

RESEARCH MASTER'S PROGRAMME  
Behavioural and Cognitive Neurosciences  
University of Groningen

Report on generic quality  
1 December 2022

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## 1. Introduction

This advisory report contains findings, considerations and judgements about the research master's programme Behavioural and Cognitive Neurosciences (BCN) of the University of Groningen (UG). The Accreditation Organisation of the Netherlands and Flanders (NVAO) bases its accreditation decision on this report.

### 1.1 Panel

The research master's programme Behavioural and Cognitive Neurosciences of the University of Groningen 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 Behavioural and Cognitive Neurosciences of the University of Groningen consisted of:

- Prof. Maarten Frens (chair)
- Prof. Jean Vroomen
- Dr. Joris Koene
- Suraj Harylallsingh BSc (student member)

The panel was supported by dr. Floor Meijer, 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 7 October 2022 in Groningen (see appendix 7.2). During the site visit, the panel spoke with delegations of students and teaching staff, the board of examiners, alumni/representatives of the professional field, and the management of the programme. The discussions were partly organised around the development themes that the programme itself identified: 1) BCN careers outside of academia, 2) statistics in the BCN curriculum, and 3) prerequisite knowledge for first-year core courses. These discussions also

provided the panel with the opportunity to raise (remaining) questions regarding the generic quality of the programme with those involved. In addition, the panel requested to organise a discussion to gauge how BCN's system of assessment works in practice and how it is experienced by lecturers and students. 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 Groningen received the final report on 1 December 2022.

Representatives of the programme gathered their main findings concerning the development opportunities of BCN 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:	Behavioural and Cognitive Neurosciences
Croho:	60615
Level and orientation of the programme:	academic research master's programme
Credits:	120 EC
Specialisations or tracks:	Animal and Human Behavioural Neurosciences Cognitive Neuroscience and Cognitive Modelling Molecular and Clinical Neuroscience
Location:	Groningen
Mode of study:	full time
Language of instruction:	English

### 2.2 Organisation

The two-year research master's programme Behavioural and Cognitive Neurosciences (BCN) is effectively a multi-faculty programme, involving staff and facilities from three main faculties – Faculty of Science and Engineering (FSE), Faculty of Medical Sciences (FMS), Faculty of Behavioural and Social Sciences (BSS) – and two further contributing faculties, Faculty of Arts (FoA), Faculty of Philosophy (FoP). Its three tracks, (1) Animal and Human Behavioural Neurosciences ('B-track'), (2) Cognitive Neuroscience and Cognitive Modelling ('C-track') and (3) Molecular and Clinical Neuroscience ('N-track'), are linked to the main faculties involved (B-track: FSE, C-track: BSS, N-track: FSE/FMS). BCN's daily management resides at FSE, which is the coordinating faculty for the programme. Here, the programme is part of the Biology cluster. BCN's management is responsible for the day-to-day running of the programme, which is done in consultation with track coordinators at the three main faculties. At FSE, BCN is the only formal research master's programme.

As a research master's programme, BCN intends to immerse students in the relevant research groups of the associated faculties. The programme is also connected to the BCN research school, which is UG's main hub for multi-/interdisciplinary neurosciences research at the level of PhD candidates, postdocs and principal investigators (PIs). The programme aims for cohorts of 45 students (15 students per track). Admission to the programme is selective, based on the applicant's academic credentials and motivation. In three consecutive editions of the *Keuzegids Masters* (2017/2018/2019), BCN was awarded the label of 'Top Rated Programme'.

### 3. Summary

The research master's programme Behavioural and Cognitive Neurosciences (BCN) offers students an attractively broad, multi-/interdisciplinary profile that spans relevant subfields of the neurosciences and deals with both human and animal behaviour. This profile has been elaborated in broadly phrased intended learning outcomes (ILOs) and a two-year curriculum (120 EC) that comprises three distinctive tracks. Apart from track-specific courses, students also follow common courses that promote a wide perspective on the latest research methods in neuroscience. This combination of high-quality broad and specialised courses helps to deliver well-rounded graduates and facilitates community building across tracks. BCN's staff and students are critical determinants of its success. Students are known for being talented and highly motivated, which means that staff are willing to go the extra mile for them. The programme fosters small-scale teaching in which staff and students interact intensively. Supervision is geared towards helping students develop their own research profile.

As a research master's programme, BCN has made research skills a central component of its ILOs and curriculum. Overall, the training of such skills takes place at a high level, with the caveat that statistics and – to a lesser extent – ethics should receive more emphasis. The programme is part of a supportive research community spread out across multiple faculties. For their research projects students are immersed in high-quality research groups, both within and outside of the University of Groningen, where they are exposed to senior and junior role models. The theses that result from students' final projects attest to the thoroughness of the research training students receive. Two-thirds of BCN graduates secure PhD positions within months after graduation. Notably, the programme is also committed to providing guidance to students who choose non-academic career paths but is still working on implementing this more firmly into the curriculum.

Understandably, BCN's challenges and opportunities for improvement mostly ensue from the difficulties inherent in organising a programme across multiple faculties. In its day to day running of the programme, BCN's management must navigate different faculty-level systems, provisions and regulations that do not connect seamlessly. Furthermore, staff is spread out across the entire university and does not interact regularly. Under these challenging conditions, the importance of frequent alignment, efficient communication and diligent centralized record keeping cannot be overstated. To ensure its long-term viability, the programme is advised to continue to be mindful of and act to improve these crucial aspects.

<b>Standard</b>	<b>Judgement</b>
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
<b>Final conclusion</b>	<b>Positive</b>

## 4. Strong points

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

- 1. Research environment** – BCN is sustained by a large, diverse and supportive research community. Students are embedded and supervised in high-quality research groups where they get a real-life taste of an academic career.
- 2. Breadth** – BCN features a broad profile that covers various key subdisciplines of the neurosciences (behavioural, cognitive, molecular/clinical). By offering three distinct tracks, the programme accommodates students with a wide variety of backgrounds and preferences. Its curriculum combines specialisation in track-specific courses with common course units that promote multi-/interdisciplinarity, thus helping to deliver 'T-shaped' graduates with a clear, personal research profile upon completion of the programme.
- 3. Student population** – BCN's selective admission procedures help build an academically inclined and highly driven population of students that enjoys a good reputation across the main faculties involved in the programme. In addition, the students have a clear track-cohort feeling and are passionate about the track they follow.
- 4. Inclusive approach to professional field** – BCN intends to gradually extend its professional field to non-academic contexts in which high-quality research takes place, thus creating awareness that research is not limited to academia. This should help to further improve the employability of graduates in industry.
- 5. Student-centred education** – BCN promotes small-scale education that is specifically tailored to the interests and needs of its students. Small classes (5-15 students) enable intensive scientific exchanges between staff and students and amongst students.
- 6. Profile building** – By combining careful supervision and customizable curriculum components, BCN encourages students to build their own distinctive research profile throughout the programme. With this in mind, students are free to choose their own research projects and supervisors, and they are encouraged to go abroad.

## 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 generic quality of the programme.

- 1. Increase training in statistics (and to a lesser extent: ethics)** – Extend the training of skills in statistics for all students and tailor it to the specific needs of different groups of students/tracks. The training of research skills should also include uniform coverage of ethical issues.
- 2. Promote independent thesis assessment** – Introduce truly independent assessment procedures for the (minor and) major research project. This means that consultation between examiners should be eliminated and that precautionary measures should be taken to avoid dependency relationships between examiners.
- 3. Clarify student's process** – Make the process that the student has gone through more transparent and include it in thesis assessment. Define the student's contribution to the thesis more explicitly in terms of their contribution to study conception and design; data collection; data analysis and interpretation of results; manuscript preparation.
- 4. Increase information exchange** – Promote structural and intensive information exchange between staff members to ensure that all are well aware of agreed upon procedures and benchmarks.
- 5. Ensure auditable paper trail** – Make sure that a (centrally administered) written record is kept of all quality assurance activities undertaken by the board of examiners.

## 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 two-year research master's programme Behavioural and Cognitive Neurosciences (BCN) aims to equip the next generation of neuroscience researchers with the multi-/interdisciplinary research skills required to answer complex questions on how the mind and brain function to regulate behaviour and physiology in health and disease, both in animals and humans. Its three tracks focus on Behavioural (B-track), Cognitive (C-track) and Molecular and Clinical (N-track) aspects. The panel notes that the breadth that emerges from the three tracks and the simultaneous focus on both human and animal behaviour gives BCN its distinct character. Stakeholders that the panel spoke with clearly recognize and appreciate this profile.

The panel was informed that the programme benchmarks itself against the other master's programmes in the main participating faculties, including 'regular' one- and two-year master's programmes and research master's programmes. What sets BCN apart from regular master's programmes is a bigger emphasis on research, resulting in the expectation that BCN students achieve a higher level of research skills. The panel respects BCN's choice to benchmark itself against master's programmes in general, which it interprets as in accordance with the European Qualifications Framework (EQF). To facilitate a proper understanding of what is expected of BCN students in relation to what is expected in other master's programmes at FSE, BSS and FMS/UMCG, the panel does encourage BCN to make its benchmark choice more explicit.

The 17 intended learning outcomes (ILOs) of the programme are formulated at a relatively high level of abstraction since they cover all three tracks. They are grouped under the 5 Dublin descriptors and are in line with (inter)national requirements for an academic (research) master's programme. Furthermore, the panel noted that BCN's multi-/interdisciplinary approach and research-oriented character resonate clearly in the ILOs. Students are expected to acquire a broad overview of contemporary issues in behavioural and cognitive neurosciences, as well as specialized knowledge in the subfield of the chosen track ('T-shaped'). Research skills feature prominently. Students must be able to complete the successive steps of the research cycle whilst demonstrating a reflective, critical attitude and understanding of existing limitations. Research integrity and ethics are also touched upon in the ILOs. Appropriately for a research master's programme, realizing all ILOs will lead to students entering the labour market at the level of starting PhD candidates.

In 2019, the programme adjusted its ILOs in response to recommendations made in the previous full-term and mid-term assessments. This revision has resulted in ILOs that are better adapted to BCN's profile and less generic than before. A further adjustment that the programme is currently considering, is the addition of track-specific ILOs. These would detail which skills and what knowledge students are expected to acquire within their track, making it easier for teaching staff to translate ILOs into learning objectives at course level. Should BCN choose to pursue this course, the panel encourages the programme to take care that track-specific ILOs do not compromise the integrity of the programme as a whole. The breadth of the programme is a fundamental part of its identity, and the addition of track-specific learning outcomes should not result in a *de facto* break-up into three separate programmes. One way to deal with this, is to make this exercise a shared effort that includes lecturers of all tracks, who jointly discuss track-specific ILOs. This is expected to lead to more alignment between tracks. Finally, the panel encourages BCN to ensure that all ILOs (and especially ILO 4, 5, 7, 9, 11) are formulated in accordance with so-called 'SMART' principles and are therefore optimized for measuring and monitoring student progress.

As a research master's programme, BCN primarily prepares students for academic careers. This means that its professional field mostly consists of academic research groups. Close contacts with these groups are facilitated by their (physical) proximity to the programme. Such contacts have also been formalized by the establishment of an advisory board that coincides with the board of the research school BCN. In recognition of the valuable research that takes place in industry, BCN is progressively embracing a wider definition of research. This comes with initiatives to diversify and broaden contacts with societal stakeholders. The panel greatly appreciates BCN's efforts in this respect and encourages it to continue along this path. The panel also supports BCN's plans to add ILOs that reflect that students acquire knowledge and skills that transfer well to a non-academic context. This would help students to showcase their qualities to future (non-academic) employers.

In conclusion, the panel notes that BCN's breadth and aspirations towards multi-/interdisciplinarity give it a characteristic profile. The programme's ILOs match this profile and are in line with international requirements for an academic master's programme. BCN has followed up on recommendations made by previous panels and a further revision of the ILOs is planned. The programme is in close contact with its professional field. Its aspirations to contribute towards more permeable boundaries between academic research and research in industry are commendable.

## **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**

BCN is a selective programme. Its Board of Admissions selects students based on a combination of background, motivation, grades in relevant courses and reference letters. Students indicate their choice of track upon application. The panel is confident that this selection process results in an appropriate, academically inclined group of students. BCN students were repeatedly described to the panel as talented, enthusiastic and highly driven. Because of the three tracks, the student population is also diverse in background. While there is no formal cap, student numbers never exceed the target of 45 students per cohort. Initial imbalances in track size have stabilized over the years.

The panel established that BCN offers students an attractive, coherent and sufficiently challenging curriculum. It consists of (1) common components (12 EC, mostly year 1) that train students in developing multi-/interdisciplinarity and general skills, (2) track-specific courses (20 EC, year 1) which focus on the acquisition of fundamental knowledge and research skills and aims of a specific track, (3) electives (19 EC, year 2) and (4) research projects (69 EC, year 1 and 2). Both years of the programme have a similar set-up consisting of courses in the first semester and research projects in the second semester. Students progress through the curriculum in a fixed order, but experience quite a bit of freedom in managing their own development by choosing electives and research projects that suit their interests. Electives in year 2 come in different categories. Students can take track-specific courses of other BCN tracks or choose from a catalogue of 18 pre-approved non-BCN courses. Alternatively, they can propose other relevant courses, which will then have to be approved by the board of examiners. When taking non-BCN courses, BCN students fulfil the same requirements as other students; there are no additional requirements. Since courses from regular master's programmes only amount to a small part of the curriculum, the panel finds this acceptable. For those students who wish to further deepen or broaden their research skills, honours courses are offered. However, students mentioned that combining these with BCN is not common, since BCN is already quite challenging on its own.

BCN champions intensive, small-scale and student-centred education that leaves room for personal preferences. Track-specific courses include 5-15 students and offer interactive teaching that is tailored to the interests of students. Students work both individually and in small groups. Group assignments are seen as a way to capitalize on the diverse backgrounds of students: students learn from each other's skills and experiences ('peer learning'). Students clearly appreciate this method. In their experience, it works particularly well in a programme where students share the same intrinsic motivation and (therefore) all contribute equally to group assignments. To help them develop their own individualized profile, students can call on the three track coordinators and the academic advisor.

Students seem pleased with the level of counselling and general support available to them. The documentation and interviews also pointed out that students feel heard. The full curriculum is evaluated every year and feedback and recommendations made by students are taken seriously. Course evaluations examined by the panel reveal that this is done to a high standard. Desk research also shows that the digital learning environment is well-structured and contains all the necessary information. Course files include clear descriptions of course content, learning objectives, teaching methods and assessment. However, a cross-table that correlates courses and ILOs reveals quite a bit of overlap between courses. As BCN is aware, a programme-wide realignment of learning objectives at course level and ILOs might be necessary.

When exploring the extent to which students experience the breadth of BCN, the panel noted that the share of common components is limited (12 EC) and that tracks are linked to different faculties and thus relatively separate. While the N- and B-track share commonality in terms of content and physical nearness, the C-track appears to be more isolated. Even so, the panel is convinced that BCN largely lives up to its claims of breadth. Conversations with stakeholders highlighted that, even though tracks have their own distinct flavour, there is quite a bit of crosspollination. The common course *Introduction to BCN* was said to give students an overview of neuroscience at UG, sparking students' interest in contents and approaches covered by tracks other than their own. It is common (but not obligatory) for students to pursue these interests by taking electives from other tracks and by choosing research projects at the intersection of tracks. While students indicated that understanding and appreciating content from other tracks is hard at first, they also mentioned that this becomes easier over time and adds value. Moreover, the panel was pleased to find that students identify as 'BCN students' rather than as students of their own track. The existing sense of community across tracks is backed up by the recently established student council, which is composed of three students, one from each track. This council organizes joint social and study-related events, helping students to build networks across tracks.

Research skills are central to the curriculum. Overall, the panel is satisfied with the extent and level to which these skills are taught. BCN gives ample attention to the successive steps of the research cycle and stresses preconditions such as science communication, grant writing and network building. The approach here is a combination of theoretical instruction and 'learning by doing' under the supervision of PIs. The latter seems to be especially appreciated by students, who mentioned the lab components of the N-track and the practicals in the C-track as strong features. The curriculum includes two substantial research projects, which hone students' skills: the minor research project (29 EC, year 1) and the major research project that concludes the programme (40 EC, year 2). Both projects have a similar set-up and share the same learning objectives, although a higher level is expected during the major project. Students are free to choose their own projects and supervisors, which is usually a smooth process. According to students, staff members are likely to respond positively to their inquiries, because of the good reputation that BCN students enjoy. In line with BCN's breadth, multi-/interdisciplinary projects are encouraged. Students

also particularly like that both projects end with a joint summer symposium, during which they present their research results in a talk or a poster. After examining samples of written reports from both projects, the panel is convinced that students' research skills progress steadily throughout the programme.

An issue that was discussed at length during the panel's online preparatory meeting and during the site visit, is that statistics receive limited dedicated emphasis in the current curriculum. A large share of BCN students (especially those from the B- and N-track) have little background in statistics. The B- and N-track currently share a 1-week refresher course in statistics (1 EC) that teaches both coding in R and statistics in general. As evidenced by student evaluations, this is an overambitious approach given the limited time available. Students of the C-track are similarly critical of the course on offer in their track (*Repeated measures*, 5 EC). BCN informed the panel that it plans to dedicate more ECs to statistics. Several options were discussed during the site visit, ranging from adopting a modular approach (offering multiple statistics modules from which students select those that match their needs) to consistently incorporate statistics in content-driven courses. In addition, the programme is open to exploring how it can offer tailored feedback to students through an open office hour. The panel appreciates that BCN proactively selected statistics as a subject to discuss during the site visit. This strengthens the panel's confidence that the programme will soon implement the panel's recommendation to extend the training of skills in statistics for all students and tailor it to the specific needs of different groups of students/tracks.

Research integrity is well-covered. The panel established that the importance of good research practices (i.e., replicability, sound sample choices, responsible data management) is stressed throughout the curriculum. Ethics, however, could do with more consistent attention. As it stands, students who choose to do a research project on non-human vertebrates receive an ample education in research ethics: they have to complete the course *Animal-human experimentation* (5 EC), which includes creating an extensive and according to students 'thought-provoking' portfolio. There is, however, no similar obligation for students who study human topics. This means that for much of the student population, ethics education is limited to a much appreciated but very short ethics workshop in the course *Career related topics*. The panel advises to broaden the attention given to ethics, for example, as students suggested, by also including it in the *Introduction to BCN* course.

The panel is fully convinced of the suitability of the research environment that BCN is part of. Recent research evaluations of the faculties/disciplines that host BCN students confirmed that these research units foster innovation, originality and excellence, resulting in internationally visible research and academic leadership. The presence of the BCN research school, which provides some research training to BCN students, is also beneficial to the programme. For their research projects, students are embedded in high-quality research groups at the three main faculties: FSE (Groningen Institute for Evolutionary Life Sciences, GELIFES), FMS, BSS (Department of Psychology). These faculties have state-of-the-art labs

(for, e.g., biomedical research, microscopy, eye-tracking, psychophysics, neurostimulation, neuro-imaging) and other complexes (e.g., climate rooms, animal facilities). Students are supervised by established researchers with international track records as well as by young talent (postdocs and PhD candidates). This immersion in high-quality research communities and extensive exposure to both senior and junior role models is appropriate for a research master's programme. Interviewed students qualified it as a strength – even if the experiences of the last two cohorts of students were impacted by the Covid-19 pandemic, which moved some of the interaction online.

BCN progressively caters to the needs of students who discover that they do not want to pursue an academic career after all. The programme is committed to stepping up its efforts from counselling individual students on potential opportunities outside of academia to starting more structural initiatives aimed at non-academic career paths. A course that reflects this new approach is *Career related topics*, which features a lecture by an affiliate professor who combines his academic work with a successful career in industry. In the future, BCN aims to give non-academic career opportunities an even bigger platform in this course. Another example of BCN's widening focus is that it would like to offer students the opportunity to do research projects in industry, thus facilitating the building of non-academic networks. The panel concludes that BCN is taking its responsibilities in preparing students for diverse (research) careers seriously. This is a notable strength of the programme and an example for other research master's programmes.

As a programme that primarily prepares students for careers in international research environments, BCN's orientation is evidently international. Many of its students and some of its staff come from outside the Netherlands, courses take an international perspective in terms of their content and the literature that is used, and students are encouraged to go abroad for research projects. All teaching is done in English, as is the norm for master's programmes at FSE. Language criteria are part of recruitment procedures, but the faculty does not require new and existing staff to present or acquire certificates that attest to their proficiency in English. Nonetheless, the panel has no reason to doubt staff's competence in this respect.

BCN's teaching staff consists of 36 staff members of the 5 participating faculties. They can be subdivided in an inner circle of core staff who teach multiple courses and hold management/administrative positions, and an outer circle of additional teaching staff. The student-staff ratio is favourable (B-track: 18:1, C-track: 21:1, N-track: 18:1). The panel established that all staff members are active, established researchers in relevant fields such as (molecular) neurobiology, cognitive neuroscience and experimental psychology. Two-thirds of those involved are professors. The panel is also confident of the didactic qualities of staff. Students described the teaching as high-quality. In their experience, lecturers are knowledgeable, open to questions and easily approachable. All staff members have acquired a university teaching qualification (UTQ) or are in the process of obtaining one.

In addition to the obvious advantages in terms of breadth and multi-/interdisciplinarity, organizing an educational programme across multiple faculties also presents challenges. The panel notes that the daily management is clearly committed to keeping everyone involved by way of frequent information emails, phone calls, exchanges in group chats and sustained contacts with the three track coordinators. Nevertheless, running a multi-faculty programme without a physical meeting place, joint facilities, fixed meeting times or clear compensation scheme for non-FSE staff, is no small feat. This is reflected in the student chapter, which signals that 'the coordination of courses and tracks sometimes falls short'. The panel believes that BCN could benefit from a more intensive exchange with and between teaching staff, not just about the ins and outs of daily educational practice, but also about larger developmental issues such as those discussed during the site visit. Setting up a (semi)annual BCN day where staff and management meet seems worth considering, Such activities could also help to keep the enthusiasm for the programme at a consistently high level, which is particularly important now that BCN has developed from a fresh, new initiative into a more mature programme. The panel would further advise to put in place agreements that detail which authority BCN's management and board of examiners have over staff at faculty level.

In summary, the panel notes that the BCN curriculum, didactics, staff and facilities adequately support students in building their own research profiles. The diverse, but overall very talented student population is clearly a strength that adds to the attractiveness of the programme, not just to other students but also to staff. Opportunities for improvement mostly lie in intensifying training in statistics and, to a lesser degree, ethics, and in actively mitigating the challenges inherent in organising a multi-faculty programme.

## **Conclusion**

Meets the standard

### **6.3 Standard 3: Student assessment**

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

#### **Findings and considerations**

BCN adheres to the principles for valid, reliable and transparent assessment as laid out in the general UG assessment policy and the ensuing FSE assessment policy. FSE policy is currently being updated to reflect recent changes in the university-wide policy. A new faculty assessment policy will be implemented in 2023-2024. BCN's annually updated course unit assessment overviews (CUAOs) and assessment plan describe the links between learning outcomes, modes of instruction and modes of assessment at course level and curriculum level. Desk research by the panel shows that these documents are generally fit for purpose, although there are some shortcomings regarding constructive alignment that

could easily be fixed by enlisting the help of an assessment expert. An example that BCN is aware of, is that there is quite a bit of overlap in the cross table that correlates ILOs with courses. The programme intends to re-examine the table and make improvements. The committee encourages such an effort and advises to include all lecturers involved.

The panel concludes that the system of assessment functions as it should. Students mentioned that they are aware of what is expected of them, since learning objectives and assessment modes are discussed in the first meeting of each course. Furthermore, they have access to practice materials for exams and assignments, as well as to the forms and rubrics that will be used to assess their work. From the documentation, the panel learned that examiners are appointed by the BoE and must be in possession of a UTQ. When constructing assessments, they are expected to have written tests and associated answer models checked by a colleague that is not involved in the course ('four eyes principle'). Similarly, essays, presentations and theses are assessed by two examiners, one of whom was not involved in the execution of the project. As of 2017, assessment forms and rubrics have been standardized. In view of the required learning effect of assessment, the panel was particularly interested in the extent to which high-quality feedback is given throughout the programme, specifically with respect to research skills. It learned that BCN employs both teacher feedback and peer feedback. Interviewed students qualified the feedback they received from supervisors/examiners as sufficient and helpful in further enhancing their research skills. Notably, students themselves have taken the initiative to set up informal, non-mandatory 'thesis rings', in which they exchange theses and give each other feedback.

The panel established that BCN overall uses an appropriate variety of assessment modes, including essays, presentations, and reports that enable an assessment of the highest levels of academic thinking in the Bloom taxonomy. Individual courses usually use more than one assessment mode, which is a practice that the panel encourages. The exact mix of assessment modes varies somewhat between tracks. While the B-track contains hardly any exams that test knowledge, such written exams are more common in the C-track and especially in the N-track. Students of the N-track, much like the panel, would like to see some written exams replaced by assignments, essays or presentations. Management and BoE recognize the need to introduce a greater variety of assessment modes that test higher cognitive levels in the N-track, and assured the panel that remedial action will be taken in the near future. The panel is pleased with the overall quality of assessment, as evidenced by limited samples of written exams, the answers to those exams and essays. It found that the sample exams are in line with the material covered in the course and include clear questions, which can easily be graded with the help of the associated answer models. Sample essays are well written and based upon relevant literature.

The panel notes that many courses have a pass rate of 100%. BCN students generally receive high grades, and some students even score a 10 out of 10 for their thesis. As a result, many students graduate with honours – although the percentage (around 40% for recent

cohorts) has decreased after a tightening of the cum laude regulations in 2019. During the site visit, these above-average results were discussed at length and the panel found the explanation given largely satisfying. According to management, high grades and substantial numbers of cum laude graduations should be seen as indicative of BCN's talented and highly motivated student population. Students enter the programme at a high level and – because of intensive, small-scale education – achieve significant further growth during the programme, particularly when it comes to research skills. Examiners who grade BCN students also grade regular master's students and see considerable differences between both categories in terms of motivation and level. New staff is instructed that a higher level of research skills should be expected of BCN students. This, however, seems to take place rather informally. The panel did not see written instructions aimed at (new) examiners. While the panel recognizes the professionalism of teaching staff, it would argue in favour of clarifying and further operationalizing the now informally used benchmark. This recommendation is also motivated by the panel's findings on thesis grades. While it often agreed with the grading of examined theses, in some cases it found the grades somewhat inflated.

The procedures for thesis assessment are in line with FSE requirements. However, the panel identifies some opportunities for further improvement. For one thing, it notes that BCN uses the assessment form and underlying rubrics that have been standardized for all master's programmes of the Biology cluster. These are largely adequate instruments, but they have (understandably) not been tailored to match all 15 ILOs that a BCN thesis is expected to cover. Also, the panel found that the current assessment form focuses on the thesis outcome and sheds little light on the process. Combined with the fact that the panel did not see instructions about the number of revisions that theses are allowed to go through, it is currently very difficult for external assessors to grasp how the final product came about. The panel notes that this issue could easily be solved by adding a further section to the assessment form, defining the student's contribution to the thesis in terms of contribution to study conception and design, data collection, data analysis and interpretation of results, and manuscript preparation. Finally, the form should also encourage examiners more compellingly to provide constructive feedback that supports their assessment on various (sub)criteria.

Another observation with respect to thesis assessment is that the final grade does not come about in complete independence. Theses are currently assessed by the daily supervisor (in some cases PhD candidates and postdocs) and a second reader that was not involved in the project but does have expertise in the field. Both readers independently fill out the form but jointly discuss which final grade will be given. The panel would prefer to see that the final grade is a weighted average of both assessments. Furthermore, it notes that all semblances of a relation of dependency between the two readers should be avoided. In fact, this is something that BCN is already working on, since the new UG assessment policy no longer allows PhD candidates and postdocs to assess theses. A suggestion that the panel would

like to make, is to abandon the practice that PhD candidates and their supervisors submit an evaluation each. Rather, they should do this together, alongside a second fully independent examiner. A thesis coordinator could be appointed to do a procedural check, calculating the final mark and making sure that the two assessments are not too far apart. A discussion with the daily and formal management showed that BCN and the faculty board are open to following up on this recommendation.

BCN has its own board of examiners (BoE), which consists of representatives of all three main faculties/tracks, an external member and a secretary. These members have ample experience with assessment and have participated in professionalization activities organized by UG. The panel notes that the BoE operates in close proximity to the staff of the three tracks, which means that it is easily accessible in case of questions or problems. At the time of the previous evaluation, this proximity and especially the overlap between BoE and other BCN bodies (mainly the board of admissions, BoA) also raised questions on the BoE's independence. Since, BCN has proceeded to separate the BoE and the BoA. Based on its desk research and a conversation with the BoE, the panel concludes that the BoE is well aware of its responsibilities in safeguarding the quality of assessment and end level of the programme. As of 2015, the BoE conducts annual audits of samples of courses (two per year, with the exception of 2020, when no course audit was done because of Covid-19 related pressure) and theses (six per year, two per track). This is done according to a procedure that was designed in collaboration with an assessment expert. The panel was informed that the outcomes of these checks are discussed with examiners and, if necessary, followed up on in the next year.

An important point of improvement is that the paper trail of these activities of the BoE is incomplete for recent years. The panel has seen annual reports for 2019, 2020 and 2021, which for 2019 included underlying audit reports with conclusions and recommendations on theses and courses. For 2020 and 2021, the BoE was not able to produce similar reports. This was explained to be the result of both the Covid19-pandemic and a serious lack of administrative support. Over the course of 2020 and 2021, the BoE had no less than four different formal secretaries. This has resulted in a lack of consistency in note taking, preparation of meetings and audits, and reporting and central archiving. In the panel's opinion, this is a situation that requires remediation. While the panel does not doubt that the BoE does a good job in terms of content, it wants to stress that – in the interest of traceability of activities – keeping a written record is an essential part of its responsibility. The recent appointment of a permanent secretary to the BoE is a good step towards a more stable situation.

In conclusion, the panel has made a number of suggestions, mainly relating to improving the traceability of both the assessment itself and the quality assurance of assessment. While these are important aspects that BCN is advised to act on shortly, the panel has seen ample

and convincing evidence of the substantive quality of course and thesis assessments, and the professionalism and expertise of staff involved.

## **Conclusion**

Meets the standard

### 6.4 Standard 4: Achieved learning outcomes

*The programme demonstrates that the intended learning outcomes are achieved.*

#### **Findings and considerations**

To assess whether BCN fulfils its ambition of delivering graduates that function at the level of starting PhD candidates, the panel studied a selection of 15 recent theses written as part of the major research project (40 EC). The panel is pleased with the quality of the work. The theses are the result of substantial research projects that usually cover all successive steps of the research cycle. In a few cases students started with existing data sets, but this was always due to Covid-19 related restrictions. In general, students demonstrate that they have acquired good research skills. Using the latest methods in neuroscience, they tackle important topics and questions that reflect the breadth of BCN. In some cases, projects fall firmly within the boundaries of the track that the student in question was part of, but in other cases students seem to have deliberately crossed over to other tracks, thus underlining BCN's multi-/interdisciplinarity. In one or two cases, the panel noticed that the topic of the thesis was very much at the edge of the field of neuroscience. While not extreme, this may be something for BCN and its BoE to look into. A weakness in some of the theses is the reporting of statistical analyses. Considering the small amount of training that some students have in this respect, this did not surprise the panel. The panel also found that discussions of results generally stay quite close to the student's own project, instead of relating results to the broader perspective and discussing their potential implications for the current state of affairs in the field. This is something that supervisors should be aware of and point out to students where applicable. Finally, the panel established that most theses are (very) well written, and some are of submittable/publishable quality.

After graduation, students have a solid chance to secure a PhD position at UG or elsewhere: 68% of alumni of the 2017-2021 cohorts entered PhD programmes within half a year after graduation. In the end, this number grows to an average of 80%, which is impressive. More than half of these graduates enrol in PhD programmes elsewhere in the Netherlands and outside of the Netherlands, the rest stays at UG or its medical centre (UMCG). A minority of graduates (intentionally) pursues careers outside of academia, for example in industry or consultancy. Alumni research confirms that they generally do well there, as BCN research skills transfer well to non-academic careers. BCN does a good job at staying in touch with former students, for instance inviting them to alumni events where they connect with

current students. There is also a self-organised alumni network that the programme consults periodically. According to BCN's management, the programme derives valuable insights from these contacts with former students.

All in all, the panel is fully convinced that BCN delivers high-quality graduates that are qualified for the academic and non-academic labour market.

### **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:

- Vision and SWOT document; reading guide
- Student chapter
- Course files of:
  1. Human Neuroanatomy (common course unit)
  2. Introduction to BCN (common course unit)
  3. Molecular and Cellular Neuroscience (N-track)
  4. Neuroendocrine Basis of Behaviour (B-track)
- Master's theses of fifteen graduates (student numbers available on request)

### 7.2 Site visit programme

#### 6 October 2022

Time	Session	Participants
8:15	Welcome and coffee panel	Daily/formal management and panel
8:30	General session with management	Management and panel
9:15	Assessment	Examiners, students and panel
10:00	Students	Students and panel
11:00	Board of Examiners	BoE including former formal secretary and panel
11:30	Development 1: <i>Explicitly address how skills acquired in the BCN master apply to careers outside of academia</i>	(Former) programme director, teaching staff, alumnus, representative of the professional field and panel
12:15	Lunch	
13:00	Teaching staff  Development 2: <i>Develop uniform teaching and application of statistical skills at the whole</i>	Teaching staff and panel

	<i>programme level when the different tracks have different scheduling</i>	
14:00	<i>Development 3: Clarify prerequisite knowledge for each core course of the first semester and offer study material for students to practise ahead of those courses</i>	Teaching staff, chair BoE, academic advisor, programme director and panel
15:00	Final discussion	Formal/daily management and panel
15:45	Discussion panel	Panel and secretary
16:45	Presentation of findings by the panel	All staff, students, and alumni who are interested