some of these had specific topics in the neurosciences in mind, as for instance depression and emotions (*Discovering our Selves: The Science of Emotion* 1998) or, specifically later in the Decade, placidity (*the Adaptable Brain* (1999), others as NIHM's *Discovering the brain* (1992) or SfN's 'Brain Facts' were more general overviews from PET-scans to 'brain illness' and 'learning' or 'improving' the brain.[264] The DANA-foundation as well, published a newsletter *Brainwork* (appeared bimonthly), a newspaper called *The brain in the news* (appeared biweekly) and semi-scientific journal *Cerrebrum* (appeared 4 times a year) in which they regularly reported on advances and new 'discoveries' in the neurosciences.[265] The discourse that these educative materials contained is exemplified by the text of a brochure by NAMI titled 'Mental Illness: An Illness Like Any Other':

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258 Myslinski, N.R., 'A Revolution in Brain Literacy', Dana Foundation (October 2001) https://www.dana.org/article/a-revolution-in-brain-literacy/
259 Myslinski, N.R., 'A Revolution in Brain Literacy', Dana Foundation (October 2001) https://www.dana.org/article/a-revolution-in-brain-literacy/
260 Purpura, D., 'Statement of Dominick P. Purpura, M.D. for the Society for Neuroscience Concerning FY 1992 Appropriations', (April 19, 1991) 2. And US Congress, Office of Technology Assessment *The Biology of Mental disorders* (Washington 1992) 136.
261 Myslinski, N.R., 'A Revolution in Brain Literacy', Dana Foundation (October 2001).
262 Seeing the high numbers of unknown events, let alone the impossibility to measure the reach or impact of these events, statistical categorization is impossible.
263 Marilyn Dickey, M., *Anxiety Disorders. Decade of the Brain* (Washington December 1994) and Society for Neuroscience, *The Creation of Neuroscience. The Society for Neuroscience and the Quest for Disciplinary Unity (1969-1995)* 65.
264 Marilyn Dickey, M., *Anxiety Disorders. Decade of the Brain* (Washington December 1994).
265 Rowland, L.P., *NINDS at 50. An Incomplete History Celebrating the Fiftieth Anniversary of the NINDS* (New York 2003) 149-152.

> 'Mental illnesses are medical conditions. Just as diabetes is a disorder of the pancreas, mental illnesses are medical conditions that often result in a diminished capacity for dealing with the ordinary demands of life'.[266]

Additionally, individual publicists, journalists and authors were approached to become involved in the official DoB campaign. Publicist and New York Times columnist William Safire for instance remembered being asked by Mahoney and Watson in 1992 'to help enliven a moribund Decade of the Brain' through his journalist writing.[267] Most of the discourse on the importance of the brain however appeared independently from the campaign. Daniel Buchman and Fernando Vidal argue that the idea of the importance of the brain for who we are, can be found in many movies, art and (science) journalism in the 1990s.[268] Literary critics as Marco Roth have argued similarly that the impact on literature was so substantial that the 1990s saw a whole new 'strain of books' called the 'neuronovel'.[269] According to him these were characterized by authors who had 'ceded their ground to science' and accepted the premise that neuroscience had the 'capacity to explain him better than he can explain himself'.[270]

Secondly, a large focus from especially the DANA Foundation and the Society for Neuroscience were several teaching programs aimed at on the one hand primary high schools teachers and on the other hand trained neuroscientists in public communication.[271] The first types of programs were mostly developed in collaboration with the National Association of Biology Teachers (NABT) and aimed to 'educate' children about neuroscience and the importance of the brain, as well as the use of animals in neuroscientific experiments.[272] An example of the second type were the 'Education Day Workshops' organized by the Society for Neuroscience in which neuroscientists were trained to 'talk to the media or to children in the

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266 Fein, E., 'Innocent Machines. Asperger's Syndrome and the Neurostructural Self', in: *Advances in Medical Sociology* 13 (December 2003) 27-4937. And Flynn, L., 'NAMI Calls For Increased Funding For Research Of Serious Brain Disorders', *NAMI Press Release* (Feb 1998) https://www.nami.org/Press-Media/Press-Releases/1998/NAMI-Calls-For-Increased-Funding-For-Research-Of-S

267 Safire, W., 'A columnists Farewell. Never Retire', in: *New York Times* (2005) online: https://www.nytimes.com/2005/01/24/opinion/never-retire.html

268 Daniel Dennett's *Consciousness Explained* (1991) and Steven Pinker's *How the Mind Works* (1997) are other good examples. Vidal, F., 'Eternal sunshine of the spotless mind and the cultural history of the self', in: *Werkstatt Geschichte* 16.45 (2007) 96-109. See also: Buchman, D., 'Are We Living in a Neuro-Culture?', in: *Neuroethics at the Core* (3 june 2010) online accessible at: https://neuroethicscanada.wordpress.com/2010/06/03/are-we-living-in-a-neuro-culture/

269Now, one could argue, as the earlier mentioned Fernando Vidal does, that these thought-experiments already can be traced back to way earlier and (that he interestingly does not mention) this appeared cross-cultural as for instance Bulgakov's 1925 masterpiece Heart of a Dog, but this changes little from the fact that this rise happened in the 1990s. Roth, M., 'The rise of the neuronovel', in: *N+1 Recessional* Issue 8 (fall 2009) online link: https://nplusonemag.com/issue-8/essays/the-rise-of-the-neuronovel/ and Vidal, F., 'Eternal sunshine of the spotless mind and the cultural history of the self', in: *Werkstatt Geschichte*, 16.45 (2007) 96-109. See also: Buchman, D., 'Are We Living in a Neuro-Culture?', on: *Neuroethics at the Core* (3 june 2010).

270 Vidal, F., 'Eternal sunshine of the spotless mind and the cultural history of the self', 96-109.

271 Carvellas, B., Lumsden, A., 'The 1990s. The 20th Century Ends (1991–2000)', in: *The American Biology Teacher* 75, no. 8 (2013) 519-21. and And Flynn, L., 'NAMI Calls For Increased Funding For Research Of Serious Brain Disorders', *NAMI Press Release* (Feb 1998) https://www.nami.org/Press-Media/Press-Releases/1998/NAMI-Calls-For-Increased-Funding-For-Research-Of-S

272 Additionally, there were events for policy makers in education that examined how neuroscientific knowledge could be put in practice directly. Flynn, L., 'NAMI Calls For Increased Funding For Research Of Serious Brain Disorders'.

school'.[273] Additionally, there were events that aimed at incorporating neuroscientific knowledge in education in general. In September 1996 for example, the DANA Foundation together with the Education Commission of the States organized a conference with 74 neuroscientists and policy makers to discuss how the neurosciences could reshape early childhood education.[274]

Thirdly, these organizations started organizing a large number of public events that ranged from scientific symposia and public exhibitions to local information events in town halls and more popular meetings that were broadcasted on local TV-networks as the 1994 event 'Brain Fitness for Life' in San Diego.[275] While there were a vast number of neuroscientific conferences in the context of the Decade of the Brain in the 1990s, the events that the NIHM organized in cooperation with the Library of Congress are especially interesting for they are both well documented yet unused in by scholars, but also because they were most likely the meetings that attracted the most (inter)national attention as besides neuroscientists, also journalists, policy makers, senators, individual activists, representatives of patient organizations and private investment funds were involved.

2.4 Two discourses on mental health

There were at least 14 large events or 'symposia' that the NIHM organized together with the Library of Congress between 1990 and 2000.[276] In the first half of the Decade these events mostly focused on specific diseases and neuroscientific advancements, while in the second half healthcare policy and public awareness were more important.[277] A notable example of this change of focus was the 1996 symposia 'Understanding and Treating Mental Illness' that was held on 16 September, the 50th anniversary National Mental Health Act, in the Library on

273 Education Commission of the States and Dana Foundation Held events in Denver, Colorado July 26-28, 1996 titled Bridging the Gap Between Neuroscience and Education. See: Society for Neuroscience, *The Creation of Neuroscience. The Society for Neuroscience and the Quest for Disciplinary Unity (1969-1995)* 68.

274 Quote: 'The brain matters for educators, so they can find ways to enrich the school experience for all children the gifted, the creative, the learning disabled, the dyslexic, the "average" student and all the children whose capabilities are not captured by IQ or other conventional measures. If neuroscience has strategies to improve what we're doing, we can put them in place very quickly for four million children', said Robert Slavin, co-director of the Johns Hopkins Center for Research on the Education of Students Placed at Risk. See: Education Commission of the States, 'Bridging the Gap between Neuroscience and Education. Summary of a Workshop (Denver, Colorado, July 26-28,1996). Collected Works Conference Proceedings (021). Society for Neuroscience, *The Creation of Neuroscience. The Society for Neuroscience and the Quest for Disciplinary Unity (1969-1995)* 68.

275 Society for Neuroscience, *The Creation of Neuroscience. The Society for Neuroscience and the Quest for Disciplinary Unity (1969-1995)* 68.

276 Library of Congress, 'Information Bulletin' vol 55.15 (September 16 1996) 325-326 and https://www.loc.gov/loc/brain/activity.html and https://www.loc.gov/loc/brain/public.html

277 Thus, in 1991 saw an 'Frontiers of Neuroscience' symposia with lectures on brain imaging, the mind and brain relation and neurobiology in 1992 the focus was on learning memory and memories, in 1993, language and the brain as well as Alzheimer and aging. Where 1995 saw an event on Placidity or the adaptable brain, this still had a rather molecular, neurobiological, focus and did not for instance include the 'brain fitness' or 'brain training' that were already taking place at events aimed at the larger public. In 1996 however, with the focus on 'Understanding and Treating Mental Illness', and in 1997 with events on early brain development of children and mental health services, and especially in 1998 with the 'Discovering Our Selves: The Science of Emotion' as well as 1999, Understanding Our Selves: The Science of Cognition', this explicitly got a more general focus. Library of Congress, 'Information Bulletin' vol 55.15 (September 16 1996) 325-326 and https://www.loc.gov/loc/brain/activity.html and https://www.loc.gov/loc/brain/public.html

Congress.[278] At the event there were two primary discourses that can be distinguished. The first was mostly presented by neuroscientists and is very similar to that of the early documents on the Decade of the Brain as it presented the search and 'discovery' of the neurobiological causes of mental illness as the way to find 'cures' for these illnesses and disorders and thereby reduce the economical 'burden'.[279] The second, was mostly presented by representatives of patient organizations and individual mental health activists and claimed that neurobiological explanations of mental illness offered individual patients hope for a cure and additionally would reduce stigma on mental health problems.[280]

As an example of the first discourse, acting Director of the NIHM Rex Cowdry in his opening speech argued that the 'most significant change' in the past years was the 'recognition' that mental illness had 'identifiable biological origins', and that this meant eventually a medicine-like cure would be developed.[281] Another researcher Joseph Coyle, NIHM specialist in neurotoxicology and clinical child psychiatry, made clear that he believed that these neurobiological causes of mental illness were all-important, whereas environmental factors should be regarded as irrelevant. In his lecture on 'inner city children's learning disabilities and developmental disorders', he linked learning disabilities to the 'toxic environments' in which some children grew up. With this, he however did not mean poverty, social inequality, poor healthcare or a segregated schooling system, but the 'contact' that these children, or more so, their brains, had with 'cocaine, alcohol and lead'.[282] As the solution, and as an example of 'how neuroscience should influence policy', he proposed funding research into the effects of cocaine on the brain as well as legislation that would ensure that 'lead would be removed from paint and gasoline'.[283]

Laurie Flynn, director of NAMI, interestingly presented a mix of both discourses. On the one hand, she argued for the 'extension of insurance coverage' for mental disorders to the same status as physical disability and illnesses, for the prime reason that this would 'increase productivity, save Medicaid and expenditures on our correctional system', as it would 'help people return to work and get on with their lives'.[284] At the same time, she spoke about the ability of neuroscientific explanations to reduce stigma on mental illness.[285] As journalist Wray

278 The event saw several speakers ranging from neuroscientists, to senators (often with family or friends who suffered from mental illness) as well as representatives of patient organizations and mental health activists present two versions of a neurobiological discourse on mental illness.'80 to 100 visitors'. See: Library of Congress, 'Information Bulletin' vol 55.15 (September 16 1996) 325-326 and https://www.loc.gov/loc/brain/activity.html and https://www.loc.gov/loc/brain/public.html and Levy-Reiner, S.. 'The Decade of the Brain Library and NIMH Hold Symposia on Mental Illness' (September 16, 1996) online: https://www.loc.gov/loc/lcib/9615/brain.html
279 Library of Congress, 'Information Bulletin' vol 55.15 (September 16 1996) 325-326
280 Library of Congress, 'Information Bulletin' vol 55.15 (September 16 1996) 325-326 and The NIH Record, 'HE. 20. 3007, 3:50/1 (January 3 1998) online: https://books.google.nl/books?id=Hc2MasoLtlUC&printsec=frontcover&hl=de#v=onepage&q&f=false
281 Levy-Reiner, S.. 'The Decade of the Brain Library and NIMH Hold Symposia on Mental Illness' (September 16, 1996).
282 Levy-Reiner, S.. 'The Decade of the Brain Library and NIMH Hold Symposia on Mental Illness' (September 16, 1996).
283 Levy-Reiner, S.. 'The Decade of the Brain Library and NIMH Hold Symposia on Mental Illness' (September 16, 1996).
284 https://www.loc.gov/loc/lcib/9615/brain.html
285 Herbert, W., 'The Politics of Biology. How the nature vs. nurture debate shapes public policy--and our view of ourselves', By *US News and World Report* (April 21, 1997) online: https://sites.oxy.edu/clint/physio/article/politicsofbiology.htm

Herbert noted in 1997, Flynn was well known in Washington for going to lawmakers and senators and presenting them with pictures of 'colorful brain images' from the PET-scan that showed 'brains with mental illness and normal brains', thereby convincing them that mental illness is a 'physical disease of the brain just as heart disease is a physical disease of the heart, and lung cancer is a physical disease of the lungs'.[286] As Flynn recalls in the interview with Herbert, when lawmakers saw these scans they realized that 'it's not some imaginary, fuzzy problem, but a real physical condition, then they get it: 'Oh, it's in the brain'.[287]

At the symposia this sentiment was shared by other activists, who presented their personal experiences of stigmatization of mental health. Senators with family members affected by 'brain disorders', praised the neuroscientists and pledged to support legislation incorporating neuroscientific explanations as well as attempts to gain extra funding for research. Several activists explained how the neuroscientific model of explanation of mental illness in itself had helped them. Kathy Cronkite for instance explained how depression first gave her an 'ongoing sense of hopelessness', but when neuroscientists told her that depression is merely a 'brain disease' and thereby a 'medical condition' that 'soon' would be fully 'treatable', she regained hope.[288] Another mental health activist who spoke at the event, Jerilyn Ross, combined both discourses when she noted that 'victims of a panic attack frequently are told: it's all in your head as if your head isn't part of your body', whereas according to her 'panic disorder is real', and its realness to her constituted of the fact that it's a 'treatable disorder that costs the nation about 47 billion each year'.[289] Indeed, the realness or seriousness of the disorder to her lied not so much in the phenomenological experience of the individual, but more so in its neurobiological causes and the economic costs.[290]

This discourse that equates mental illnesses to physical diseases and denied environmental causes became even more explicit and dominant during the final years of the decade. In June 1999, the new president Bill Clinton and his team organized the White House Conference on Mental Health that was extensively covered by the media.[291] Especially Clinton's announcement of a new 'national campaign' against stigma is nowadays hailed as a landmark. Practically, the idea was not to organize an awareness campaign against stigma itself.

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286 Solomon, A., *The Noonday Demon. An Atlas Of Depression* (New York 2015) 369.
287 Myslinski, N.R., 'A Revolution in Brain Literacy', Dana Foundation (October 2001).
288 Levy-Reiner, S.. 'The Decade of the Brain Library and NIMH Hold Symposia on Mental Illness' (September 16, 1996).
289 Levy-Reiner, S.. 'The Decade of the Brain Library and NIMH Hold Symposia on Mental Illness' (September 16, 1996) and Stine, J., Benares, C., 'It's All in Your Head. Remarkable Facts about the Human Mind Prentice', (Upper Saddle River 1994).
290 Herbert, W., 'The Politics of Biology. How the nature vs. nurture debate shapes public policy--and our view of ourselves', By *US News and World Report* (April 21, 1997).
291 The event that saw besides Clinton also his wife Hillary Clinton as well as Vice President Al Gore, and his wife Tipper, who as well was the President's Adviser on Mental Health, was extensively covered in the US-media and hailed as an marking point in the history of mental health. See: White House archives, 'White House Conference on Mental Health', by *Office of the Press Secretary* (June 7 1999). https://clintonwhitehouse4.archives.gov/textonly/WH/EOP/First_Lady/html/generalspeeches/1999/19990607.html

Rather, the idea seemed to be that popularizing neuroscientific explanations of mental illness as a disease not fundamentally different from physical diseases, by itself would remove any stigma. When Clinton at the conference declared that 'we must make it clear, once and for all: mental illness is no different from physical illness', he thus was not just repeating earlier talking points, but also framed them in a new context, that of the unquestionable primacy of the neuroscientific explanation of mental illness.[292]

Where earliest reports that formed the basis of the Decade of the Brain had still mentioned the environmental causes or the 'personal' burden; the experiences of the individual or the environment that played some role, these by the time of the symbolic closure of the campaign had disappeared, even from the background. Indeed, as Albee and Joffe (2004) show in their rare analysis of some of the speeches at the White House Conference, there was 'not any reference to the role of poverty, homelessness, overcrowded and unhealthy living conditions, poor diets, and lack of parental attachment in producing childhood emotional distress'.[293]

The reasons for this absence can be found at least partly in the words and personal history of two leading scientist who were 'interviewed' by Hilary Clinton at the event. The first one is Steven Hyman, president of the NIMH from 1996 to 2001 and the second one is Harold S. Koplewicz, the head of the New York University Child Study Center. Hyman who opened the event, began his presentation by showing pictures of PET-scans of a 'healthy person with a normal brain' and 'someone with severe depression'.[294] He urged the attendees to remember that 'these poor sick children' suffer from 'real diseases of a real organ, the brain' and that thanks to the neuroscientific advancement of the past years 'we can make diagnoses' and thus treat these illnesses just 'like general medical illnesses'.[295] Indeed for Hyman treating mental illness as other medical illnesses also meant that treatment itself was just as other medical treatments and this was something which according to him represented an 'enormously liberating force for families and for people with mental illness'.[296]

Koplewicz as well, began his explanation of the 'progress' of the past decade by noting how research had proven that mental illness is a 'real illness of an organ' and thus 'treatable' by medicine.[297] Firstly, his speech seems similar to the earlier statements of neuroscientists in

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292 White House archives, 'White House Conference on Mental Health', by *Office of the Press Secretary* (June 7 1999).
293 Albee, G.W., Joffe, J.M. Mental Illness Is NOT "an Illness Like Any Other". The Journal of Primary Prevention 24, 419–436 (2004) 433.
294 White House archives, 'White House Conference on Mental Health', by *Office of the Press Secretary* (June 7 1999).
295 White House archives, 'White House Conference on Mental Health', by *Office of the Press Secretary* (June 7 1999). https://clintonwhitehouse4.archives.gov/textonly/WH/EOP/First_Lady/html/generalspeeches/1999/19990607.html
296 White House archives, 'White House Conference on Mental Health', by *Office of the Press Secretary* (June 7 1999).
297 Koplewicz described three actions needed to fight "brain diseases": Identify the cost of non-treatment, educate children in middle school about mental illness, and launch a national public awareness campaign so that mental illnesses are understood as well as heart disease. These three steps are actually marketing actions that modern corporations take to sell a product. The products being sold are psychiatric drugs as "treatments" for "mental illness as brain disease." White House archives, 'White House Conference on Mental Health', by *Office of the Press*

the decade, as he focusses on the necessity of treatments and making the 'public aware' about the 'costs of untreated mental illness'. Costs that he as well, solely defined in 'lost school days, lost work days, dropout, marital distress, lost opportunity cost', and visualized by describing 'executives and leaders who are quietly depressed and who aren't functioning at full capacity'.[298] What is new in Koplewicz speech is that he explicitly rejects the view that environmental factors play a role in mental illness. In that context, it is worth mentioning that he was one of the scientists who some years after the conference would be successfully sued for 'exaggerating the effects of the antidepressant drug Paxil (based on Paroxetine) and 'downplaying the risks for children' in the so-called Study 329 (1994-1998), a study that was financed and PR-written by British pharmaceutical company SmithKline Beecham.[299] It can then also hardly be surprising that he presented psychiatric medication as the only treatment option for what he describes as 'essentially no-fault brain disorders':

> 'It's hard to believe that until 20 years ago we still believed that inadequate parenting and bad childhood traumas were the cause of psychiatric illness in children. Even though we know better today, that antiquated way of thinking is still out there, so that people who wouldn't dream of blaming parents for other types of disease, like their child's diabetes or asthma, still embrace the notion that somehow absent fathers, working mothers, over-permissive parents are the cause of psychiatric illness in children'.[300]

2.5 Neoliberalism, recovery and identity

Towards the end of the Decade of the Brain, mental illness thus was increasingly presented as a 'no-fault brain disorder'.[301] Arguably, unlike most medical diseases however, what it means to be cured from mental illness includes thinking not just about what to recover *from* but also of what to recover *to*. As Annemarie Mol (2008), Brigit McWade (2013) and Slade (2009) therefore argue it is crucial to make distinctions between 'kinds of recovery'.[302] According to them these differences result from 'different social and material practices', ranging from 'clinical recovery' that defines recovery as the reduction of specific, classified, symptoms, or

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Secretary (June 7 1999). Editorial, 'The White House Conference on Mental Health', in: *Ethical Human Sciences and Services*, Vol. 2, No.1 (2000) online: http://breggin.com/wp-content/uploads/2008/01/thewhitehouse.pbreggin.2000.pdf

298 White House archives, 'White House Conference on Mental Health', by *Office of the Press Secretary* (June 7 1999).

299 , and would settle for an apparently record settlement of 3 billion Study 329 1994-1998. Doshi, P., 'No correction, no retraction, no apology, no comment. Paroxetine trial reanalysis raises questions about institutional responsibility', in: *British Medical Journal* (2015) 351.

300 Albee, G., Joffe, J., 'Mental Illness Is NOT "an Illness Like Any Other', in: *Journal of Primary Prevention* 24 (2004) 419–436, 432.

301 Albee, G., Joffe, J., 'Mental Illness Is NOT "an Illness Like Any Other', in: *Journal of Primary Prevention* 24 (2004) 419–436, 432.

302 Mol, A., *The Body Multiple* (London 2005) Slade, M., 'Personal Recovery and Mental Illness. A Guide for Mental Health Professionals' (Cambridge 2009). Slade, M., Amering, M., & Oades, L., 'Recovery. An international perspective', in: *Epidemiologica e Psichiatria Sociale*, 17 (8) (2008) 128-137.

'personal recovery', as 'defined by the person recovering'.[303] More so, the concept of recovery *to* something, contains a 'conception of who we are' but also of 'how our lives should be lived', as historian of neuroscience Stephen T. Casper recently argued in *Science*.[304] Considering that in the Decade of the Brain the promise of the neurosciences for a cure for mental illness was interwoven with a promise of the reduction of the 'economic burden' by allowing people to 'return to the work floor', symptom reduction that made people 'able' to return became a central aspect of what it meant to be recovered.[305]

The connection between psychiatry and discourses on work and productivity has a history that goes beyond the Decade of the Brain, as Richard U'Ren (1997) shows.[306] Where capitalism historically presented 'work' as 'a mark of personal virtue and the route to make material reward through individual effort', Freudian psychiatry in the early 20th century 'reinforced' this ideal by 'maintaining that the ability and desire to work (and consume) is a sign of mental health'.[307] This connection between the ability to work and mental health was only strengthened during the later 20th century and postwar period.[308] For although neuroscientific explanations differ from Freudian analysis on most levels, both fundamentally locate the causes of problems inside the individual. As U'Renn argues, they both, just as neoliberal logic, rather than locating problems in 'culture, economy, social system and work', focus on how 'problems are experienced and expressed individually'.[309]

Neuroscientists themselves might argue that they merely discover or 'produce' scientific knowledge without making a clear policy advice, something that can hardly be maintained seeing how they 'sold' neuroscience during the Decade of the Brain, even in this case they are at best ignorant of the consequences of their 'knowledge'. As Albe and Joffe and Brigit McWade show, neuroscientific knowledge from the 1990s has become a 'primary tool' of neoliberal state making, for when mental illness is a brain disease like any other disease, 'efforts at prevention need to pay little attention to the social environment in which the affected person lives and has developed'.[310]

As noted in the first chapter, the 1980s in America saw an increased process of neoliberalization that meant the retreat of the state from many public roles and responsibilities

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303 McWade, B., 'Recovery-as-Policy as a Form of Neoliberal State Making',In*: Intersectionalities a global journal of social work analysis research polity and practice* Vol 5.3 (2016) 62.
304 Casper, S., 'To better treat brain disorders, we must look beyond biology', Science Magazine (15 April, 2019) online: https://blogs.sciencemag.org/books/2019/04/15/everything-in-its-place-mind-fixers/
305 Policy makers as director of the Center for Psychiatric Rehabilitation at Boston University, William A. Anthony, praised neuroscientists in his 1993 article 'The Guiding Vision of the Mental Health Service System in the 1990s', for having a vision on 'curing and preventing severe mental illness', of 'recovery', unlike 'the field of services'. U'ren, R., 'Psychiatry and Capitalism', in: *Journal of Mind and Behavior* 18 1-12 (1997) 4-6.
306 U'ren, R., 'Psychiatry and Capitalism', in: *Journal of Mind and Behavior* 18 1-12 (1997) 4-6.
307 U'ren, R., 'Psychiatry and Capitalism', in: *Journal of Mind and Behavior* 18 1-12 (1997) 4-6.
308 U'ren, R., 'Psychiatry and Capitalism', in: *Journal of Mind and Behavior* 18 1-12 (1997) 9.
309 U'ren, R., 'Psychiatry and Capitalism', in: *Journal of Mind and Behavior* 18 1-12 (1997) 4-6.
310 Albee, G., Joffe, J., 'Mental Illness Is NOT "an Illness Like Any Other', in: *Journal of Primary Prevention* 24 (2004) 419–436, 434.

an increased liberalization of the job market and, as German sociologist Ulrich Bröckling has argued, the transformation of the conception of work.[311] People were increasingly encouraged by neoliberal discourses to be self-responsible and self-reliant, to self-conceptualize as an 'entrepreneurial self' that is constantly 'improving' and 'optimizing' to 'increase the market value of my Me-shares'.[312] It is important to emphasize as Bröckling does that this 'logic' was not spread only by direct governmental authority, but mostly through discourses of 'training, management and self-help literature' and, as Holman and Villers-Sidani, Harper-Till and Pitts-Taylor have argued, by neuroscientific discourses of 'brain fitness and training'.[313] Consequently, the Entrepreneurial Subject is not so much the description of an 'empirically existing entity', not even as a Weberian ideal type that can be ultimately be reached. More so, it is a description of the constant process that is often described as 'self-realization', in which we all, more or less, are directed to internalize competitive market principles in our thinking of being.[314]

This neoliberal logic formed the fundament of a new movement of mental illness patients that by the late 1980s began defining themselves as 'consumers' of mental healthcare and quickly gained prominence in governmental discourse in the United States. Unlike earlier ex-patient movements that defined themselves as 'survivors' and sought to abolish mental healthcare altogether, this 'consumer-movement', wanted to make mental health treatments more 'effective' by allowing 'consumers to choose' treatment options on a sort of marketplace.[315] The underlying idea was that the principle of competition between providers of treatment would guarantee these consumers the best available option for the lowest price. As Barbara Everett notes, the term 'consumer' was primarily employed to 'empower patients and clients by equating them with customers' as the term 'denotes people who are respected because they demand satisfaction or else they take their business elsewhere'.[316]

Where Luigi Esposito and Fernando M. Perez (2014) argued that the most fundamental change that the consumer movement introduced was the idea that 'mental health issues are best handled through business and marketplace', I would argue that something more fundamental changed.[317] The self-conceptualization of the patient as a 'consumer', who rationally, in an act

311 Bröckling, U., *The Entrepreneurial Self. Fabricating a New Type of Subject* (2007) 22 and Rimke, H.M., 'Governing Citizens Through Self-Help Literature', in: *Cultural Studies* 14, no. 1 (09 Nov 2010) 61-78.
312 Bröckling, U., *The Entrepreneurial Self. Fabricating a New Type of Subject* (2007) 21.
313 Holman, C., De Villers-Sidani, E., 'Indestructible plastic. The neuroscience of the new aging brain', in: *Frontiers in human neuroscience* 8, (2014) 219. Harper-Till, C., 'Self-tracking and management ideology', On: Thisisnotasociologyblog (March 2016) onlin link: https://thisisnotasociology.blog/2016/03/29/self-tracking-and-management-ideology/ Pitts-Taylor, Victoria, 'Neurobiologically Poor? Brain Phenotypes, Inequality, and Biosocial Determinism', in: *Science Technology and Human Values* 44.4 (2019).
314 Bröckling, U., *The Entrepreneurial Self. Fabricating a New Type of Subject* (2007) 179.
315 Everett, B., *A Fragile Revolution. Consumers and Psychiatric Survivors Confront the Power of the Mental Health System* (Waterloo, Ontario 1994) 140-148.
316 Everett, B., *A Fragile Revolution. Consumers and Psychiatric Survivors Confront the Power of the Mental Health System* (Waterloo, Ontario 1994) 145.
317 Esposito, L., Fernando, M.P., 'Neoliberalism and the Commodification of Mental Health', in: *Humanity & Society* 38.4 (November 2014): 414-442, 434.

of self-responsibility, searches for the best options for treatment, makes recovery from mental illness not just a market-interaction but more so, a necessary act of 'self-improvement' by the entrepreneurial self.[318] It presupposes that as mental health treatments should be chosen and purchased, this can be either be a good or bad purchase, but at all times one that is reflective of the qualities of the individual 'consumer'.

2.6 Giving meaning to neuroscientific explanations of mental health

The consumer movement consisted mostly out of people who already underwent psychological and psychiatric treatment for mental health problems but remained unsatisfied. In addition, people with specific mental health disorders such as autism increasingly began to organize themselves. During the Decade of the Brain campaign, mental disorders such as autism were atopic of research, but far from being as central of a theme as what were seen as more widespread mental health problems such as anxiety and depression. Public and political awareness for autism had nonetheless been steadily growing since the 1980s, primarily through reporting in newspapers, magazines and films as 1988's Rain Man.[319] Additionally, in 1991 the disabilities education act (IDEA) had officially made autism a separate category of disorder, separating it more clearly from learning disability or even 'mental retardation'.[320] The 'emergence of the internet' in the late 1990s, had further created both a platform for parents with autistic children as well as autistic people to discuss social problems as stigma and neuroscientific research.[321]

As Singh, Hallmayer and Illes note, these trends gave rise to two fundamentally opposing movements of autism advocacy.[322] Firstly, organizations as the National Alliance for Autism Research (NAAR, now Autism Speaks) and Cure Autism Now (CAN), which were founded in 1994 and 1995 respectively, began working together with doctors and scientists. Together, they sought to promote studies and eventually by the early 2000s to privately secure funding amounting to 80 million dollars for extra research into the neurobiological causes of autism and a possible 'cure'.[323] The two primary projects that during the 1990s received funding were the Genomics Initiative, which aimed to identify the genes that might cause autism, and the CAN Biomarkers Initiative, which attempted to identify so-called bio-markers of autism. This bio-marker, which at the time was thought to possibly be a specific protein in

318 Esposito, L., Fernando, M.P., 'Neoliberalism and the Commodification of Mental Health', 414-442, 434.
319 Ortega, F., 'The Cerebral Subject and the Challenge of Neurodiversity', in: *BioSocieties* 4.4 (2009) 425-445, 427-430.
320Ortega, F., 'The Cerebral Subject and the Challenge of Neurodiversity', 428.
321 Ortega, F., 'The Cerebral Subject and the Challenge of Neurodiversity', 4
322 Singh, J., Hallmayer, J., & Illes, J., 'Interacting and paradoxical forces in neuroscience and society', in: *Nature reviews. Neuroscience,* 8(2) (2007) 153–160, 155.
323 Although they did so largely without congressman support, still by 1996 an coalition in congress had been established that promoted funding for research and held meetings about this as well. Dooley E. E., 'Cure Autism Now', in: *Environmental Health Perspectives* (2006) 114.

the urine of children, was promised to replace the standard diagnosis of autism that was regarded too subjective and thereby unscientific.[324]

The rhetoric of these projects in many ways was similar to that of the Decade of the Brain campaign, namely, that more neuroscientific research eventually would lead to the 'discovery' of the biological causes or markers, and thereby a cure. Besides what mostly seems to have been the sporadic involvement of doctors and neuroscientists, these groups according to Ortega were mostly led by parents with children with (low functioning) autism. There were also some adults with autism who supported these ambitions, but seemingly they represented a minority.[325] One of these was Sue Rubin, who has low-functioning autism, and argued in an interview at the time that 'the thought of a gold pot of a potion with a cure really would be wonderful', and that 'killing autism' would let her 'enjoy a life with great friends and allows me to go to college'.[326]

On the other hand however, the Autism Network International (ANI, founded in 1992) and The Autism National Committee (AUTCOM, founded in 1990) actively rejected the idea that autism should be cured.[327] These organizations were mostly led by so-called 'high-functioning' autists people who, as Sanders (2009) explains, 'might not suffer from intellectual or learning problems but instead have problems in communicating and social, emotional, bounding and interaction'.[328] An important factor in the rise of this anti-cure perspective was the complete removal of homosexuality from the DSM (Diagnostic and Statistical Manual of Mental Disorders) in 1987 (being changed to 'sexual orientation disturbance' in 1973 already) and from the WHO's International Classification of Diseases (ICD) in 1992.[329] Verhoeff additionally notes that the anti-cure perspective was strengthened by the growing 'disconnection between constructing a valid category of particular behaviors and [new] ideas about 'the pathological' or the need for psychiatric treatment'.[330] The argument of leading anti-cure activists such as Judy Singer was indeed that autism was just as homosexuality or deafness merely a 'human gnomic variation', and therefore should also be socially accepted.[331] These autism anti-cure groups did not reject neuroscientific research into the causes of autism, but

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324 Ortega, F., 'The Cerebral Subject and the Challenge of Neurodiversity', 428.
325 Ortega, F., 'The Cerebral Subject and the Challenge of Neurodiversity', 430.
326 Ortega, F., 'The Cerebral Subject and the Challenge of Neurodiversity', 431.
327 Ortega, F., 'The Cerebral Subject and the Challenge of Neurodiversity', 431.
328 Ladell, S.J., 'Qualitative or Quantitative Differences Between Asperger's Disorder and Autism? Historical Considerations', in: *Journal of Autism and Developmental Disorders* 39.11 (2009) 1560–1567.
329 Ladell, S.J., 'Qualitative or Quantitative Differences Between Asperger's Disorder and Autism? Historical Considerations', in: *Journal of Autism and Developmental Disorders* 39.11 (2009) 1560–1567.
330 Verhoeff, B., 'Fundamental challenges for autism research. The science-practice gap, demarcating autism and the unsuccessful search for the neurobiological basis of autism', in: *Medicine, Health Care and Philosophy*, (2015) 443-447, 445-446.
331 As Lampen shows, Singer especially referred to deaf-people who 'just like' autists were not neurotypical and had their own culture. Lampen, W., 'Autisme vanuit de individuen bekeken', 36-38. Singer, J., 'Why can't you be normal for once in your life? From a problem with no name to the emergence of a new category of difference', in: *Disability discourse* (1999) 59-70.

embraced this research and its knowledge-claim as the legitimization of their anti-cure perspective.[332]

The biggest differences between these two groups were thus not that they either rejected or appropriated neuroscientific knowledge and research. It was not a question or disagreement about what 'caused' autism and neither about if this disorder could be 'located' in the brain. Even the idea that neuroscientific research could eventually 'treat' or 'prevent' autism was widely shared by both perspectives. What they differed about was the meaning of this promised research. If autism was located in 'your' brain, did this mean that it was a disorder or simply an abnormality, was it part of one's identity or as Silverman notes, a 'conditional category' that should be separated from the individual as something that obstructed ones self-realization.[333]

These were questions that neuroscientists could not answer, even if they wanted and attempted to. Whereas individuals of the pro-cure movement defined themselves as people with autism rather than autistic, representatives of the anti-cure movement instead defined themselves as autistic individuals, arguing that it was an 'integral and unchangeable characteristic' of one's personal identity as that their brains were only 'wired differently'.[334] For instance, Jim Sinclair, founder of the ANI and someone with autism himself, argued that a 'person with autism' makes it sound like 'autism is something bad - so bad that is isn't even consistent with being a person'.[335] Similarly, another anti-cure activists, Michelle Dawson, argued that using the wording 'person with autism' is as 'bizarre as using 'person with femaleness' to designate a woman'.[336] For Kit Weintraub, mother of two autistic children, it was however clear that autism was not much different from other mental illnesses that should be cured:

> 'I love my children, but I do not love autism. My children are not part of a select group of superior beings named 'autistics.' They have autism, a neurological impairment devastating in its implications for their lives, if left untreated. In other words, it is no more normal to be autistic than it is to have spina bifida'.[337]

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332 Indeed, the gay-movement in the United States promoted neuroscientific research into the causes of homosexuality because they believed, similarly as the neurodiversity movement, that neuroscience would 'prove' that their sexual orientation was 'biologically natural to the brain' and therefore 'uncurable'. Jaarsma, P., Welin, S., 'Autism as a Natural Human Variation. Reflections on the Claims of the Neurodiversity Movement' in: *Health Care Analysis* 20.1 (2012) 20-30.
333 Ortega, F., 'The Cerebral Subject and the Challenge of Neurodiversity', 436.
334 Silverman, C., 'Brains, pedigrees and promises. Lessons from the politics of autism genetics', In ed. Gibbon, S. Novas, C., *Biosocialities, genetics and the social sciences. Making biologies and identities* (London 2008) 38–55. Ortega, F., 'The Cerebral Subject and the Challenge of Neurodiversity', 427.
335 Ortega, F., 'The Cerebral Subject and the Challenge of Neurodiversity', 433.
336 Ortega The Cerebral Subject and the Challenge of Neurodiversity', 433.
337 Ortega The Cerebral Subject and the Challenge of Neurodiversity', 434.

What made the differences between both groups especially tense is that for many activists of the anti-cure movement it was also a matter of their legal status, the rights embedded in one's legal personhood.[338] A group of anti-cure activists therefore petitioned the United Nations in 2004 in order to get autists 'recognized as a minority social group' and gain a political protected status against 'discrimination' and 'inhuman treatment'.[339] As Ortega notes, this fits in the rather radical initiatives of some autism self-advocates who in the late 1990's began framing research and therapies as an 'intolerance towards differences' or even as the 'promotion of eugenic and genocidal policies'.[340] Although some prominent anti-cure activists including Judy Singer said that they would find 'treatment acceptable as long as it did not change the personality', this hardly meant anything, seeing the subjective nature of defining what exactly makes up ones 'personality' and the fact that most anti-cure activists defined autism as a fundamental characteristic of their shared identity.[341]

2.7 Assessing the Decade of the Brain: funding, science and progress

For most scholars who attributed significance to the Decade of the Brain as the beginning of the dominating position of the neurosciences, the sharp increase in neuroscientific funding represents the most important proof.[342] The NIMH and NINDS from 1990 to 2000 indeed funded 140 neuroscientific research projects in the context of the Decade of the Brain., Moreover, while the portion of PhDs granted by the National Institute of Health by the mid-1990s were still equal to psychology, some of which still included brain and behavioral studies, by the early 2000s there were twice as many PhD's funded in neuroscience as in psychology. At the same time, funding for the research into treatment of mental health problems, as Tami Mark has shown, in fact grew slower than other funding of health care research in the 1990-2000 period.[343] More so, as he and others have noted, this gradual increase in funding already began in the 1970s. Thus, it was at most was the gradual continuation of an older trend.[344] More than that, many prominent neuroscientists, the DANA-foundation, Society of Neuroscience and NAMI were by the late 1990s openly displaying frustrations about the lack of increased funding.[345]

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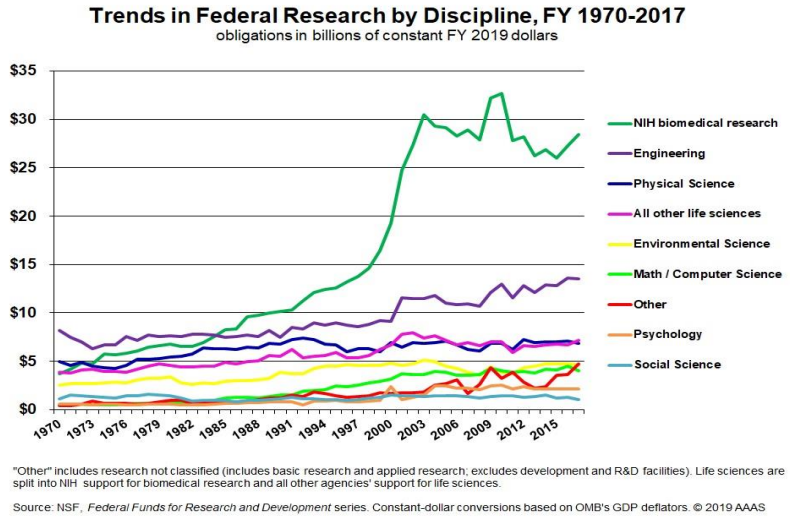
338 Ortega The Cerebral Subject and the Challenge of Neurodiversity', 434.
339 Additionally, there were several attempted court cases in the United States about the question if treatment for autism should be governmentally subsidized or if these attempts to cure in fact went against the rights of persons with autism. Ortega, F., 'The Cerebral Subject and the Challenge of Neurodiversity', 429. Nelson, A., 'Declaration from the autism community that they are a minority group' (2004). http://www.prweb.com/releases/2004/11/prweb179444.htm
340 Ortega, F., 'The Cerebral Subject and the Challenge of Neurodiversity' 429.
341 Ortega The Cerebral Subject and the Challenge of Neurodiversity', 430.
342 NIH Data, 'Trends in Major Fields of Study of NIH-Supported Ph.D. Recipients. Between 1993-2017', in: https://report.nih.gov/nihdatabook/report/267?showm=Y&chartId=267&catId=21
343 Mark, T., 'U.S. Spending for Mental Health and Substance Abuse Treatment, 1991–2001', in: *Health Affairs 24* (2005) 133-142.
344 Frank, R., Glied, S., 'Changes In Mental Health Financing Since 1971. Implications For Policymakers And Patients since 1971', in: *Health Affairs* 25.3 (2006) online: https://www.healthaffairs.org/doi/full/10.1377/hlthaff.25.3.601
345 Tandon, P.N., 'The decade of the brain : a brief review', in: Neurology India 48.3 (2000) 199-207.

This frustration was on the one hand about the absence of an increase in federal funding. On the other hand, it was seemingly even more about the way in which governmental institutes such as the NIMH, which received the vast majority of funding, spent that funding. In 1999, NAMI published the critical report 'A Mission Forgotten: The Failure of the National Institute of Mental Health To Do Sufficient Research on Severe Mental Illness', in which they blamed the NIMH for failing to live up to their original promises with which they set out the Decade of the Brain.[346] As the report noted, although the NIMH had promised Congress that extra funding would deliver the 'cure' for mental illness, most funding did not go to research of these cures.[347]

In their analysis of NIMH research funding they showed that 'only 33.2 percent of NIMH's 1997 research awards had any relevance for serious mental disorders and only 7.8 percent were directed to clinical and treatment aspects of these disorders'.[348] In 2003, a large coalition of critical neuroscientists similarly criticized the fact that while the NIMH budget doubled from 1997 to 2002, from $661 million to $1.3 billion, actual funding for research into the 'cures for severe disorders' dropped from 31% to 28%.[349] Among the examples of studies which according to the neuroscientists had no 'value for understanding mental illnesses', were research grants on 'how people in Papua New Guinea think' as well as '18 different studies' on Pidgeon behavior and brains, including a 208,931 dollar study on Pidgeon learning. This research was made possible, as they angrily wrote, while funding for 'trials to improve the treatment of schizophrenia' was refused.[350]

346 Tandon, P.N., 'The decade of the brain : a brief review', in: Neurology India 48.3 (2000) 199-207.
347 Tandon, P.N., 'The decade of the brain : a brief review', in: Neurology India 48.3 (2000) 199-207.
348 Torrey EF, Gottesman II, Davis JM, Knable MB, Zdanowicz MT., 'Missions Impossible. The Ongoing Failure of NIMH To Support Sufficient Research on Severe Mental Disorders (Arlington 2000). Torrey EF, Knable MB, Davis JM, Gottesman II, Flynn LM., 'A Mission Forgotten: The Failure of the National Institute of Mental Health To Do Sufficient Research on Severe Mental Illnesses' for , Va.: *National Alliance for the Mentally Ill* (Arlington 1999).
349 Mentioned disorders and illness as schizophrenia, mood disorders, panic disorders, compulsive disorders, bipolar and depression. In 2000, another organization, the Treatment Advocacy Center, published a similarly critical report on the 'The Ongoing Failure of NIMH To Support Sufficient Research on Severe Mental Disorders', noting that despite promises of several top NIMH administrators in the mid-1990s, there had been 'no improvement in the percentage of the funding for research into severe mental disorders'. See: Torrey EF, Knable MB, Davis JM, Gottesman II, Flynn LM., *Federal Failure in Psychiatric Research: Continuing NIMH Negligence in Funding Sufficient Research on Serious Mental Illnesses* (2003) 11
350 *Federal Failure in Psychiatric Research: Continuing NIMH Negligence in Funding Sufficient Research on Serious Mental Illnesses* (2003) 11.



From the 1990s there was a general increase in funding of the NIH biomedical research, under which institutes as the NIMH and NINDS also belonged.[351]

Whereas it thus seems that at least for the NIMH the original promises were not translated into a focus on funding mental health research; neuroscientists in their 'assessments of the decade' nonetheless primarily focused on the scientific achievements in the research into mental illness. The past decade, scientists at a concluding event claimed, 'delivered more advances than all previous years of neuroscience research combined.' While some of them, such as as Richard Hodes, director of National Institute on Aging, questioned whether the 'same [scientific] progress would have occurred' without the 'banner' anyway; most seemed to have been satisfied with the apparent rise of public attention due to the campaign.[352] Neuroscientists Edward Jones and Lorne Mendell noted towards the end of the 1990s in *Science* and *Nature* that the greatest achievement was the 'extraordinary increase in the visibility of neuroscience'.[353]

Neuroscientist Joseph Martin likewise concluded that seeing the goals that were set at the beginning of the 1990s, the Decade of the Brain 'on average scored a B+'.[354] Still, the ambitious promises with which the Decade was launched; the claim that by the end of the 1990s there would have been found 'cures' for mental illness which would relieve the 'financial burden', were not fulfilled. It is then also rather fascinating that Martin concludes his 'evaluation' with the promise that 'new and more effective treatments for many of these brain

351 *Federal Failure in Psychiatric Research: Continuing NIMH Negligence in Funding Sufficient Research on Serious Mental Illnesses* (2003) 33.
352 Lewis P. Rowland, concluded later 'the goal to enhance NIH funding for neuroscience did not materialize', in: Rowland, L.P., *NINDS at 50: an incomplete history celebrating the fiftieth anniversary of the National Institute of Neurological Disorders and Stroke* (Washington 2001) 142-145.
353 Only the US-budget for research into brain disorders would already exceed 3 billion dollar in 1999. Jones EG., Mendell L.M., 'Assessing the decade of the brain', in: *Science* Vol. 284, Issue 5415 (1999) 739. Online: https://science.sciencemag.org/content/284/5415/739 and https://www.nature.com/articles/nn0699_487
354 Martin, J.H., 'On Average the Decade of the Brain scores a B+', in: *Delivering results a progress report on brain research update 2000. Brain research in the new Millennium* (Washington 2000) 6-9.

diseases are certain to appear in the first decade of the twenty first century'.[355] This is maybe especially intriguing knowing in hindsight that these new promises, as of today, still remains largely unfulfilled.

2.8 The adaption of the Decade of the Brain campaign around the globe

The success of the Decade of the Brain as an American science project could arguably be mostly detected in how other states and international organizations reacted to it. It was almost directly endorsed by many prominent international organizations such as the United Nations (UN), World Health Organization (WHO) as well as transnational organizations in neuroscience and followed by many states with their own local, yet largely identical, projects.[356] While the planning of the initiatives of large states including China, India and Japan likely began soon after the proclamation in the early 1990s, they would only formalize in the later part.[357] In 1997 Japan announced that it would integrate neuroscience in its Human Frontier Science program and additionally that it would locate a yearly budget for neuroscientific research, starting with 125 million dollars and increasing this to around 700 million by 2002.[358] Similarly to Japan, India already in 1995 and China in 1998, announced dedicated budgets for neuroscientific research as well as the founding of their own national neuroscience research institutes.[359] While this thesis is too short to go into depth about these and other national initiatives, let alone make a full comparison, the initiative of the European Union and the Netherlands will receive somewhat more attention because they highlight both the defining role of the American Decade, as well as the local variations.

Even before that the European Union was formally established through the ratification of the Maastricht Treaty in November 1993, the European Parliament on July 10 had unanimously called on the European Commission and Council of Ministers to set up a campaign similar to the American Decade of the Brain within the framework of the Program of Research and Technology Development. The lobbying for a European version of the Decade of the Brain appears to have been the responsibility of the European College of Neuropsychopharmacology (ECPN), rather than that of the national organizations.[360] This

355 Society for Neuroscience, 'Neuroscience 2000: a new era of discovery', *Symposium organized by the Society for Neuroscience in Washington*, D.C., 12–13 April 1999 (April 1999). https://www.nature.com/articles/nn0699_487
356 Mendlewicz, J., Report of the ad hoc Task Force of the European Decade of Brain Research by. Decade of the Brain in Europe', in: European Neuropsychopharmacology, 2 (1992_) 475-479, 476.
357 Tandon, 'The decade of the brain: a brief review' 198.
358 125 million yearly budget that would increase 5 year, and the founding of the Brain Science Institute at Riken of 61 million. Tandon, 'The decade of the brain: a brief review' 199.
359 Tandon, 'The decade of the brain: a brief review' 199. Normile D., 'Japanese neuroscience. New institute seen as brains behind big spending', in: *Science* 14.275 (1997) 1562-1563.
360 Gispen, W.H.., 'Towards the European Decade of Brain Research', in: *European Neuropsychopharmacology* 3(3) (1993) 179-180.

explains why the Task Force that was established by the Commission to set up the outlines of a European campaign, possibly even more than in the US, focused on how extra funding for neuroscience had to stimulate the cooperation between private 'industrial' research and public institutions.[361] Under the leadership of Professor Julien Mendlewicz, they followed the example of neuroscientific organizations in the United States. This meant focusing on how neuroscientific research would 'improve treatment, prevention and rehabilitation of nervous and mental disorders' and by doing so, how it would, 'reduce the 'economic burden' of mental disorders.[362] In September 1992 the 'European decade of brain research' was finally launched by Vice-President of the Commission of the European Communities, Filippo Maria Pandolfi and the queen of Belgium.[363]

While a large part of the outline of the European Decade thus followed the example set by the United States, both in its rhetoric as well as in form; it was largely shaped by the context of the European political situation of the 1990s.[364] Neuroscientists and organizations lobbying for the support of the European Union for example repeatedly highlighted the necessity of European cooperation within a transnational organization such as the EU.[365] A cooperative European neuroscience project was a necessity because, as Dutch neuroscientist W.H. Gispen wrote, the 'health authorities of our governments' alone would not be able to finance research and to reduce the 'economic burden of brain disorders'.[366] Gispen argued that a single European state was 'too small' and 'only Europe as an entity can compete in this field with the major efforts being mounted elsewhere'. Mendlewicz similarly noted that 'Europe' was already 'behind the American and Japanese initiatives', and that 'unless a decisive effort is made by European Science organizations' to make a 'collaborative effort' a 'brain drain' would take place, with European neuroscientists leaving for abroad.[367]

There were however also clear scientific benefits of organizing a European campaign instead of several national ones, according to representatives as Gispen and Mendlewicz.[368] As Gispen argued, by uniting neuroscientists under one banner they would simply have more research data: 'particular abnormalities are frequently more prevalent, or have been better collected, in different national and ethnic populations'. Similarly, one of the originally formulated goals of the European Decade was organizing the 'training' and education of neuroscientists under the banner of the European Union for 'training at the national level may

361 Gispen, W.H.., 'Towards the European Decade of Brain Research', in: *European Neuropsychopharmacology* 3(3) (1993) 179-180.
362 Olesen J, Baker MG, Freund T, di Luca M, Mendlewicz J, Ragan I, Westphal M., 'Consensus document on European brain research', in: *Journal of Neurological Neurosurgery and Psychiatry* 77.1 (2006) 1-49.
363 Towards the European Decade of Brain Research Gispen, W.H.. European Neuropsychopharmacology 3(3): 179-180 1993.
364 EU Commission, 'Inaugural Session by: Vice-President F.M. Pandolfi Commission of the European Communities European decade of brain research', in: Italian Journal of Neurological Science 14. (1993) 395-397.
365 Gispen, W.H.., 'Towards the European Decade of Brain Research', in: *European Neuropsychopharmacology* 3(3) (1993) 179-180.
366 Gispen, W.H.., 'Towards the European Decade of Brain Research', in: *European Neuropsychopharmacology* 3(3) (1993) 179-180.
367 Gispen, W.H.., 'Towards the European Decade of Brain Research', in: *European Neuropsychopharmacology* 3(3) (1993) 179-180.
368 Gispen, W.H.., 'Towards the European Decade of Brain Research', in: *European Neuropsychopharmacology* 3(3) (1993) 179-180.

be difficult to mount adequately especially in the smaller member states'.[369] 'Talented' neuroscientists of the various member states further had to be able to compete and gain research grants and fellowships directly within the 'framework' of the European Union, as well as work on collaborative projects in a yet-to-be founded research facility called European Centralized Facilities for Brain Research.

Despite this clear effort to come up with a European version of the American Decade of the Brain, most European states seem to have ultimately opted for their own national projects instead. As Rose and Abi-Rached have highlighted, the United Kingdom like India, China and Japan founded its own dedicated national neuroscience research institute with the Functional Imaging Laboratory in 1994 and several other university institutes in the latter 1990s.[370] The German 'Dekade des menschlichen Gehirns' only began in April 2000, most likely because first attempts were made to work under a European framework and also because of the focus on the integration of Eastern European scientific institutes with West-Germany. The German Decade overall however seemed to have little direct political backing with Wolfgang Clement, the President of the state of North Rhine-Westphalia, being the highest-placed politician involved.[371] Much of the campaign itself was legitimized as an attempt at the recovery of a backlog in neuroscientific research, with fewer mentions on combatting rising mental health costs.[372] The campaign additionally focused on creating public awareness, and saw the involvement of famous scientists such as physiologist and Nobel Prize Winner Bert Sakmann (Heidelberg) and the Director of the Klinik für Epileptologie of the University of Bonn, Christian Elger.[373]

2.9 The Dutch Decade of the Brain. Similarities and differences

Despite the fact that the Dutch campaign too resembled the American one on many points, more than other European countries it seemed to have differentiated from it on four major points. Firstly, while the Dutch campaign was the initiative of the Brain Foundation (Hersenstichting) that was founded in 1989 and the national Organization for Scientific Research (NWO, De Nederlandse Organisatie voor Wetenschappelijk Onderzoek), overall the

369 Gispen, W.H.., 'Towards the European Decade of Brain Research', in: *European Neuropsychopharmacology* 3(3) (1993) 179-180.
370 As they summarize: 'key moments here were the establishment of the Functional Imaging Laboratory (now the Wellcome Centre for Neuroimaging) in 1994, the Institute of Cognitive Neuroscience in 1996, the Gatsby Computational Neuroscience Unit in 1998, and the Centre for Behavioural Neuroscience in 2007. In Cambridge, the interdisciplinary Research Centre for Brain Repair was established in 1992, a neuroimaging centre opened in 1997, and the Brain Mapping Unit in 1999'. See: Abi-Rached, J. and Rose, N., 'The birth of the neuromolecular gaze', in: *History of the Human Sciences* 23.1 (2010) 11–26.
371 Presentation about the 'accomplishments' of the German Decade of the Brain: https://slideplayer.org/slide/206164/
372 Presentation about the 'accomplishments' of the German Decade of the Brain: https://slideplayer.org/slide/206164/
373 Gabriel, M., *Ich ist nicht Gehirn. Philosophie des Geistes für das 21. Jahrhundert* (Berlin 2015).

campaign took a more grassroots approach.[374] The intention statement of the campaign that received the name 'Brain Work' (Hersenwerk) and was launched in 1992, was signed by over 30 organizations of four general types: patient advocacy movements, professional associations, scientific institutions and fundraisers, would participate.[375] Together these different organizations held yearly meetings where they would discuss and prepare new advertisement and media campaigns, the content of the yearly 'day for the public', as well as lobbying for specific 'diseases and disorders of the brain'.[376] While there were some politicians involved in the campaign: former Minister of Economics Jan Terlouw was the chairmen and Els Borst-Eilers was member of the committee until she became Minister of Health Care in 1994; the main initiative thus was planned and carried out by non-governmental organizations.[377] The multiorganizational basis of the Dutch campaign created some clear problems, for example, as internal competition occurred between patient organizations and fundraisers for subsidies and funds. Yet, ultimately, it seemed to have been more effective in gathering public and grassroots activist support and this was something which the American initiative, according to many American neuroscientists at the time, lacked.[378]

Secondly, the 'promotion' of neuroscientific research through funding was from the beginning just one of three aims which were called 'pillars' of the 'Hersenwerk 2002' campaign. Additionally, gaining extra funds for healthcare innovations and cures as well as 'informing and educating the public' on 'brain illnesses', were goals that were deemed of equal importance.[379] An example of neuroscientific research projects that was promoted within the framework of the campaign is the funding of 1 million euros for research of the University of Limburg (presently the University of Maastricht) into dementia (Alzheimer) and Parkinson that the Hersenstichting together with the NWO provided.[380] The campaign itself further used the media to urge neuroscientists to opt for 'direct and relevant research' into brain diseases, instead of 'more fundamental research' and criticized 'the attitude of science towards patients'.[381] As part of the 'educating the public pillar', the campaign opted for publicly

374 Nederlandse Organisatie voor Wetenschappelijk Onderzoek, Archief Hersenstichting, 'Speciale uitgave 10 jaar hersendecenium Hersenwerk 2002 bijlage A'.
375 Archief Hersenstichting, 'Speciale uitgave 10 jaar hersendecenium Hersenwerk 2002 bijlage A'.
376 In de proclamatie uit 1992 van het Nederlands Hersendecennium 'Hersenwerk 2002' stond: "Ruim eenderde van het budget voor volksgezondheid is bestemd voor hersen- en geestesziekten. Toch is de omvang van het wetenschappelijk onderzoek naar hersenaandoeningen (nog steeds) relatief klein. Ook is de zorg voor mensen met een hersenaandoening vaak niet toegesneden op de behoefte. De maatschappelijke acceptatie van mensen met een hersenaandoening is nog steeds
Archief Hersenstichting, 'Instalatie nationaal comite hersenwerk 2002, Dhr P.C. Beelaerts van Blokland in Den Haag op woensdag 10 juni 1992 voordracht'.
377 Archief Hersenstichting, 'lijst deelnemende organisaties Hersenwerk 2002'.
378 Goldstein M., 'Decade of the Brain. An agenda for the nineties'.
379 Archief Hersenstichting, 'doelstellingen hersenwerk 2002'.
380 Algemeen Dagblad, 'Onderzoek naar achteruitgang geheugen', (1992/09/09) online: http://resolver.kb.nl/resolve?urn=KBPERS01:003104008:mpeg21:p00005
381 Het Parool, 'Parkinson', (1993/04/17) online: http://resolver.kb.nl/resolve?urn=ABCDDD:010842515:mpeg21:p029 and Trouw, 'Samenleving Duistere Alzheimerclub deelt twee beurzen uit', (1994/07/27) http://resolver.kb.nl/resolve?urn=ABCDDD:010822846:mpeg21:p009

accessible conferences, television and radio shows, events of patient organizations as well as mailing postcards to ask for donations.[382] In April 1995 for instance, an open letter asking for donations was sent to 5 million addresses with the story of patients suffering from brain injuries.[383] The yearly 'brain weeks' that were taken over from the United States seemed to have generated most attention as they were covered extensively on television and radio.[384]

Thirdly, the Dutch campaign seemed to have more actively promoted neuroscientific discourses on brainhood, or the idea that the brain is of defining importance for who we are.[385] In 1994 a public campaign under the slogan 'you are your brain' ('je brein ben jezelf') was launched with several public TV and radio shows with high ranking 'mind sporters', such as chess-players, to highlight the importance of the brain for one's thinking capabilities.[386] Additionally, volunteers walked through the streets of The Hague and other Dutch cities with large balloons with a picture of brain and the slogan as well as distributed information folders.[387] These folders on the one hand spread information about the campaign, but also presented information on the brain which 'makes us what we are', is the 'seat of our consciousness and our ability to think' and what makes us different from other 'living beings'.[388] The two opening declarations of the campaign by former ministers Jan Terlouw and Pieter Beelaerts van Blokland are also clear examples of how this conviction was propagated. Beelaerts for instance argued that while the brain 'determines our physical and mental well-being', neuroscientific research into the brain was always controversial because 'the brain is closely connected to spirit and soul'. 'If you touch the brains', Beelaerts argued, then you 'touch the personality and the ground of existence of a person'.[389]

Fourthly, the Dutch campaign from the beginning had a strong focus on spreading neuroscientific knowledge of 'our most important organ' as a way to 'reduce the suffering' of people with mental disorders from stigmatization. Terlouw for example argued during one of the opening days of the campaign that neuroscientific knowledge causes the 'awe for the brain to diminish' and the 'magic to crumble' and that 'translating brain research' to the public would

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382 De Volkskrant, 'Denksporters ingeschakeld bij publiekscampagne Staatssecretaris stimuleert onderzoek hersenziektes', (1992/06/12) http://resolver.kb.nl/resolve?urn=ABCDDD:010866905:mpeg21:p006

383 De Volkskrant, 'Denksporters ingeschakeld bij publiekscampagne Staatssecretaris stimuleert onderzoek hersenziektes', (1992/06/12) http://resolver.kb.nl/resolve?urn=ABCDDD:010866905:mpeg21:p006

384 De Telegraaf, 'ons brein op radio en televisie' (10-04-1993). https://resolver.kb.nl/resolve?urn=ddd:010691835:mpeg21:a1551

385 Archief Hersenstichting, 'flyer Je brein dat ben jezelf'.

386 De Volkskrant, 'Denksporters ingeschakeld bij publiekscampagne'. (12-06-1992) https://resolver.kb.nl/resolve?urn=ABCDDD:010866905:mpeg21:a0131

387 Archief Hersenstichting, 'flyer Je brein dat ben jezelf'.

388 Archief Hersenstichting, 'Persbericht Geestelijk Onzelzijn'. Quote: 'Hersenen zijn meest ingewikkelde orgaan en belangrijkste want het maakt ons tot wat we zijn ons geweten zetelt er we leren er mee en we denken er'.

389 Original text in Dutch: 'Dit orgaan bepaalt bij uitstek ons lichamelijk en geestelijk welzijn' and 'Hersenen zijn nu eenmaal zeer nauw verbonden met begrippen als geest en ziel. Kom je aan de hersenen dan kom je aan de persoonlijkheid van het individu dan kom je aan de grond van je bestaan. Dat vinden we eng en we houden ons dus liever wat afzijdig van hersenonderzoek'. And: Hersendecenium moet 'lijden van veel van onze medeburgers met hersenaandoeningen verzachten. Alleen al door ze de aandacht te geven die ze verdienen. Meer inzichten in de werking van het belangrijkste orgaan van hun lichaam maar ook meer begrip, huidig onbegrip voor de medemens wordt lijden versterkt en dat is niet toelaatbaar'. Zie: Archief Hersenstichting, 'Installatie nationaal comite hersenwerk 2002, toespraak voor staatsecretaris en parlement. Beelarts Blokland Den Haag woensdag 10 juni 1992'.

lead to ‘greater acceptance’ and ‘prevent’ stigmatization and ‘suffering’ of people with mental disorders.[390]

Thus, the fourth national brain week (31 March to 7 April 1996) had as its theme ‘the confused brain’ (‘hersenen in de war’) and explained the brain as a ‘chemical factory’ and people with mental disorders as having a problem or ‘confusion’ in their personal factory. ‘Deviations in behavior’ and ‘psychological illnesses such as schizophrenia, depression and anxiety disorders’ were explained to be solely the result of a ‘disorder in the production and breakdown of chemical substances’ as ‘so-called neurotransmitters’ in the brain, and not the person’s or societies fault.[391] Social misconceptions about these mental problems were at the same time argued to be the result of a ‘lack of knowledge about these disorders and the functioning of the brain’ and on the other hand because ‘parts of society have problems with the brain and brain research’.[392] The fundamental assumption underlying these initiatives is thus clearly that spreading neurobiological knowledge about the importance of the brain for personal identity and mental health would ultimately reduce social stigmatization on mental health disorders. At the same time, it is likely that these ambitions ultimately led to different or even conflicting interpretations of the meaning of disorders for one’s personal identity under diagnosed or stigmatized communities. Were they to be cured, or to be accepted?

390 Dutch translation: ‘Minder bevreesdheid voor oorzaken gevolgen hersenaandoeningen. Ontzag voor de hersenen lijkt af te nemen, de magie begint te verbrokkelen. Niet alleen meer zorg maar ook grotere acceptatie in de maatschappij dat veel leed kan voorkomen’. Archief Hersenstichting, ‘Installatie nationaal comite hersenwerk 2002.

391 Likewise, an information flyer titled ‘mental (non)wellbeing’ (‘geestelijk (on)welzijn’) argued that ‘patients with schizophrenia, depression, fear, phobia or addiction’ suffered from a ‘disruption of brain functions’. Original text of the quote: ‘Hersenen zijn een soort chemische fabriek met talloze chemische stoffen zogenaamde neurotransmitters. Stoornissen in de aanmaak en afbraak van zulke chemische stuffen zijn de oorzaak van afwijkingen in het gedrag en kunnen mogelijk leiden tot psychische ziektebeelden als schizofrenie, depressie en angststoornissen. De hersenen zijn dan in de war. And about Schizofrenie: door medicijnen kan een deel zich redelijk niveau handhaven in maatschappij, medicatie voor depressie waarom de nu toegepaste medicijnen de klachten wegnemen is onbekend.’ Archief hersenstichting, ‘Installatie nationaal comite hersenwerk 2002’.

392 Archief Hersenstichting, ‘Persbericht Geestelijk Onzelzijn’.

Epilogue. Past's promised futures. Neuroscience and critique

In the early morning of 21 February 1990, 24 metal and wooden coffins filled with scientifically prepared brain slices were symbolically buried in Munich's Waldfriedhof cemetery.[393] It were the parts of some of the 700 unnamed victims of the euthanasia program of Nazi-Germany, in which an estimated 300.000 people who were deemed as mentally or physically useless, as a 'burden', were murdered between 1939 and 1945.[394] Nazi authorities had first planned to burn and burry the remains of victims of this 'T4-program', but after brain scientists protested against the 'loss of valuable research material', the brain parts were used both for experiments during the Nazi-era, and afterwards in laboratory research at the Max Planck Institute (MPI) until at least the middle of the 1980s.[395] Although the responsible professors at the MPI on that day had decided to do the burial in the early morning, in order to prevent a large coverage by the press; they repeatedly declared that they did not want to bury their ethical responsibility and that of neuroscience as a whole, together with the brains of these victims. The large memorial stone on the gravesite which was erected 'in memory of the victims of National Socialism', therefore as well specifically mentioned the 'abuses by medical researchers' and gave a 'warning call' to future 'scientists to engage in responsible self-limitation' ('Verantwortlicher Selbstbegrenzung').[396]

The burial should be seen as a highly symbolic act that represented two developments in neuroscience in the first year of the Decade of the Brain. Firstly, it highlights the increasing spread of the conception of Brainhood, or that humans are essentially their brains. It were not just remains of the unnamed victims of the Nazi's that were buried that day, it were the human victims itself. Where neuroscientists had continued to use these brain slices for decades, because they likely did not identify these brain parts as an individual human beings, in the 1990s that attitude had clearly changed. Secondly, the burial, the memorial stone and the

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393 Neumann, C., 'Präparate von Nazi-Opfern Gehirne in der Gerümpelkammer', in: *Der Spiegel* (March 2017) https://www.spiegel.de/spiegel/euthanasie-im-ns-funde-im-max-planck-institut-muenchen-a-1137219.html

394 According to an article in Quartz media, Erin Schuman, managing director of the Max Planck Institute in 2015, stated, "Hallervorden used the brains for his research up into the 1960s, and some of his immediate successors likely continued using those brain samples well beyond the 1960s." Schuman explained that in 1990, remaining brain tissue samples were laid to rest in Munich's Waldfriedhof cemetery. In the 1980s still show that the brains of about 700 Euthanasia (and according to Israeli media possibly holocaust victims) were kept in former German brain research institutes and even used in experiments until at least the late 1960s and all eventually symbolically buried in the 1990s. Haaretz, 'Munich Scientific Institute Finds Remains of Brains From Nazi Experiments on Humans', (September 1 2016). https://www.haaretz.com/jewish/munich-scientific-institute-finds-remains-of-huamn-brains-from-nazi-experiments-1.5433746 Kelly Kim, B., 'Unraveling the Mysteries of Nazi Brain Research', in: Labroots (October 4 2017) https://www.labroots.com/trending/neuroscience/7032/unraveling-mysteries-nazi-brain-research

395 MPG, 'A new approach to dealing with the past. Burial of brain specimens at Munich's Waldfriedhof Cemetery' (1990) https://www.mpg.de/956456/35_event24-1990

396 Erin Schuman, managing director of the Max Planck Institute in 2015, stated, "Hallervorden used the brains for his research up into the 1960s, and some of his immediate successors likely continued using those brain samples well beyond the 1960s." Schuman explained that in 1990, remaining brain tissue samples were laid to rest in Munich's Waldfriedhof cemetery. On the large stone was written 'zur erinnerung an opfer des Nationalsozialismus und ihren missbrach durch die medizinallen forschern als mahnung zu verantworlicher selbstbegrenzung'. See: Neumann, C., 'Präparate von Nazi-Opfern Gehirne in der Gerümpelkammer', in: *Der Spiegel* (March 2017) https://www.spiegel.de/spiegel/euthanasie-im-ns-funde-im-max-planck-institut-muenchen-a-1137219.html

statements at the time of influential neuroscientists such as Wolf Singer and MPI director Heinz Wässle who called for 'self-restrain in scientific research' and the attention paid to the political aspects of neuroscientific research, show that neuroscientists were increasingly occupied with the ethical consequences of knowledge.[397]

The statements of self-restraints were more than a call directed at scientists, therefore they should be seen as a promise to society that neuroscience had learned from its dark past and adapted more ethical standards of self-responsibility. It suggested that neuroscientists would not just think twice before conducting research and take into account the potential missuses, but also that it would pay attention to the relationship between their scientific promises and the potential political abuses. After all, it were these promises rather than actual knowledge or technology that were responsible for the dark pages of neuroscience employed by the Nazi-regime. Neuroscientific promises, rather than actual 'technological inventions' or scientific breakthroughs, shaped the political support and employment of neuroscience in the policy towards people with mental illness and disorders from its institutionalization in the 19th century.

I The emergence of Neuroethics in the Decade of the Brain

Today we know that this original promise of the prominent Max Planck Institute for Brain Science in first year of what would become the Decade of the Brain did not come to characterize the by then internationally emerging thinking about the neuroscience and ethics. It therefore represents only a moment of discontinuity and depending on one's perspective, a failed potential.[398] The field of neuroethics that began to be formalized in the 1990s was based on the conviction that neuroscience required a complete new set of ethical considerations that could not be answered by established fields such as bioethics or medical ethics. As authors including Vidal have argued, the 'raison d'être of neuroethics' from its beginning therefore was found primarily by neuroscientists themselves in the alleged ethical potentials, the promised futures of neuroscience, rather than in its past or present.[399]

The institutionalization of the field of neuroethics can be traced to a 2002 conference organized by the Dana Foundation where neuroscientists, law specialists and commentators affiliated to neuroscientific research organizations met to 'to project the boundaries, define the issues, and raise the initial questions appropriate to a field that probes the ethical implications

397 Neumann, C., 'Präparate von Nazi-Opfern Gehirne in der Gerümpelkammer', in: *Der Spiegel* (March 2017).
398 Vidal F., 'What makes neuroethics possible?', in: *History of the Human Sciences* 32.2 (2019) 32-58, 35.
399 Roskies,A., 'Neuroethics for the New Millennium. Mapping the Field, Conference Proceedings' in: *Neuron* 35,21–23 (May 13-14 2002).

of advances in brain science'.[400] The word 'neuroethics' is often credited to the talk of New York Times columnist William Safire, who as the previous chapter noted was one of the media-personalities that the DANA Foundation contracted to 'bring the Decade of the Brain to the public'.[401] The proceedings of the conference itself are interesting for they show that although Safire and other participants defined Neuroethics as 'a distinct portion of bioethics', the promised 'ethical neuroscience' takes a fundamental different turn compared to most thinking about science and ethics at the time.

Where the landmark Uppsala Code of Ethics for Scientists of 1981 for instance starts from the principle that the 'individual scientist is (at least partly) responsible for the consequences of her/his research' as well as the 'use in society by others', neuroethics takes a completely different starting point.[402] Neuroscientists, according to the conference participants, merely had to sketch the 'future possibilities of brain research' in the 'consciousness of society' and then through a 'clash of values' come to a decision if this research was 'ethically unwanted'.[403] Neuroethics in that sense delegated the responsibilities from the individual scientist to this undefined 'society'. In practice however, this 'society' seemed mostly to have meant its 'representatives', the governments who were deciding over regulations as well as funding.[404]

Former director of the INDS (US Institute of Neurological Disorders and Stroke) and one of the primary organizers of the Decade of the Brain, Zach Hall, in this context argued that there were two areas where these 'ethical predictions' of neuroscientists should focus at. Firstly, they should prospect how the brain could be altered on the 'long-term', and secondly how the treatment of children and people with disabilities or 'psychiatric illness or addictions' would change with more knowledge of the brain.[405] Neuroscientist and director at the NIMH (National Institute of Mental Health) Steven Hyman specified this last prospect by noting that neuroscience would not just be able to 'treat illness' but also 'prevent it or intervene early by children'.[406] Neuroethics in turn was raising, but ultimately also answering, questions such as if 'there is an ethical or moral difference between lowering cholesterol levels and altering neurotransmitter levels?' In the mind of these neuroscientists, neuroscience thus on the one

400 It was indeed the neuroscientific promise of the discovery of the relationship between brain and mind, of the all-determining role of the brain for 'individual identity' and the 'social structures that we inhabit and create' that as Vidal argues ultimately made neuroethics 'possible'. Vidal F., 'What makes neuroethics possible?' 33.
401 In his opening statement, Safire figuratively compares neuroscientists to Prometheus and the knowledge of the brain like fire in the Greek mythology, giving 'man godlike powers'. Neuroethics, he suggests, is necessary for taking away the 'fear of playing God', in society's 'new enlightenment'. Safire, W., 'A columnists Farewell. Never Retire', in: *New York Times* (2005) online: https://www.nytimes.com/2005/01/24/opinion/never-retire.html
402 Gustafsson, B., Lars Rydén, L., et al. 'The Uppsala Code of Ethics for Scientists', in: *Journal of Peace Research* 21.4 (Nov 1984) 311-316.
403 Dana Foundation, 'Neuroethics. Mapping the Field. Conference proceedings' (July 2002) https://dana.org/article/neuroethics-mapping-the-field/
404 Dana Foundation, 'Neuroethics. Mapping the Field. Conference proceedings' (July 2002).
405 Dana Foundation, 'Neuroethics. Mapping the Field. Conference proceedings' (July 2002).
406 Dana Foundation, 'Neuroethics. Mapping the Field. Conference proceedings' (July 2002).

hand promised future knowledge on the treatments of mental illnesses and disorders to gain political support and funding, but on the other hand had also to 'sketch the potentials that possibly gave ethical concerns' and then let the same political institutions decide.[407]

What makes the lack of differentiation between these promised futures and ethical considerations about future research outcomes so striking, is that Neuroethics itself was openly defined as a way to advance neuroscience's position in society and politics. In that sense, even 'predictions of ethical concerns', in certain political contexts functioned as promised future knowledge for political use.[408] Neuroscientist Judy Illes for instance argued that neuroethics served to move 'age-old debates about mind and brain towards modern theoretical discussions about the understanding of human behavior enabled by advances in neurosciences'.[409] The emergence of the field of neuroethics should therefore be understood as part of the Decade of the Brain campaign rather than as a consequence, as critical analysis by Vidal, Leefmann and Hildt and Littlefield and Johnson also suggest.[410] At the same time, this does not mean that neuroethics only emerged in the context of the Decade of the Brain campaign. Rather, the emergence and development of neuroethics and the question of what precisely was included within this field and what was not; was characterized by wider developments in the 1990s and neuroscience (and thereby neuroethic's) relation with neoliberal governance.[411]

II Neuroscientific knowledge and critique in the The Science Wars

The 1990s saw a series of intense debates between scholars from the humanities and social sciences with natural scientists about the nature of scientific knowledge as well as about larger issues such as the idea of scientific progress and the position of scientific knowledge in society. This series of debates subsequently became known as the Science Wars. Natural scientists taking on a 'realist' position argued that scientific knowledge was both objective: not influenced by the subjective, social position of scientists, and 'real': able to represent study objects directly. Their counterparts from the humanities and the by sociology-inspired Science and Technology studies argued, to various degrees, that scientific theories are socially constructed and that scientific objectivity is relative and time, spatial dependent.

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407 Dana Foundation, 'Neuroethics: Mapping the Field. Conference proceedings' (July 2002).
408 Vidal, 'What makes neuroethics possible' 36-40.
409 Illes, J. 'Empowering Brain Science with Neuroethics', in: *The Lancet* 376 (2010) 1294–1295.
410 Vidal for this reason speaks of a 'organic alliance between neuroethics and neuroscience' in attempting to spread neuroscience as an 'interpretative framework for virtually every part of human life' as well as 'the application of neuroscientific concepts, methods and theories in the social sciences and the humanities'. Leefmann, J. and Hildt, E., 'Neuroethics and the Neuroscientific Turn', in L. S. Johnson and K. S. Rommelfanger (eds) *The Routledge Handbook of Neuroethics*. (New York 2017) 14–32. Littlefield and J. M. Johnson (eds) The *Neuroscientific Turn: Transdisciplinarity in the Age of the Brain* (Ann Arbor (2012) 180–98. Vidal, F.. 'What makes neuroethics possible?' 33, 37.
411 Vidal, F.. 'What makes neuroethics possible?' 34.

These debates extended to neuroscience at a time when the field was increasingly able to claim a position of social and political relevance through the Decade of the Brain. While the Science Wars today are seen as a rather one-sided attack of natural scientists on what they deemed as the 'relativism of leftist post-modernism' and in return the defense coming from the social sciences and humanities; the debates about neuroscience were characterized by reproaches back and forth.[412] As Tara Mahfoud notes, it is for example 'notable that many pioneers of Science and Technology Studies' as Bruno Latour and Steven Woolgar (1979) and Michael Lynch (1985) opted to conduct critical fieldwork on the social constructive elements in scientific practice in the 1980s in neuroscience laboratories specifically.[413] Whereas they focused primarily on the influence of technology, others, such as Dumit (2004) would also question and criticize the way neuroscientists select their research subjects and 'make individuals representative of a group'.[414]

It were however mostly philosophers and scholars from the humanities who in the 1990s clashed with neuroscientists in public debates about the nature of neuroscientific knowledge and the position of neuroscience in society, and thereby played an essential role in the 'surface of emergence' of neuroethics.[415] There seems to have been two primary points that caused debates.

Firstly, the neuroscientific claim of scientific progress, or that neuroscientific research would replace philosophical inquiries into consciousness, mind and the mind-body problem.[416] German-American neuroscientist Christof Koch for instance repeatedly argued that the 'historical record of philosophers is pretty disastrous' for not being able to solve the mind-body problem.[417] Similarly, prominent neuroscientist and Nobel prizewinner Gerald Edelman argued in 1992 that philosophy has 'attempted' to understand the mind since 'immemorial, but it just won't do'.[418] That philosophers claimed that neuroscience could not explain the functioning of the mind and consciousness either, according to them was 'ridiculous' in the light of the recent scientific progress on the understanding of 'life'. Nobel Prize winner Francis Crick similarly argued in his 1994 book 'The Astonishing Hypothesis' that as 'philosophers over the last two thousand years' had been unsuccessful in 'solving the problem of consciousness', they should

412 On the one hand neuroscientists increasingly presented neuroscience and its claimed use of the scientific empirical method as the way to go to discovering 'consciousness' and the 'mind', on the other hand did philosophers also attack the claims and positioning of neuroscience in general. Especially the role and 'knowledge' produced by technology as FMRI-scanners was a heavily contested issue.
413 Lynch, M., *Art and Artifact in Laboratory Science. A Study of Shop Work and Shop Talk in a Research Laboratory* (London 1985).
414 Mahfoud T., 'Extending the mind. A review of ethnographies of neuroscience practice', in: *Frontiers of Human Neuroscience* 6.8 (2014) 359.
415 As these debates spanned almost a decade, took place in different countries and over various, often not yet digitalized, media platforms, it is however hard to measure the exact impact of these debates.
416 Crick F, Koch C., 'Towards a neurobiological theory of consciousness', in: *Seminars in the Neurosciences* 2 (1990) 263–275.
417 Paulson, S., 'The Nature of Consciousness. How the Internet Could Learn to Feel', in: *The Atlantic* (2012) https://www.theatlantic.com/health/archive/2012/08/the-nature-of-consciousness-how-the-internet-could-learn-to-feel/261397/
418 Full quote: 'One of the temptations of having a mind is to try to use it alone to solve the mystery of its own nature. Philosophers have attempted this since time immemorial. […] As a general method to explore the matter of mind, it just won't do'. See: Edelman, R.J., *Anxiety theory research and intervention in clinical and health psychology* (Chichester 1992) 31.

'show a certain modesty' and, as he suggested, accept that their time was over.[419] Indeed, as he, Edelman, Koch and other prominent neuroscientists at the time repeatedly argued in the media, neuroscience would be able to solve the problems that philosophy had failed to do and bring 'true' progress for society. As Crick wrote, neuroscience soon would deliver the ultimate proof that 'you', that is 'sorrows, your memories and your ambitions, your sense of personal identity and free will', can be reduced to the 'behavior of a vast assembly of nerve cells and their associated molecules'.[420]

Philosophers such as Thomas Nagel ad David Chalmers on the other hand rejected the neuroscientific promise and argued that neuroscience would not be able to solve the problem of consciousness in either the near or far future.[421] Nagel already argued in his influential 1974 paper 'what is it like to be a bat', that consciousness, like all experiences, is subjective and unlike physical states, can't be reduced to 'physical functionalisms or made objective and generalized by science'.[422] Chalmers's formulation of the 'hard problem of consciousness' in the late 1990s created especially lively debate for it denied the possibility that consciousness, as a personal experience, could be understood *even* if neuroscience had explained and located 'all the relevant cognitive functions' in the brain.[423] Koch, unlike philosophers, believes that it is a temporarily problem that 'in principle is solvable' by the advancement of neuroscientific knowledge. As he once provokingly noted: 'just because some philosophers don't get it doesn't mean that this is true and we shall never know this'.[424]

The second topic where philosophers, scholars from the humanities as well as individual activists clashed with neuroscientists was neuroscientific research that linked the brain to characteristics of the personal identity of individuals. Especially neuroscientific research into the neurobiological basis of homosexuality, that before the 1990s was mostly seen as the result of environmental factors in early childhood, lead to widespread discussion in most Western countries. A reason for this was that research into topics that involved homosexuality were already controversial because of AIDS-pandemic that was going on at the time. As AIDS in this period mostly seemed to produce victims among gay men, researchers such as Norman Geshwind had made the explicit causal connection between homosexuality and AIDS that only later came to be refuted.

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419 Crick, F., *The Astonishing Hypothesis. The Scientific Search for the Soul* (1994) 3, 5-9, 258.
420 Crick, F., *The Astonishing Hypothesis. The Scientific Search for the Soul* (1994) 3.
421 Chalmers, D., 'Facing up to the problem of consciousness', in: *Journal of Consciousness Studies* 2.3 (1995) 200–219 and Weisberg, J., 'The Hard Problem of Consciousness', on: *Internet Encyclopedia of Philosophy* (2018).
422 Nagel, T., 'What is it like to be a bat?', in: *The Philosophical Review* 83.4 (1974) 435–450.
423 Chalmers, D., 'Facing up to the problem of consciousness', in: *Journal of Consciousness Studies* 2.3 (1995) 200–219.
424 While Koch does not represent the so-called 'strong reductionists' as well, who argue that all mental states and consciousness can be reduced, and explained, by research of the brain, his aversy against the philosophical method is still telling. Weisberg, J., 'The Hard Problem of Consciousness', on: *Internet Encyclopedia of Philosophy* (2018).

Even though the discussions on the 'gay brain' were international in the sense that various national discussions referred to the same research and followed roughly the same patterns, at the same time two national cases stood out for the scale and intensity of the controversy.[425] Firstly, in the Netherlands the research of neurobiologist Dick Swaab caused a controversy starting in 1989 and at its heights saw protests in front of his house, bomb threats to his institute and him personally receiving death threats. Secondly, in the United States the work of neuroscientist Simon LeVay caused debate from 1991 onwards. Both public controversies were notably in countries that saw the most prolific Decade of the Brain campaigns.

Dick Swaab was already a well-known scientists in the Netherlands as well as internationally for his research into Alzheimer, before a controversy broke out about his research into the 'differences in the brains of gay people'.[426] Although this study was only published in June 1989, its preliminary results were announced by Swaab in the magazine for scientists Academie Nieuws which led to an interview with the Dutch newspaper Het Parool on 4 February that year.[427] Swaab in quite difficult wordings explained that he had found a 'deviation' or difference that could 'possibly explain homosexuality' in the hypothalamus (a small almond-sized part in the middle of the brain) of passed away gay men. A salient detail considering the later discussion was that these victims had died from AIDS and gave up their bodies, including brains, for science possibly with the goal to further research into a cure for AIDS.[428] Most critics however likely only became angered after Swaab appeared that same night at Public Broadcaster NOS where he was asked if his 'discovery' meant that 'in the future there would be a pill against homosexuality'. Swaab elaborated rather vaguely on that 'potential', repeating several times that he was 'just doing research' and should be able to do so, without denouncing the potential political abuses outright.[429]

A large part of the criticism that Swaab received came from public organizations of gay people including the Gaykrant and 'Nederlandse Vereniging tot Integratie van Homoseksualiteit', COC, but noticeably many criticizers were scientists from the social sciences and humanities.[430] Rob Tielman, professor in gay studies in Utrecht, for instance

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425 Andere Tijden, 'De Knobbel van Swaab', (Februari 2009) https://anderetijden.nl/aflevering/282/De-knobbel-van-Swaab
426 Andere Tijden, 'De Knobbel van Swaab', (Februari 2009) https://anderetijden.nl/aflevering/282/De-knobbel-van-Swaab
427 Hofman MA, Goudsmit E, Purba JS, Swaab DF., 'Morphometric analysis of the supraoptic nucleus in the human brain', in: *Journal of Anatomy* 172 (1990) 259-70. Swaab DF, Hofman MA., 'An enlarged suprachiasmatic nucleus in homosexual men', in: *Brain Research* 24 (1990) 537.
428 De Telegraaf, 'Swaab had zijn hersenen moeten gebruiken' (07-02-1989) https://resolver.kb.nl/resolve?urn=ddd:010645466:mpeg21:a0323
429 The article and interview with the Parool would be the first publication, but the report of the NOS was likely the cause of the controversy. See: Andere Tijden, 'de Knobbel van Swaab', https://anderetijden.nl/aflevering/282/De-knobbel-van-Swaab Hofman M.A., Swaab D., 'The sexually dimorphic nucleus of the preoptic area in the human brain: a comparative morphometric study', 55–72.
430 One of the primary critics of Swaab was Henk Krol (currently representative in parliament) who at the time was chief editor of the *Gay Krant* (Gay Newspaper). In opinion articles in other newspapers he argued that making 'homosexuality a deviation in the brain' causes gay-people to 'go back into the closet' where they 'cannot be reached any longer with useful information about AIDS'. He further denounced that Swaab wanted to study the brain of gay-people and not that of heterosexuals, noting that this 'implicitly gives a judgement' about homosexuality. See: De Waarheid, ´COC betreurt publikatie hersenonderzoek' (06-02-1989) https://resolver.kb.nl/resolve?urn=ddd:010472093:mpeg21:a0015

argued that gay people, including himself, were 'suspicious' of neuroscientific research because 'the history' of research defining them as 'defiantly sick or unnatural'. Referring to the recent WHO-declaration that defined homosexuality no longer as a disorder, he argued that 'homosexuality was thought of as a 'curable disease' only a few years ago, and that homosexuals because of 'science' still 'get discriminated in most countries'.[431] According to Tielman and other scholars such as historian Douwe Yntema and biologist and women studies Nelly Oudshoorn (University of Amsterdam), Swaab therefore was not being conscious enough about the 'unforeseen consequences' of his promised discovery.[432] 'Scientists especially', Tielman wrote, 'can no longer afford to lock themselves up in an ivory tower and wash hands in innocence'.[433] J.G.P Best, formal chair of the Dutch Federation for Researchers FENO ('Federatie Nederlandse Onderzoekers'), went even further and accused Swaab of 'pseudoscience' and called the research 'nonsense'.[434] According to him it was clear 'to what this would lead': 'fifty years ago skull shaping was introduced to distinguish Untermensch from übermensch-breeds, now skull content will be misused to distinguish between straight and gay'.[435]

The American discussion around the research of neuroscientist Simon LeVay into the differences in brains of homosexual people was however mostly between representatives or organizations of gay people and neuroscientists as LeVay. Although often having a background in the social sciences and humanities, these representatives most of the times were not directly

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431 De Telegraaf, 'Swaab had zijn hersenen moeten gebruiken' (07-02-1989) https://resolver.kb.nl/resolve?urn=ddd:010645466:mpeg21:a0323

432 De Volkskrant, 'Homoseksualiteit lijkt maatschappelijk geaccepteerd' (15-02-1989). https://resolver.kb.nl/resolve?urn=ABCDDD:010856392:mpeg21:a0207 and NRC Handelsblad, 'binnen homostudies sta ik het dichtst bij Swaab' (18-02-1989) https://resolver.kb.nl/resolve?urn=KBNRC01:000030522:mpeg21:a0225

433 Quote: 'Prof Swaab onderzoek zou geruststellende uitwerking kunnen hebben want biologische verklaring maakt geaardheid vergelijkbaar met huidskleur en maakt dus gelijke behandeling afdwingen beter mogelijk'. Tegen discrimineren. Andere lezer: COC heeft zich altijd verzet tegen bewering dat homoseksualiteit morele afwijking is nu prof Swaab tegendeel aantoont is t weer niet goed etc. Tromp, B., 'Bekrompenheid der mannenbroeders', in: *Het Parool* (08-02-1989). https://resolver.kb.nl/resolve?urn=ABCDDD:010832988:mpeg21:a0209

434 De Volkskrant, 'Homoseksualiteit lijkt maatschappelijk geaccepteerd' (15-02-1989).

435 Interestingly, some commentators at the time pointed out that there might be something more fundamental underlying the critique of the Dutch gay movement on Swaab's research. Why else, as some journalists noted, would the gay movement, that so fervently had attacked the idea that homosexuality was a 'moral deviation by choice', suddenly attack the 'prove' that it was not some moral failure. As prominent sociologist Bart Tromp noted, Swaab's claim that sexual orientation; arguably the most important part of the personal identity of many gay-people, was biological 'predestined' by 'the brain' and not the result of some social construct, in many ways 'disproved' the 'myth of homosexuality'. According to Tromp the resistance against Swaab's neurobiological explanation was therefore merely a 'late protest against the integration and de-pillarization (ontzuiling) on the basis of sexual orientation'. It was the beginning of the end of what (apparently) many homosexuals as famous poet Gerrit Komrij affectionately described as their 'secret society'. In a famous reading in 2008, Komrij looked back and explained that he indeed always had interpreted his homosexuality as a 'delightful negation of everything that made ordinary people so ordinary'. It was arguably mostly this conception of homosexuality as 'rebellious' and non-normative that was so important to some gay people's personal identities, that they wanted to protect it from Swaab's neurobiological explanation that made it 'normal'. For Swaab, as Gert Hekma of the Homostudies department in Amsterdam explained at the time, there was no 'free-will' of being gay, as according to Swaab 'we' are merely 'our brains'.De Telegraaf, 'Swaab had zijn hersenen moeten gebruiken' (07-02-1989) https://resolver.kb.nl/resolve?urn=ddd:010645466:mpeg21:a0323 and 'Een biologisch component van deze geaardheid maakt haar vergelijkbaar met bijvoorbeeld huidskleuren en wet gelijke behandeling. Terecht heeft het COC zich verzet dat morele afwijking is, maar nu is het weer niet goed'. Trouw 'homo' (10-02-1989) https://resolver.kb.nl/resolve?urn=ABCDDD:010828213:mpeg21:a0232 Het berooft de homoseksuele beweging van een fundamenteel uitgangspunt: het recht om homoseksueel te zijn. Trouw, 'De reactie van verliezers? (2)', (07-02-1989) https://resolver.kb.nl/resolve?urn=ABCDDD:010828210:mpeg21:a0085 Tromp, B., 'Bekrompenheid der mannenbroeders'. Het Parool 08-02-1989 https://resolver.kb.nl/resolve?urn=ABCDDD:010832988:mpeg21:a0209 Bosman, F., Komrij hekelt homovertrutting, in: Het Parool (september 2008) https://www.parool.nl/kunst-media/komrij-hekelt-homovertrutting~b1fd5720/ De waarheid, 'In de 19e eeuw vonden de artsen homo's uit' (11-02-1989) https://resolver.kb.nl/resolve?urn=ddd:010472098:mpeg21:a0055

affiliated with universities.[436] Moreover, the discussion was relatively moderate in the United States compared to the Dutch controversy. This can be attributed to the fact that the potentials of the research was interpreted very variedly under different people. As well as by that LeVay from the beginning took a clearer stance against potential political misuses of his research. That he himself was openly homosexual, likely also gave credibility to his defense.[437]

In late August 1991 LeVay had published his initial report in which he announced to have found 'a slight difference between the brains of homosexual and heterosexual men in the hypothalamus in the brain'.[438] On September first 1991, the New York Times published a lengthy overview of both positive and negative reactions to LeVay's announcement. On the one hand, gay activists such as Andrew J. Humm, who also was part of New York's Human Rights Commission, complimented the research for 'talking about homosexual orientation as something innate', whereas it was usually viewed 'as a character or a moral defect'.[439] Similarly, the important Lambda Legal Defense Fund questioned the 'research method', but named the research 'intriguing' for 'if it proves the neurobiological basis for homosexuality' it would undermine the 'moral, ethical or religious basis one can reasonably discriminate against homosexuals'.[440] Many others were however more critical about the potential political abuse of LeVay's promised knowledge. David Barr, assistant director of a New York gay organization, among others argued that it 'opened up a can of worms with good sides and bad sides'.[441] For on the one hand the research could be used to argue that 'you can't punish gays for being biologically different', but on the other hand potentially 'people will ask how can we detect those differences and what can we do about them?'[442]

The fear that this promised knowledge could directly be political application was therefore also present in the American debate. John P. DeCecco, professor of psychology and editor of the Journal of Homosexuality, argued that LeVay's research fitted in a trend of neurobiological research that searched for 'some malformation of the brain as a cause of homosexuality' and 'has been ongoing for 100 years'.[443] According to him the 'the idea that you can describe a person by looking at the brain' was 'nonsense'. DeCecco and other critics mostly feared that while the research eventually could turn out to be false, this promised knowledge would still lead to political abuse in the present.[444] Indeed, as he and other critical

436 Angier, N., Ideas and Trends. The Biology of what it Means to be Gay', in*: New York Times* (1 September 1991) https://www.nytimes.com/1991/09/01/weekinreview/ideas-trends-the-biology-of-what-it-means-to-be-gay.html?searchResultPosition=12
437 Kristof, N.D., 'Gay at birth', in: *The New York Times* (Oktober 25 2003) https://www.nytimes.com/2003/10/25/opinion/gay-at-birth.html?searchResultPosition=1
438 Angier, N., Ideas and Trends: The Biology of what it Means to be Gay', in: *New York Times* (1 September 1991)
439 Angier, N., Ideas and Trends: The Biology of what it Means to be Gay'.
440 Angier, N., Ideas and Trends: The Biology of what it Means to be Gay'.
441 Angier, N., Ideas and Trends: The Biology of what it Means to be Gay'.
442 Ibidem.
443 Ibidem.
444 Ibidem.

scholars from the humanities predicted, it potentially already could allow for a 'prenatal diagnosis, a test that would detect a budding homosexual in the womb early enough for the fetus to be either whisked out in an abortion, or somehow changed with the proper cocktail of hormones'.[445]

One opinion piece that characterizes this critique of the neuroscientific promise, was of professor in psychology William M. Byne that appeared in the New York Times on 19 September 1991.[446] According to Byne, it was not just 'premature to accept LeVay's homosexuality theory', but according to him it was also part of a larger trend of 'provocative, sexually and politically charged studies' of neuroscientists.[447] As he noted, these studies 'enjoyed widespread news media coverage and acceptance by the scientific community before being discredited because their results could not be duplicated'.[448] He blamed neuroscientists such as LeVay for making large claims that would later turn out to be false, effectively spreading false knowledge because they according to him knew that the 'refuting of these provocative claims receives essentially no news media attention'.[449] LeVay responded a day later by noting that 'skepticism to new research' is right, but that scientists who argued for a difference in the immune system of homosexual men, like himself and Norman Geschwind did, only presented a possible 'conjecture'.[450]

Rather than taking into account the ethical critique from scholars in the humanities, neuroethics continued and strengthened the promise of future knowledge that it offered in these debates. Whereas critics from the humanities focused on so-called macro ethics, the responsibilities of science as a whole for society, neuroscientists in these debates focused on micro-ethics of individual scientists that ensured the quality of their research.[451] As Stephanie Bird argued, this can partly be explained by the fact that science students 'learn that "good science" means responsible conducted research', whereas for scholars in the humanities and social sciences, as well as 'for much of society', good science means 'science that does good' for society.[452] The result, as she notes, is that most scientists - as seen in the position of

445 Ibidem.
446 Byne, W.M., 'Opinion Premature to Accept Homosexuality Theory', in: New York Times (Sept. 19, 1991) https://www.nytimes.com/1991/09/19/opinion/l-premature-to-accept-homosexuality-theory-044991.html?searchResultPosition=14
447 Byne, W.M., 'Opinion Premature to Accept Homosexuality Theory'.
448 Byne, W.M., 'Opinion Premature to Accept Homosexuality Theory'.
449 Byne, W.M., 'Opinion Premature to Accept Homosexuality Theory'.
450 Where Byne argues that LeVay dangerously generalizes and ignores individual differences, LeVay asserts that 'while the cell group differs greatly in size between individuals', this is mostly 'accounted for by the sex and sexual orientation of the subjects'. These questions of individual difference, the generalization of individuals into groups and categories, formed an important part in the nature of neuroscientific knowledge production and the critique it received in the 1990s. Bird, Stephanie J., 'Socially responsible science is more than "good science', in: *Journal of microbiology & biology education* 15.2 (2014) 169-72.
451 Bird, Stephanie J., 'Socially responsible science is more than "good science', in: *Journal of microbiology & biology education* 15.2 (2014) 169-72.
452 Bird, Stephanie J., 'Socially responsible science is more than "good science' 172.

neuroscientists as Swaab and LeVay - believe that the ‘user rather than the scientist is responsible for how research findings are used’.[453]

More importantly, it shows that neuroscientists disconnected the scientific promises they made to get political funding from their ethical considerations when doing research, thus actively ignoring that funding shaped both the research topics and thereby the way research was conducted. As Albee and Joffe suggested, ‘major neuroscientific research funding aimed at treatment using organic, usually pharmaceutical, interventions’ and research on prevention of mental illness and disorders solely focusses on ‘locating risk factors for the brain disease’.[454] More so, this continuation showed the ignorance of neuroscientists of the history of their own discipline. As this thesis has shown, throughout the history of neuroscience, it was the promised future knowledge rather than actual neuroscientific research or neurotechnology that attracted political attention and characterized political employment. From phrenology to electroencephalography to PET-scans and even the promise of a ‘cure for mental illness’ which was introduced during the Decade of the Braine,these were all promised futures that were used by politics to change the life of people with mental illness in the present.

III Neoliberalism and the Paradox of brain placidity

During the 1990s Decade of the Brain, the neuroscientific promise of future knowledge was turned into an international project by neoliberal governments such as the Bush administration in the United States as well as a large number of countries worldwide. The adaption of this promise was fueled by concerns with rising mental health care costs and populations that were unable to work. Neuroscientific reductionist explanations were successfully made to resemble neoliberal discourses on individual responsibility and the inability of governmental interference in the social environment. Whereas in the first years of the Decade social factors were mentioned by neuroscientists and governmental officials in relation to mental health and disorders, by the beginning of the 21th century mental illness had become a ‘no-fault brain illness’, a neurobiological phenomenon without external causes and therefore also solutions. The results of this change can be easily exemplified in failed mental health policy, the opioid epidemic in the US and many more crisis reactions as to today’s COVID-19 mental health consequences. Its widespread and at the same time blatant nature is best shown by the statement

453 Bird, Stephanie J., ‘Socially responsible science is more than "good science’ 172.
454 Albee, G., Joffe, J., 'Mental Illness Is NOT “an Illness Like Any Other', in: *Journal of Primary Prevention* 24 (2004) 419–436, 434.

of notable UK Labor spokesperson Luke Bozier who argued that 'Welfare suicides don't exist as suicide is a mental health issue'.[455]

The widespread acceptance of this idea under policy makers, governments and significant portions of the public is even more remarkable in the context of the complete new paradigm of brain placidity that began to emergence in the middle of the Decade of the Brain. This paradigm conceptualized the brain as moldable, adaptable throughout life and therefore highly open to environmental influences.[456] Before the 1990s, neuroscientists had believed that the brain, once full-grown in adulthood, would barely change and that neuronal connections were mostly genetic and non-dynamic.[457] As Rose and Abi-Rached note this change was therefore nothing less than a 'radical transformation in genomic styles of thought', 'a move from determinism to probabilities and susceptibilities', a move that located the brain 'in the dimension of time'.[458] While this should have made the neuroscientific promise underlying the decade unattainable, together with the neoliberal health care policy that reduced all mental illness to a 'non-fault brain disease', in fact it did the opposite. As Becker notes, 'placidity only changed the neuroscientists promise from one of prediction to one of neurobiological engineering'.[459] The interwovenness of neuroscience with neoliberal ideas and state making seems to be the most likely explanation for this.

At the same time it is important to remember that unlike some criticists as well as neuroscientists themselves suggest, neuroscientific knowledge and explanations do not 'transfer' directly into the public understanding. Even though neuroscience claims that its explanations are reflective of the reality of human nature, it ignores that reality itself, that human individuals negotiate scientific knowledge and give meaning themselves rather than that knowledge gives meaning to people.[460] To a certain extent the 'objects' of neuroscientific

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455 Mold A., 'Making the Patient-Consumer in Margaret Thatcher's Britain', in: *Historical journal* 54(2) (2011) 509–528. And C. Webster, *The National Health Service. A political history* (Oxford, 2002) 140–207.

456 This radical shift of thinking about the brain did not occur overnight and cannot be traced to the work of one single neuroscientist. Some scholars as Tobias Rees have portrayed the shift as 'the scandal of plasticity', and elevated a debate between a few neuroscientists (within one research institution in France) to a conflict within the whole neurosciences. Rees for instance argued that only in 1998, after prominent French neuroscientist Alain Prochiantz published a report on adult brain placidity, that this concept was suddenly 'viewed as avant-garde'. At least in the United States the concept of neuroplasticity was already mentioned in the earliest reports that were send to the Senate in 1988 and not seen 'nonsense', as the 1995 report 'The Neuroscience of Mental Health' shows brain placidity already formed an important theme. More so, that year's event of the Library of Congress in commemoration of the Decade of the Brain stood completely in the light of the 'Adaptable brain', and had prominent neuroscientists explore brain placidity as an example of the 'self-organization of the brain' that goes on 'constantly and not something that begins and ends in adolescence'.TOBIAS REES McGill University Being neurologically human today: Life and science and adult cerebral plasticity (an ethical analysis) 156 Koslow, S.H., The Neuroscience of Mental Health: A Report on Neuroscience Research ((Maryland 1995) and Lewis, J., 'Brain plasticity origins of human abilities and disabilities', video of the event 'adaptable brain' held in the Libary of Congress at february 7 1995. https://collections.nlm.nih.gov/catalog/nlm:nlmuid-101708831-vid

Lewis, J., 'Brain plasticity origins of human abilities and disabilities', video of the event 'adaptable brain' held in the Libary of Congress at february 7 1995. https://collections.nlm.nih.gov/catalog/nlm:nlmuid-101708831-vid

457 Koslow, S.H., The Neuroscience of Mental Health: A Report on Neuroscience Research ((Maryland 1995).

458 Brain placidity, as they write, meant a move away from the focus of hereditary genes that caused disorders to 'variations in the nucleotides within coding that might affect the nature of a protein or an enzyme with functional consequences for biological processes linked to health, illness or other capacities'. Rose, N., Abi-Rached, J., 'Governing through the Brain Neuropolitics, Neuroscience and Subjectivity', 11, 16.

459 Becker, P., 'The Neurosciences and Criminology. How New Experts Have Moved into Public Policy and Debate', 151.

460 As O'Connor and Jaffe argued, 'scientific information is rarely transplanted intact into the public domain' O'Connor C, Rees G, Joffe H. Neuroscience in the public sphere. Neuron. 2012 Apr 26;74(2):220-6. doi: 10.1016/j.neuron.2012.04.004. PMID: 22542177.

research determine and constitute their own reality, negotiating the promised future of neuroscientists and policy makers through wider cultural and social frameworks into their own present. As O'Connor and Jaffe suggest, as neuroscientific knowledge claims go through a 'dense network of cultural meanings and worldviews', this context ultimately 'determines which aspects of science travel into public consciousness'.[461]

In this context it cannot be stressed enough that already during the Decade itself there were critiques on what I call the paradox of brain placidity; the fact that the 1990s reconceptualization of the brain as highly moldable by environmental factors led to more reductionism and, counterintuitively, less interdisciplinarity in neuroscience. One such example of critique that deserves to be highlighted is that of Seth Manoach, a young medical student, who had probably specialized knowledge in neuroscience. In an opinion piece in the New York Times on January 7th 1992 he argued against prominent neuroscientists such as LeVay who explained all of human identity, all our mental states, illnesses disorders and behavior, as reduceable to the brain.[462] Referring to 'recent neurobiological research' that shows that the brains 'are highly responsive to early environmental stimuli and retain a degree of plasticity in later life', he argued for more focus on social policy and more ethical concerns by neuroscientists. Manoach urged neuroscientists to put an end to the 'disturbing trend' which involved neuroscientists making 'stronger sociobiological claims in the popular press than was warranted by the data they presented in scientific journals'. As he rightly concluded, neuroscientists should understand that the 'political stakes are high': the more the neuroscientific promise that holds the brain as all-important continues to be spread, the more we 'neglect life histories and the less is our interest in attempting to change others through the environment'.[463]

This thesis ultimately should not be understood as an argument against neuroscience in general or even against its involvement with politics but rather, as part of a growing corpus of historical accounts that point out the necessity for a more historically and politically informed neuroscience. In fact, as Daniel Lord Smail has suggested, there are plenty of opportunities for a politically and historically informed neuroscience to engage in the analysis of trends in society. These range from linking stress and anxiety to the historical development of capitalism to the understanding, destigmatization and treatment of mental illnesses and disorders. As Smail writes, the paradigm of brain placidity is essentially based on the rejection that 'between

461 As science penetrates the public sphere, it enters a dense network of cultural meanings and worldviews and is understood through the prism they provide. The cultural context determines which aspects of science travel into public consciousness: knowledge that resonates with prevailing social concerns is.
462 Manoach, S., 'Opinion: The Politics of Finding Homosexuality Genetic', in: New York Times (January 7, 1992) https://www.nytimes.com/1992/01/07/opinion/l-the-politics-of-finding-homosexuality-genetic-248292.html?searchResultPosition=20
463 Manoach, S., 'Opinion: The Politics of Finding Homosexuality Genetic', in: New York Times (January 7, 1992).

culture and the brain, one of the two must be sovereign' and instead works from the idea that 'the patterns of influence are cross-cutting, mutual, and contingent.[464]

It is therefore not just the responsibility of neuroscientists to engage with these types of questions, but also the task of historians to present them with questions and perspectives. As an interdisciplinary conference held in Bielefeld on Substance Addiction and Recovery in 2014 suggests, this can deliver very productive results.[465] Although limited, the above mentioned critiques and considerations represent a promise that an alternative neuroscience is not just necessary but also possible. A neuroscience that is less involved with neoliberal political ambitions, more considerate of social, cultural and political factors that shape both the causes of mental illness and disorders as societal reactions, and more importantly, one which is also concerned with the treatment in the widest sense of the word.[466] The speech by Du Bois-Reymond opening chapter one and the ethical call of self-restraint by neuroscientists of the Max Planck Institute in 1990 opening chapter two as well as the critiques in this epilogue thus far only represent a failed potential of the past. At the same time, they, and the histories as this thesis that recall them, are important reminders that potential different futures exists and are possible.

464 Smail, D.L., 'Neuroscience and the Dialectics of History', in: *Análise Social* 47.4 (2012) 894-909, 908.
465 Smail, D.L., 'Neuroscience and the Dialectics of History', in: *Análise Social* 47.4 (2012) 894-909, 908. See examples: ZiF Center for Interdisciplinary Research, 'Neuroplasticity in Substance Addiction and Recovery. From Genes to Culture and Back Again', (January 9-11, 2014 Bielefeld, Germany) https://sites.google.com/site/thespiralalsorises/home Hanson, D., 'Neuroessentialism: The 'Dark Side' of Focus on Brain Plasticity?' in: *Dana Foundation* (January 23 2014). https://www.dana.org/article/neuroessentialism-the-dark-side-of-focus-on-brain-plasticity/
466 Hanson, D., 'Neuroessentialism: The 'Dark Side' of Focus on Brain Plasticity?' in: *Dana Foundation* (January 23 2014). https://www.dana.org/article/neuroessentialism-the-dark-side-of-focus-on-brain-plasticity/

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