RESEARCH MASTER'S PROGRAMME
Brain and Cognitive Sciences
University of Amsterdam

Report on generic quality
13 January 2023

Content

1. Introduction

This advisory report contains findings, considerations and judgements about the research Master's programme Brain and Cognitive Sciences (MBCS) of the University of Amsterdam (UvA). The Accreditation Organisation of the Netherlands and Flanders (NVAO) bases its accreditation decision on this report.

1.1 Panel

The research master's programme Brain and Cognitive Sciences of the University of Amsterdam is part of the visitation group Cognitive Neurosciences (2), which comprises three programmes offered by three Dutch universities. The panel for the visitation group Cognitive Neurosciences (2) consists of seven independent experts, including two student members. The NVAO has approved the composition of the panel on 12 July 2022:

- Prof. Maarten Frens (chair), professor of Systems Physiology, vice dean education Erasmus MC, scientific director Erasmus MC Graduate School;
- Prof. Jean Vroomen, professor of Cognitive Psychology, Tilburg University;
- Dr. Joris Koene, associate professor of Ecology & Evolution, Vrije Universiteit Amsterdam;
- Dr. Anna van Duijvenvoorde, associate professor in the unit Developmental and Educational Psychology of the Institute of Psychology, Leiden University;
- Prof. Harold Bekkering, professor of Cognitive Psychology, Radboud Universiteit;
- Suraj Harylallsingh BSc (student member), student M Cognitive Neuropsychology (research), Vrije Universiteit Amsterdam;
- Dieta Gruppen BSc (student member), student M Behavioural and Cognitive Neurosciences (research) and M Biology – Modelling in Life Sciences, University of Groningen.

The panel had the support of drs. Linda te Marvelde, who acted as the coordinator for the visitation group, and of dr. Floor Meijer and dr. Jetje De Groof, who were involved as secretaries.

The panel conducting the assessment of the research master's programme Brain and Cognitive Sciences of the University of Amsterdam consisted of:

- Prof. Maarten Frens (chair)
- Prof. Jean Vroomen
- Dr. Anna van Duijvenvoorde
- Suraj Harylallsingh BSc (student member)

The panel was supported by dr. Jetje De Groof, who acted as secretary.

1.2 Assessment framework

The three participating universities had their research master's programmes assessed in accordance with the Assessment Framework for Limited Programme Assessment (NVAO 2018, hereafter: 'the assessment framework') and the additional criteria for the assessment of research master's programmes (NVAO 2016).

1.3 Approach

The universities, programmes, panel, coordinator and secretaries have agreed on a 'development-oriented' approach to the assessments. This makes use of the opportunity offered by the assessment framework to place less emphasis on accountability and more on improvement and development. This methodology is based on trust and responds to the autonomy and ownership of the study programme as emphasised in the framework. Transparency, openness, and co-creation are key in this approach. Characteristic of the development-oriented approach is that the panel makes a preliminary statement about the generic quality of the programme on the basis of existing documentation. The subsequent site visit is – in part – dedicated to discussing the programme's own themes that are of importance to its development. This step-by-step approach aims to reduce the pressure traditionally placed on site visits. The programme knows in advance where it stands and thus experiences the opportunity to openly submit development themes to the panel. This promotes an equal dialogue between peers.

1.4 Working method

Eight weeks before the site visit, the panel received the documentation, including a reading guide, vision document and SWOT analysis, a student chapter, and a selection of fifteen recent graduation files (see appendix 7.1). These documents formed the basis for the assessment of the generic quality achieved. The panel studied the documents and organised a digital panel meeting three weeks before the site visit. In this meeting, the panel discussed its initial findings and provisional conclusions regarding the quality achieved on the four standards of the assessment framework. Part of the meeting was a (digital) consultation opportunity for students and lecturers who wanted to engage in conversation with the panel. No one took advantage of the opportunity to speak with the panel at this stage. Shortly after the meeting, the chair and secretary shared the panel's initial findings with the programme.

The site visit took place on 22 November 2022 in Amsterdam (see appendix 7.2). During the site visit, the panel spoke with delegations of students and teaching staff, the examinations board (EB), alumni/representatives of the professional field, and the management of the programme. The discussions were partly organised thematically around the development questions of the programme. The discussions also provided the panel with the opportunity to discuss remaining questions regarding the generic quality of the programme with those involved. The panel mostly used this opportunity to gain insight into how MBCS's system of assessment, notably of the capstones, works in practice. Also, the panel explored how

MBCS is in control of the degree to which students achieve all exit qualifications, regardless of their learning trajectory. At the end of the visit, the panel drew up findings and recommendations. The panel's chair presented these orally to stakeholders of the programme.

After the visit, the secretary drew up the advisory report. This report (presented here) contains the assessment of the programme's generic quality on the four standards of the framework and the additional criteria for research master's programmes. On the basis of this report, the NVAO takes an accreditation decision. After processing the panel's feedback, the secretary sent the advisory report to the programme for the purpose of fact-checking the text. The secretary has corrected factual inaccuracies identified by the programme in the final version. The executive board of the University of Amsterdam received the final report on February 13, 2023.

Representatives of the programme gathered their main findings concerning the development opportunities of MBCS and submitted their insights to the panel as input for the development report. This report is not part of the application for renewal of accreditation, but rather discusses development opportunities identified during the site visit. The programme will publish the report (on its own website) within a year of the NVAO's accreditation decision.

2. Characteristics of the programme

2.1 Administrative data

Name of the programme:	Brain and Cognitive Sciences
Croho:	60323
Level and orientation of the programme:	academic research master's programme
Credits:	120 EC
Specialisations or tracks:	Cognitive Science Cognitive Neuroscience Behavioural Neuroscience
Location:	Amsterdam
Mode of study:	full time
Language of instruction:	English

2.2 Organisation

The two-year research master's programme Brain and Cognitive Sciences (MBCS) is hosted by the Faculty of Science (FNWI) at the University of Amsterdam (UvA) and is organized by the Institute for Interdisciplinary studies (IIS) of this faculty. MBCS draws most of its teaching staff from research institutes connected to the interdisciplinary Amsterdam Brain and Cognition Center (ABC). ABC brings together brain and cognitive scientists from five different faculties of the UvA: FNWI, UAMC (University Academic Medical Centre); FEB (Faculty of Economics and Business); FMG (Faculty of Behavioural and Social Sciences); and FGw (Faculty of Humanities). In addition, staff is also recruited from other expert centres such as the Netherlands institute for Neurosciences (NIN) and VU Amsterdam.

For its organization and coordination, MBCS relies on a programme director, a programme coordinator, and a programme assistant. Decision-making occurs at the level of the programme director, in collaboration with the programme coordinator who remains in contact with the various actors that are relevant for the programme. MBCS is furthermore supported by an assessment coordinator and study adviser, who both work at the IIS. The programme director is a member of the ABC Board to facilitate exchange between research and MBCS education.

MBCS is a selective research master's programme that admits students on the basis of excellence, educational background and motivation for research in an interdisciplinary environment. MBCS selects a maximum of 60 students yearly. The programme is segmented into three domains: Behavioural Neuroscience, Cognitive Neuroscience and Cognitive Science. The domains have been identified on the basis of three main perspectives on cognition: a biological perspective, a psychological perspective and a cognitive science perspective.

3. Summary

The profile of the Master in Brain and Cognitive Sciences (MBCS) of the University of Amsterdam (UvA) is distinctive and attractive. The aim of the 120 EC, two-year master's programme is to deliver graduates that combine disciplinary depth in brain and cognitive sciences with the ability to work across the boundaries of disciplines. The exit qualifications adequately mirror the programme's ambition to train the next generation of neuroscience and cognitive science researchers.

MBCS offers a flexibly designed, research-intensive curriculum. Students are given a large degree of freedom to navigate the curriculum, yet the necessary checks and balances are in place to ensure that students grow in a balanced manner towards all the intended exit qualifications. Fitting for a research master, a substantial part of the programme is dedicated to individual research projects. MBCS fosters student-centered education, in which interdisciplinary interaction assumes a central place. The programme's cohesive community plays a crucial role in its teaching-learning environment. The interdisciplinary inclined teaching staff is eager to teach and supervise MBCS' intellectually curious and disciplinary diverse student population. As a balanced intake of students is crucial to enable the interaction between students of different backgrounds, MBCS should consider fine-tuning the current admission procedure.

MBCS succeeds in navigating the challenges of governing an interdisciplinary master's programme. Its programme management is highly responsive and maintains short lines of communication with both students and staff. Through its close connection to the interdisciplinary Amsterdam Brain and Cognition Center (ABC), the programme is assured access to a rich pool of excellent researchers and to state-or-the-art facilities. However, the planned discontinuation of the UvA-wide Research Priority Area Brain and Cognition may impact the current collaboration with ABC. Safeguarding access to the current pool of researchers in anticipation of this future evolution should be a top priority for MBCS.

Student assessment at MBCS is valid, reliable, and transparent. The assessment adequately mirrors the research environment for which students are being prepared. The procedures for the assessment of the capstones are up-to-standard, and measures are in place to ensure the quality of assessors. However, there is room for improvement in further sharpening the measures to avoid dependency relationships between assessors in the Research Projects. Also, the topics and research methods in the broad domain of brain and cognitive sciences that are eligible to count as a capstone deserve to be made more explicit. The same holds true for the expected variety of methods and topics across the capstones and the expectations for the progression of students between Research Project 1 and Research Project 2. Although the examinations board (EB) is in control of the quality of student assessment, it is encouraged to play a more proactive role regarding these points of improvement.

The quality of the capstones and the performance of alumni show that MBCS delivers high-quality graduates. However, adding information on students' contribution to Research Project 1 and 2 on the assessment form would further tighten the quality assurance of the capstones. In the same vein, the EB is advised to consider randomly selecting sample students rather than (or in addition to) sampling and monitoring individual capstones.

Standard	**Judgement**
1 Intended learning outcomes	Meets the standard
2 Teaching-learning environment	Meets the standard
3 Student assessment	Meets the standard
4 Achieved learning outcomes	Meets the standard
Final conclusion	**Positive**

4. Strong points

The panel identified numerous strengths. The ones listed below stood out.

1. **Research-intensive teaching learning environment** – With a substantial part of the programme dedicated to individual research projects, a high degree of hands-on experimental experience, and direct links to the research institutes connected to ABC, MBCS students have ample opportunity to develop their research skills.
2. **Interdisciplinary inclined teaching staff with an excellent academic reputation** – MBCS teaching staff are active researchers with an excellent track record that are interested in working across the boundaries of disciplinary research. Students are very appreciative of their quality and level of engagement.
3. **Flexible curriculum enabling student-centred education –** MBCS wants to be 'an enabler for the development of students', offering students a large degree of freedom to design an individual trajectory that combines interdisciplinary breadth with disciplinary focus in varying combinations. Also, classes are kept small, fostering active learning, group discussions and interdisciplinary exchange between students.
4. **Tight-knit community** – Students spend a considerable part of the MBCS curriculum working on individual projects, yet joint classes and extracurricular activities ensure that students grow into a tight community. The teaching staff from the various faculties and research groups the programme draws from, enjoy teaching MBCS' intellectually curious students. The short distance between students and staff further adds to the feeling of community.

5. Recommendations

The panel makes a number of recommendations to aid with the further development of the programme. These do not detract from the positive assessment of the basic quality of the programme.

1. **Transparency of expectations for the capstones** – Topics and research methods in the broad domain of brain and cognitive sciences that are eligible to count as a capstone deserve to be made more explicit. The same applies to the expected variety of methods and topics across the capstones and the expectations for the progression of students between Research Project 1 and Research Project 2.
2. **Make student's contribution to research project more explicit** – Explicitly add student's contribution to Research Project 1 and 2 on the assessment form. Adding this information would help to monitor whether students perform all stages of the empirical cycle across their capstones.
3. **Quality assurance of the capstones** – To establish the students' attainment of the exit qualifications across the capstones, consider randomly selecting sample students rather than (or in addition to) sampling and monitoring individual research projects or literature theses.
4. **Continuity of the influx of high-quality teaching staff** – MBCS' close link to ABC and its rich pool of excellent researchers is key to the programme's viability. Safeguarding access to this pool after the discontinuation of the RPA Brain and Cognition should be a top priority for MBCS programme management.
5. **Admission procedure** –The interaction between students from different backgrounds is a key element of MBCS' teaching-learning environment, which is why the panel advises to ensure that the admissions procedure guarantees a more balanced intake.

6. Assessment

6.1 Standard 1: Intended learning outcomes

The intended learning outcomes tie in with the level and orientation of the programme; they are geared to the expectations of the professional field, the discipline, and international requirements.

Findings and considerations
The field of brain and cognitive sciences is made up by different disciplines that study cognitive or neural structures and processes. MBCS' mission is to train the future generation of brain and cognitive scientists who are experts in a given domain in the field of brain and cognitive sciences, but who can also cross boundaries and work together with scientists from adjacent disciplines such as (neuro)biology, psychology, computation, modelling, linguistics, logic and philosophy.

Aligned with its mission, the programme has defined three complementary aims. MBCS wants to train students:
(1) to become skilled experts within a specific domain within brain and cognitive sciences;
(2) to become knowledgeable about concepts from distinct disciplines within the field of brain and cognitive sciences so that they can communicate and collaborate with scientists from these disciplines;
(3) to integrate findings from different disciplines, so that they can build bridges between their domain and other disciplines within brain and cognitive sciences.

The panel finds that MBCS has set itself ambitious goals and particularly values the ambition to train students to integrate findings from different disciplines.

During the site visit, the panel came to understand that MBCS wants to provide students a large degree of freedom to navigate the curriculum, with some students going into depth in one discipline, and others using the freedom offered to explore different corners of the domain of brain and cognitive sciences. The panel is particularly enthusiastic about MBCS' ambition to be 'an enabler for the development of students', as one stakeholder put it. Students confirmed that the ability to design an individual trajectory which combines interdisciplinary breadth with disciplinary focus in varying combinations, was an important reason to choose MBCS.

MBCS' benchmarking exercise provided in the preparatory documents substantiates how the combination of both expert and interdisciplinary training for students who are interested in brain and cognitive sciences sets MBCS apart from similar programmes in the Netherlands and abroad.

The programme's 19 exit qualifications follow the categories of the Dublin Descriptors and are an adequate translation of MBCS' profile. They evidently belong to an academically inclined master's-level programme that aims to train the next generation of neuroscientific researchers. They include understanding and application of recent scientific insights, research paradigms, and state-of-the art methodologies. Upon graduation, students must be able to formulate novel research questions, and to perform all stages of the empirical cycle, applying the appropriate paradigms and methods. They are moreover trained to understand ethical aspects and best practices in the domain of brain and cognitive science, and to apply them in their own research. The panel confirms that in realizing all exit qualifications, students that graduate are at the level of starting PhD candidates, as can be expected from a research master's programme. The exit qualifications moreover mirror the programme's ambition to offer a balance between educating skilled researchers within a domain and training students to integrate findings from other disciplines. Students are required to understand current debates across brain and cognitive science's adjacent disciplines, use and integrate knowledge and paradigms from varying disciplines, and value contributions from different disciplines to a research question. The panel noted that the exit qualifications are also geared towards employability of students. They include transferable skills like project management, team and communications skills. Recently, an exit qualification regarding making informed (research) career decisions was added, which the panel welcomes.

As a research master programme, MBCS' priority lies in preparing students for a research career. Connection to the professional field's expectations comes by means of its lecturers who are all active researchers in the field of brain and cognitive sciences, and MBCS' close link to the research groups of ABC. Also, as students perform internships throughout the Netherlands and abroad, input from other research centres is granted. In addition, MBCS has an Advisory Board that meets twice a year and consists of professors and assistant professors in the domain of brain and cognitive sciences from both the Netherlands and Germany. They advise the programme management on strategic matters and assist with knowledge exchange across disciplines and programmes.

In conclusion, MBCS' profile that combines disciplinary depth in brain and cognitive sciences with the ability to work across the boundaries of disciplines, is distinctive and attractive for students. The programme's exit qualifications adequately reflect the programme's research-intensive nature and its interdisciplinary ambitions. MBCS has the necessary systems and structures in place to ensure that its stays up to date with the latest evolutions in the domain of brain and cognitive sciences.

Conclusion
Meets the standard

6.2 Standard 2: Teaching-learning environment

The curriculum, the teaching-learning environment and the quality of the teaching staff enable the incoming students to achieve the intended learning outcomes.

Findings and considerations

MBCS has a maximum capacity of sixty students per cohort and receives over 200 applications per year (280 in 2022). Student influx is increasingly international (50-60% of the total student cohort). The panel notes that the programme has an adequate admission procedure. Students are admitted based on excellence, educational background, and a demonstrated interest in research and interdisciplinarity. Appropriately for an English-language master, students must proof their English language proficiency. Following the advice of the previous assessment panel, prospective students are now selected by a distinct admissions committee instead of the examinations board. The interdisciplinary-oriented, research-driven, and intellectually curious students the panel met during the site visit indicate that MBCS succeeds in selecting a student population that matches the programme's profile and ambitions.

Students enter MBCS in one of three so-called domains (Behavioural Neuroscience, Cognitive Neuroscience, and Cognitive Science), based on their bachelor's diploma and their specific, personal interests. In recent years, the intake of the domains Cognitive Neuroscience (cohorts of 2020 and 2021), and Cognitive Science (cohort of 2022) has been considerably larger compared to that of Behavioural Neuroscience. The panel understands that this is an unwanted side effect of the fact that MBCS admits more students than it can accommodate since a percentage of students does not claim their spot. Maintaining a balanced intake of students between the three domains is crucial to enable the interaction between students of different backgrounds. This interaction being a key element of MBCS' teaching-learning environment, the panel advises to fine-tune the current procedure so that a more balanced intake is guaranteed.

MBCS offers its students a flexibly designed, attractive, and research-intensive curriculum (a schematic overview of the curriculum can be found in de appendix). The curriculum consists of taught courses and individual projects. The individual projects are (1) a Literature Thesis (LT, 12EC); and (2) two large Research Projects (RP1 26-32EC; RP2 36-42EC). The LT and the two RPs are the programme's capstones. The taught courses consist of (1) 2 entry courses within one of three domains (10EC); (2) interdisciplinary courses (12 EC); (3) a specialisation course (6EC); and (4) electives (12-18EC). Most specialisation and elective courses are also open to students from other (research) master's programmes. In these courses, MBCS students fulfil the same requirements as other students. The panel finds this acceptable since courses from regular master's programmes only amount to a small part of the curriculum.

Delivering on the ambition to enable students' development, MBCS offers students a large degree of freedom to navigate the curriculum. Beyond the interdisciplinary and the entry courses, students enjoy many degrees of freedom in choosing their specialisation course and electives, as well as the topics for their LT and RPs. Students, both during the site visit and in the Student Chapter of the information file, expressed their appreciation for this flexibility. The panel noted that the freedom that is offered leads to considerable variety in the learning trajectories of students, with some focusing on one discipline, and others exploring different corners of the domain of brain and cognitive sciences.

The panel observed that checks and balances are in place to ensure that students grow in a balanced manner towards all the intended exit qualifications. The structure of the curriculum allows students a 'soft landing' in the programme. The Milestones, Promises and Pitfalls-course offers an introduction to the breadth of the field and the promises of interdisciplinary research. In the domains' entry courses, students are then taught the insights, theories, and methodologies that are dominant in the respective domain. It is only after this initial phase that flexibility is offered to students, yet the boundaries for this flexibility are clearly set. The specialisation courses are restricted-choice electives, meaning that a list of electives has been pre-approved by the EB. Electives that are not on this list require the EB's approval. The coherence in students' study plans is monitored by the study advisor and are explicitly approved by the EB before graduation. Importantly, students have to submit a proposal before being able to start with their Research Projects. The programme management formally checks each proposal to ensure that the proposed topic is situated in the domain of brain and cognitive sciences, to detect which steps of the empirical cycle the student will perform, and to monitor whether the planning is feasible and in correspondence with the EC attributed. When a proposal is approved, the examiner also has to validate the topic and research question from the perspective of the domain.

MBCS' flexible curriculum puts considerable responsibility on the shoulders of the students. The students confirmed that they receive the necessary guidance to be able to make informed decisions on their study trajectory. Students and staff form a close-knit community; as a result, students generally feel confident to approach the lecturers and programme management directly. The study advisor and programme management work in tandem to assist students with questions. Following the advice of the 2016 assessment panel, a mentoring system has been introduced, which ensures that students meet their mentor three times in their first year to check on progress and well-being, including during their internship. This support network, so the panel established, allows for close monitoring of the progress, decision-making, and wellbeing of students.

In line with what is to be expected of a research master's programme, MBCS's curriculum is research-intensive and embedded in an excellent research context. A substantial part of the programme is dedicated to individual research projects (LT, RP1 and RP2). As the university has strong connections with a myriad of potential host institutions, students are offered the

opportunity to take part in a wide variety of research projects – locally, nationally, and internationally. MBCS' taught courses are moreover delivered by active researchers. Teaching staff and students provided many examples of how ongoing research features prominently in the classroom.

The panel is pleased with the hands-on experimental experience offered. Training in MBCS covers studies ranging from genes, neuronal networks and behaviour and cognition in rodents, to neuroimaging, computational modelling and behaviour and cognition in humans, all requiring state-of-the-art facilities. Students have the opportunity to gain experience with the relevant techniques during the taught courses, or at least see them in action when individual engagement with these techniques is not possible (e.g. MRI and fMRI). They can subsequently gain hands-on experience with all relevant techniques during their RP. Many of the research groups that are connected with MBCS have their own state-of-art facilities.

The panel established that the MBCS curriculum offers students sufficient opportunities to engage in all stages of the empirical cycle, allowing them to develop their research skills. While the LT's emphasis is on the ability to collect, interpret and critically evaluate existing research findings, student perform their own research in the RPs. Although the panel noted that in some of the RPs, students work with existing datasets, it learned that if no data are gathered in RP1, students must engage in data collection in RP2. This requirement is known by all students, and is formally checked in the research proposal before students start their RP.

In studying the preparatory documents, the panel had some concerns about the absence of a required statistics course. The interviews during the site visit revealed that this is a conscious choice. Students' backgrounds and their background in statistics vary to a considerable degree. An elective is offered and students who would benefit from it, are advised to take it up in their programme. Furthermore, statistics is offered in an integrated way throughout the taught courses. Finally, if specific statistics knowledge and skills are required for the RPs, students receive the necessary guidance from their supervisor or find their way to extracurricular courses. The students the panel talked to all confirmed to be in favour of the current arrangement. The panel understands the rationale behind the current solution, and sees no immediate risks. Yet, it asks MBCS to carefully monitor whether all students receive the necessary training to graduate with the statistics skills that can be expected from a research master graduate.

The panel noted that ethical aspects of research are given consideration in several courses. A wide variety of topics relevant to the broad domain of brain and cognitive sciences are addressed, such as safeguarding privacy, coding practice and transparency, good data management, setting up replicable studies, and responsible use of experimental animals. Considering the ethical implications of proposed research is also covered in assignments.

Also, the reflection assignment after RP 1 asks the student to consider ethical aspects of the work they have done. Although the panel is satisfied with the attention paid to ethics throughout the programme, students ask for more focus on research ethics in the curriculum. The panel encourages the programme to evaluate the students' request and take appropriate measures, if deemed necessary.

In talking to the different stakeholders of the programme, it became increasingly evident to the panel that the MBCS delivers on its interdisciplinary ambitions, and that the curriculum allows each student, regardless of the study path chosen, to attain the interdisciplinary exit qualifications. The structure of the curriculum ensures that all students experience using and integrating knowledge, methods and paradigms from a variety of disciplines, to answer interdisciplinary questions. In dedicated courses, like Special Topic in Cognitive Sciences (STICS) or the Summer School, students explore a theme using different perspectives, and drawing from their own disciplinary background. The interdisciplinary orientation of the LT has also been strengthened, with students now linking their problem statement and result to multiple disciplines.

The panel was pleased to find that the programme components aimed to deliver on the interdisciplinary exit qualifications, are increasingly solid. The STICS course, which has received unfavourable student evaluations in the past, has been completely redesigned by a new team of co-ordinators, and has been implemented in this new form for the first time in the academic year 2022-2023. Students confirmed that their feedback has been taken into account. The panel concludes that STICS now is more streamlined with the ambition to develop interdisciplinary skills for academic research.

The panel noted that the cohesion in the second year, when students spend most of their time on individual research projects in research groups and labs scattered around the Netherlands and the globe, has been a continued point of attention. Conversations with the programme's stakeholders highlighted that following the 2016 accreditation, a second-year kick-off moment and a postgraduation meeting with the programme's alumni network are now organised. Also, as mentioned above, study guidance during the RPs has been intensified. The deployment of further initiatives was delayed due to the covid-19 pandemic, but new actions are in the pipeline, such as (online) intervision sessions that students can sign into during their RP's. The panel supports the plans that are on the table to further embed substantial meeting points in the second year, so that students can connect and learn from each other's experiences. The panel suggests to engage students closely when designing and developing these extra activities, so that extra initiatives are tuned to the students' needs.

The panel concludes that MBCS' tight knit community is a clear strength. Students identify as MBCS students, and not as students belonging to one domain. They emphasized that the first year provides sufficient joint classes and activities for the student group to feel as one

cohort. Extracurricular activities such as the annual study trip and the activities organized by the study association Cognito further add to this community feeling.

MBCS' didactical concept adequately supports the realization of the programme's ambitions. On the basis of its review of selected course materials, the panel established that lecturers structure their courses to stay close to the research process. Fitting for the didactical concept of a research master, students read and critically evaluate literature, have debates, hold scientific discussions, write research proposals, and present their work. The selective admission allows MBCS to keep class sizes small (between 20-24 students), and students confirmed that it allows for active learning, group discussions and interdisciplinary exchange between students.

As can be expected from a research master, MBCS is clearly international in character. 50-60% of its student cohort is international, as are some of its teaching staff. The international orientation is also embodied in programme features such as the international Summer School or the study trip, or in MBCS' membership in the Network of European Neuroscience Schools (NENS). Also, many opportunities are available to perform internships abroad, an opportunity many students seize.

The programme is clearly focused on teaching students to become academic researchers. However, the panel appreciates that preparing students for careers outside of academia is increasingly on MBCS' radar. Part of the UvA broad Tesla-minor, which focuses on applying science outside of academia, can feature as an elective in students' study plans. During the annual post-graduation event, alumni pursuing academic as well as non-academic careers are invited to share their experiences with and considerations about finding a job after graduating. In the online Alumni Talks, which came into being during the pandemic, speakers are invited for shorter sessions. Also, the study association Cognito organizes the yearly event 'Meet the Company', where students visit a company that is relevant to MBCS student careers. In spite of these valuable initiatives, not all students experience an optimal level of preparation of their careers yet, particularly when this career is not research oriented. The panel recommends to continue to invest in broad career orientation activities.

MBCS's teaching staff consists of 9.71 fte teaching staff (51 staff members). The teaching staff of MBCS consists of active senior researchers, who can share cutting-edge research, complemented by more junior researchers and dedicated teaching staff. 94% of the courses within the programme are organized by staff in the possession of a university teaching qualification (UTQ). Dialogues with students and lecturers confirmed the panel's image of the high quality of teaching staff. Students were very appreciative of the quality of the lecturers and supervisors. The panel clearly got the impression that they are accessible for and involved with students.

MBCS is tightly connected to research groups that are linked to ABC. ABC brings together brain and cognitive scientists from five different faculties and various research groups of UvA, all of which have received good to excellent ratings for quality, relevance and viability in research assessments following the Standard Evaluation Protocol for Research Assessments in the Netherlands (2015-2021). As mentioned above, the scientific track record of the lecturers involved, which the panel consulted, is irrefutable. Taken together, the panel is convinced that this provides an excellent training environment for the research-oriented nature of MBCS.

For RP1, RP2 and the LT, which together make up a considerable part of the curriculum, the specific staff involved depends on the choices of the student. The panel welcomes that since the last assessment in 2016, MBCS has tightened its grip on the quality of the involved staff for these projects. For the LT and the RP, both assessors need to have completed a doctoral programme and have relevant expertise. At least one of the assessors must be UvA staff and in possession of an UTQ in order to take on the role of project examiner.

The panel established that MBCS currently succeeds in navigating the challenges of governing an interdisciplinary master's programme. The panel was pleased to learn that MBCS puts extensive effort in building a network of lecturers it can draw on. This has resulted in a pool of key teachers and some longer-term agreements with faculties on the coordination of certain courses. Next to the programme director and the programme coordinator, the domain coordinators act as a linking pin in their domain when new opportunities arise. An element that also helps to maintain and grow MBCS' pool of teaching staff is that lecturers thoroughly enjoy teaching and supervising in the programme, as it attracts intellectual, engaged, and ambitious students. Finally, a key component in assuring the influx of high-quality staff in the programme, is MBCS' close connection to ABC, which is formalized by the programme director's membership of the ABC Board.

MBCS' relies on the ABC network for its community of lecturers. ABC currently holds the Research Priority Area (RPA) Brain and Cognition, which fosters interdisciplinary research in brain and cognitive sciences at UvA. This RPA will end soon, possibly leaving MBCS in a vulnerable position. The panel notes that being able to tap into the rich ABC-network is a requirement for MBCS to be able to continue to train the next generation of brain and cognitive scientists. Therefore, it is key that any future arrangement sustains the programme director's current formal mandate to appeal on lecturers from the different research institutes to contribute to MBCS.

The panel observed, both in the preparatory documents and during the site visit, an openness about the issues MBCS is confronted with. It noted that most points of improvement are firmly on the radar of the programme. The interviews highlighted that feedback from students is taken seriously and dealt with adequately. Members from the

Programme Committee noted that they work in close connection with the programme management. The teaching staff added that the programme coordinator actively reaches out to them in order to find solutions for issues that need to improve, or to communicate proactively on specific elements of MBCS' teaching and learning environment. The panel is impressed with the way MBCS is currently coordinated.

The panel also explored how COVID-19 affected MBCS' students' learning experience. The information file contained a document detailing the measures taken by the programme management to ensure the quality of the programme. The panel values that teaching staff worked in small groups online to continue to foster students' active learning. Practicals with experimental work were organized on-campus as much as possible. As for the RPs, possibilities for data collection were sometimes limited, which led to more research internships being focused on the analysis of pre-existing data. Students from the COVID-19 cohort explained to have strongly missed social interactions, on-site classes, and discussions. Still, students generally considered that teachers and master programme were adaptive and handled the transitions to on-line teaching well.

The panel concludes that MBCS delivers on its ambition to be an enabler for the development of students. MBCS' curriculum, didactics, staff and facilities work together to provide student-centered, research-intensive education in an interdisciplinary environment. The programme's cohesive community, its intellectually curious and disciplinary diverse student population, and its engaged programme management are clear strengths. The panel emphasizes that the close link to ABC and its rich pool of excellent researchers is key to the programme's viability. Access to this pool of researchers needs to be maintained, even after the discontinuation of the RPA Brain and Cognition. Also, MBCS is encouraged to work towards a better-balanced student intake, and to further invest in broad career orientation activities.

Conclusion
Meets the standard

6.3 Standard 3: Student assessment

The programme has an adequate system of student assessment in place.

Findings and considerations
MBCS has drawn up a clear assessment policy and plan, in alignment with the university-wide assessment policy framework. The panel established, by means of desk-research and interviews with stakeholders during the site visit, that this plan is effectively implemented, leading to student assessment that is valid, reliable, and transparent. The principle of constructive alignment, which is a key element of the policy, is applied appropriately: the courses, LT and RPs have intended learning outcomes that are constructively aligned with specific exit qualifications at programme level. Assessment within a course is in turn aligned with its respective learning objectives.

While all courses are at master's level, the early courses are biased towards measuring knowledge and understanding (and so they use written exams, quizzes, and presentations), with a fraction of the courses dedicated to applying that knowledge and understanding (through essays and research proposals). Specialization courses use assessment forms that are skill-based and closely tied to research praxis, and are thus geared towards applying knowledge and understanding, analyzing and evaluating. The interdisciplinary courses emphasize ideation and collaboration, and the individual projects assess the output of creative, scientific work.

In all courses, multiple assessment forms are used. Most courses use assessment forms that fit with the research environment for which students are being prepared (e.g. research proposals, essays, position papers, and presentations). The course manuals provide the necessary detail on the course's goals, assessment forms and grading. From its desk research of the course records of five selected courses, the panel concludes that written examinations and other forms of assessment have proper grading rubrics, answer keys or grading criteria. Students explained to find assessment at MBCS fair and transparent and expressed their appreciation for the variety of the assessment forms used.

Overall, the panel is satisfied with the procedures for the assessment of the capstones. The panel established that the manuals of the RP and LT transparently detail how both projects are assessed. They describe the requirements for those involved in its supervision and assessment. Fitting for a research master, the assessors and examiners in both projects must hold a doctoral degree. All examiners are required to be in the possession of an UTQ. The four-eye principle is applied consistently, with two separate persons involved in the assessment. For the LT, the assessor and the examiner both grade the final work. For the RP, the internal assessor, who works at the research group/lab where the student has performed his/her internship, grades the students' experimental work, presentation and

final report. The external assessor, who has not been involved in the project, only grades the final report. The panel is pleased with this transparent division of labour.

Both the RP and the LT manual stipulate that the second assessor should be a different research group than the first assessor. Still, the panel learned that implementing this rule is not always practically feasible, which is why it occasionally occurs that the daily supervisor, internal and external assessor all come from one lab. While the panel understands this, it also suggests to take precautionary measures to avoid dependency relationships between assessors.

The panel was pleased to see that standardized assessment forms are used for the assessment of the capstones. The EB and programme management have together developed grading rubrics for the LT and the RPs, which reflects positively on the reliability of the grades given. The panel observed that the grading rubrics are known by students and are consistently used by assessors. It welcomes that the rubrics have evolved from containing three categories to five categories, allowing for more fine-grained assessment.

The information file explains that the grading rubrics for both RP1 and RP2 are identical, yet it also pinpoints that as RP2 is larger, more depth of learning is expected in the second project. In the application of the rubrics in the sample of capstones, this difference between RP1 and RP2 was not immediately clear, which is why the panel discussed this issue during the site visit. The panel learned that informally, the expectation is that students perform their research more independently in RP2 compared to RP1. Still, no formal instructions exist. The panel suggests making the expected differences between RP1 and RP2 more explicit and transparent and translate the requirement to instructions regarding the use of the grading rubric.

The panel noted that the grades for the capstones are relatively high. It is to be expected that grades in MBCS are higher than in regular master's programmes, due to its selective nature. Nevertheless, the EB has taken the initiative, assisted by the IIS assessment coordinator, to revise the performance level indicators of the rubric. The aim is to ensure that in the future, students receive excellent grades in the case of truly exceptional performance. The panel was pleased to learn that the adapted rubric will be implemented in the second semester of 2022-2023.

The panel established that the necessary checks and balances have been put in place to assure high quality assessment at the individual course level. All examiners must be in possession of an UTQ. Also, all assessments should be peer-reviewed by a colleague before they are administered. Additionally, the learning goals at the course level and aligned assessment forms are reviewed by the course coordinator/examiner and programme management during the yearly course evaluation, with each course maintaining a course record that serves as the basis for this conversation.

The EB's annual reports reveal that it acts in line with its legal responsibility to safeguard the quality of assessment and end level of the programme. It meets every two months and although it acts independently, it works in close cooperation with the programme management. The EB systematically reviews the alignment of selected programme components with the assessment policy framework, providing constructive feedback to the respective examiner, which is also shared with the programme management. The panel established that the EB audits a random sample of capstones annually.

The panel concludes that the EB is in control of the quality of student assessment. Still, the panel encourages the EB to be more proactive, especially when it comes to the quality control of the capstones. For example, the panel recommends to draw up explicit guidelines regarding the topics and research methods in the broad domain of brain and cognitive sciences that are eligible to count as a capstone (cf. 6.4). Also, as mentioned above, the expectations for the progression of students between RP1 and RP2 could be made more transparent. In both cases, there is room for initiative from the EB.

In conclusion, the panel is convinced that MBCS' student assessment is valid, reliable, transparent and fair. The professionalism and expertise of the staff involved in assessment, is clear. The panel also identified points for improvement. It suggests to take precautionary measures to avoid dependency relationships between assessors in the RPs. Also, it encourages the EB to play a more proactive role in drawing up explicit and transparent guidelines regarding the requirements for research topics and research methods in the capstones, and to better delineate the requirements of RP1 and RP2.

Conclusion
Meets the standard

6.4 Standard 4: Achieved learning outcomes

The programme demonstrates that the intended learning outcomes are achieved.

Findings and considerations
RP1, RP2 and the LT are the capstones of the programme that allow the programme to test the students' research competence. MBCS strong academic research focus is certainly emphasized with these in-depth, sizable projects. The panel values that the LT has been added as a capstone to further solidify the proof of interdisciplinary skills in the capstones.

To perform a check of the achievement by the students of MBCS' exit qualifications, the panel consulted the 3 capstones of a sample of 15 students that have graduated in recent years. The panel found that the capstones are, in general, of high quality, and what can be expected of students graduating from a research master. The panel established that most theses are (very) well written, and some are of submittable/publishable quality. They are, in general, highly academic in orientation, involving empirical inquiry, and often employing the most recent methods in the field of brain and cognition.

In a small subset of the sample the panel made some observations that have led to the identification of points that can be improved in order for MBCS to further solidify its grip on students' attainment of the exit qualifications. These observations and suggestions do not detract from the positive assessment of the basic quality of the programme's achieved learning outcomes.

The panel noted that in a few of the RPs, the topics seemed to be situated at the very edge of the domain of Brain and Cognitive Science. The panel established that an explicit, transparent and formal framework as to which research topics and methods are admissible for the LT and RPs, is currently not in place. The panel learned that students can have the same supervisor or work in the same lab for all capstones. However, the research question needs to be substantially different for each capstone. Despite it being a rare occurrence for students to have the same supervisor or work in the same lab multiple times, the panel suggests that it would benefit the programme to make its expectations explicit. This suggestion also pertains to the expected variety of methods and topics across the capstones. The panel sees a role for the EB in taking the initiative to develop clear guidelines and frameworks (cf. 6.3).

Another observation in the RPs is that some students work with existing datasets. The panel noted that the evaluation forms do not contain a section on the student's contribution to the project, and what elements of the empirical cycle were included. It suggests adding this information to the assessment form. This would allow MBCS and the EB to also perform an *a posteriori* check of students' progression through all stages of the empirical cycle, in addition to the *a priori* check that is already in place (cf. 6.2.).

Finally, in order to better monitor whether individual students meet the exit qualifications across the three capstones, the panel suggests to change the way capstones are sampled for the EB's annual audit. Instead of sampling, and monitoring, individual RPs or LTs, it makes more sense to randomly sample students, and then consider their capstones together. This will allow a more detailed view of students' attainment of exit qualifications across individual capstones.

Results from the recent alumni survey confirm that MBCS succeeds in its ambition to prepare students for a research career. The alumni survey indicated that 53% of the alumni entered a doctoral programme after graduation and 60% indicated that they are currently in a research career (either in the public or in the private sector). Students are also able to find positions in other sectors such as data science, consultancy and education. 75% of the students that responded to the alumni survey were able to find a job within 3 months of graduation while 92% was able to find a job with 6 months after graduation. In the alumni survey, students indicated that they found their interdisciplinary training useful for both their personal growth and their research career.

MBCS deploys several initiatives to stay in touch with its graduates. MBCS organizes annual postgraduation meetings with its alumni network (established in 2017) to inform its students about future career options. The panel noted that the student association also deploys career-oriented activities.

In conclusion, the panel is fully convinced that MBCS delivers high-quality graduates that are qualified for the academic and non-academic labour market. To further tighten its grip on students' attainment of all exit qualifications in the capstones, the panel recommends that MBCS improves transparency of expectations for the capstones, to add information on students' contribution in the assessment forms of the RP, and to adapt the method of quality assurance of capstones.

Conclusion
Meets the standard

7. Appendices

7.1 Documents studied

The panel studied a wide selection of documents relating to the programme's profile and intended learning outcomes, its teaching-learning environment, assessment and end level. These included:

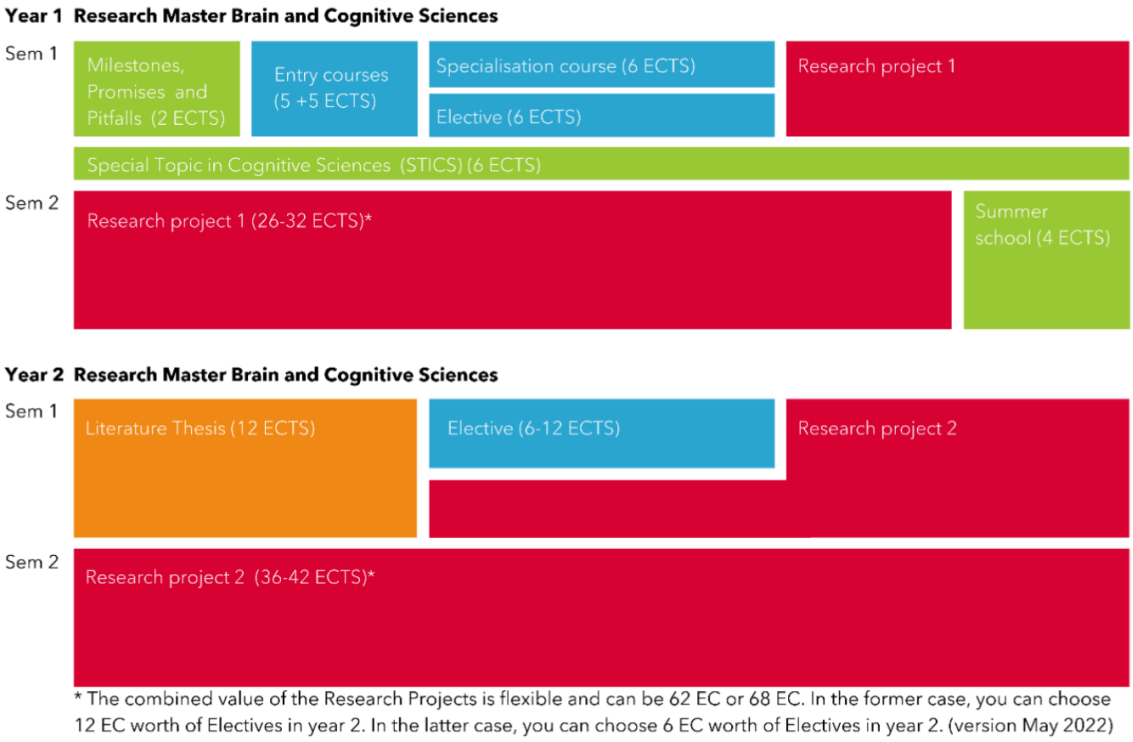
- Reading guide, SWOT-analysis
- Student chapter
- Course files of:
    1. Introduction to Computational Cognitive Neuroscience (mandatory for CS students)
    2. Brain Organization +Cognition (mandatory for CNS students)
    3. Neuroscience: From Cell to Behaviour (mandatory for BNS students)
    4. Special Topic in Cognitive Science (mandatory interdisciplinary course for all MBCS students)
    5. Cognition and Language Development (Elective)
- Capstones (RP1, RP2, LT) of fifteen graduates (student numbers available on request)

7.2 Site visit programme

22 November 2022

Time	Session
8.45	Meeting with staff
9.30	Internal Panel Discussion
9.45	Meeting with students
10.30	Meeting with lecturers
11.15	Break
11.30	Meeting with examinations board, including study advisor
12.15	lunch
13.00	Development theme discussion 1: Implementing learning trajectories
13.45	Development theme discussion 2: How can MBCS stay unique and innovative?
14.30	Break
14.45	Prepare meeting MBCS management
15.00	Meeting with MBCS management
15.30	Draft preliminary evaluation
16.30	Oral report preliminary evaluation

7.3 Curriculum



* The combined value of the Research Projects is flexible and can be 62 EC or 68 EC. In the former case, you can choose 12 EC worth of Electives in year 2. In the latter case, you can choose 6 EC worth of Electives in year 2. (version May 2022)