ARTICLE
Neuroscience and Global Learning

Michael G. Ruscio[1], Chris Korey[2], & Anette Birck[3]
[1]Psychology Department and [2]Biology Department, College of Charleston, Charleston, SC 29401, [3] DIS-Danish Institute for Study Abroad, Copenhagen, Denmark.

Traditional study abroad experiences take a variety of forms with most incorporating extensive cultural emersion and a focus on global learning skills. Here we ask the question: Can this type of experience co-exist with a quality scientific experience and continued progression through a typically rigorous undergraduate neuroscience curriculum? What are the potential costs and benefits of this approach? How do we increase student awareness of study abroad opportunities and inspire them to participate? We outline programs that have done this with some success and point out ways to cultivate this approach for future programs. These programs represent a variety of approaches in both their duration and role in a given curriculum. We discuss a one-week first year seminar program in Berlin, a summer study abroad course in Munich and Berlin, semester experiences and other options offered through the Danish Institute for Study Abroad in Copenhagen. Each of these experiences offers opportunities for interfacing global learning with neuroscience.

Key words: study abroad; global learning; curricular development; research internships; semester abroad.

During the 2012-2013 academic year, the number of American undergraduate students studying abroad hit an all-time high of 289,408. This reflects a trend of increasing enrollment in study abroad programs that has been apparent for over 10 years, with an increase of 25% in the total number of American students studying abroad in that time. Although historically study abroad had been largely the domain of language and international studies, STEM fields and the social sciences are currently the most rapidly growing areas representing 23% and 22% (respectively) of all students abroad in 2012-2013. Enrollment across all STEM disciplines increased by 9% from the previous year (Institute for International Education, Open Doors Report, 2014).

These trends represent unique opportunities for study abroad in the neurosciences. With growing numbers come the challenges of developing new courses and new programs that will serve our undergraduate students in ways that will ultimately advance their careers. A meaningful neuroscience study abroad program goes beyond the scientific knowledge and experience provided through a traditional neuroscience course by blending in an aspect of global learning. However, defining global learning, in and of itself, is challenging (Hovland, 2009, 2014; McQuaid et al., 2014) and how best to provide this experience through a neuroscience based course is worthy of attention. A useful working definition of global learning has been articulated by Hovland (2014). An effective global learner should develop a number of attributes including being a student who…:

- Masters skills and knowledge to participate in their chosen field
- Has the ability to address contemporary global issues
- Engages in meaningful interactions with people from other cultures
- Lives comfortably in an unfamiliar culture

We would also argue that future career development is an extension of living in an unfamiliar culture. Given this set of criteria, we believe that the blending of three elements: scientific knowledge, student career development and intercultural interactions are central to what global learning in neuroscience study abroad programs aim to achieve (Figure 1).

Even within this framework, the necessity and value of a neuroscience study abroad course may be less apparent than in other disciplines. For example, languages, history or international studies all have evident reasons to engage in the cultures and settings of their particular topics of interest. Within the sciences such as biology, the value of a field site provides specific observational or experimental opportunities. Comparatively, neuroscience is a primarily lab-based discipline. For example, there is not an apparent necessity to observe immunocytochemistry or patch-clamp technique somewhere in Europe as opposed to the U.S. Likewise, explaining the action potential in a different language or location does not change the basic physics of the Nernst equation. The value of neuroscience study abroad therefore, lies beyond exposure to a specific technique or particular knowledge. The added value comes from the broader recognition of applying common knowledge to address the big questions with new approaches from new angles to make advancements in neuroscience in a way that extends beyond geographical borders. However, the ability to conduct and apply research relevant to a particular issue can vary widely within a given country. This variance can come from differences in funding sources, organizational structure of the research community, government regulatory structure or health care system.

Another benefit of study abroad in the neurosciences is engaging students in thinking globally about career prospects and collaborative possibilities. As the field of neuroscience simultaneously grows and becomes

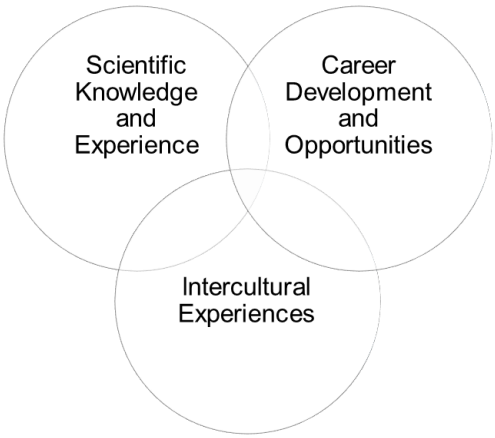

Figure 1. Global Learning in a Neuroscience Study Abroad Context.

increasingly specialized, a student whose ultimate trajectory is a career in research needs to develop an understanding of working collaboratively. In a progressively interconnected world these collaborations need not be limited to partner institutions down the road, or by the boundaries of countries. Rather they can be driven by scientific inquiry and identification of appropriate partners who are leaders in the field. Undergraduate study abroad begins to foster this recognition early in a student's research career and may ideally expand their career options. As a typical career in neuroscience can stretch from undergraduate, to graduate, to post-doc, to employment, it is often a nomadic endeavor within a highly competitive discipline. A study abroad experience can be an enormous step towards widening a student's 'familiar' geographic region.

The study abroad mechanisms for achieving these outcomes can take many forms. There are brief study tours (1 week), short courses (4-8 weeks), and semester-long experiences. These mechanisms can vary in their academic credit, experiential components, and costs. Here we discuss some of these mechanisms based upon our experiences and how they blend scientific knowledge, student career development with intercultural experiences to produce unique and individualized global learning opportunities for students.

FIRST YEAR EXPERIENCES

Research has shown that high impact learning experiences (HILE) such as study abroad, undergraduate research, and civic engagement are particularly powerful ways to improve student learning during the college years. George Kuh has outlined the beneficial student behaviors that are generated by participating in these types of high-impact practices and they include: interacting with faculty and peers about substantive matters, experiencing diversity, reflecting and integrating learning, and discovering relevance of learning through real world applications (Kuh, 2008; Brownell and Swaner, 2009). National Survey of Student Engagement (NSSE) data suggests that students, particularly under-represented minorities, that participate in at least one of these activities while in college show increased engagement and benefits in their other courses (Brownell and Swaner, 2009). Often, students are not introduced to these high-impact practices until their Junior and Senior years. This is due in part to a lack of course preparation on the student side, but more significantly it is due to a lack of structures available in the first year to encourage participation on the academic programming side. To address the lack of academic programming, the First Year Experience (FYE) program at the College of Charleston has built a FYE Abroad program that offers *one-credit* academic courses each spring that intentionally create academic experiences that are connected to short-term study abroad experiences over spring break. In the four years that it has existed, the program has grown from one course a year to five offerings a year spanning a variety of academic disciplines, such as The History and Sociology of English Football (London/Manchester/ Nottingham), Paris Up Close (Paris), The Natural History of the Galapagos (Ecuador); Genetics and Ethics in Berlin (Berlin). Chris Korey has taught the Berlin course, which focuses on eugenics in the 20th century and connects students interested in research and medicine to the controversial beginnings of human genetics.

***The Program*:** The College of Charleston's First-Year Experience Abroad program offers students the opportunity to continue engaging with ideas from their first semester through participation in a study abroad high impact learning experience. Students attend weekly classes in the first half of the spring semester to explore academic content, learn about another culture, and prepare for their travel experience during spring break. After the week abroad, students return to "unpack" the trip through a final assignment that connects course content with their cultural experiences. The courses are designed to reflect the intersection of academic knowledge, career development, and intercultural experience as outlined in Figure 1. In addition to those general themes and the primary academic content of the courses, the program tries to more finely express how we expect first year students to encounter global learning through more specific intercultural learning outcomes. Student learning outcomes are based on three key aspects of personal development: *Develop, Experience, and Reflect.* These three aspects of personal development were used to create specific student learning outcomes for the program.

After taking part in the program students will:

- Increase their ability to interact with and observe cultural differences and consider issues from diverse perspectives (Develop, Experience, Reflect)
- Demonstrate a respect for the cultural differences that exist between the cultural values of the student and the local culture after interpreting their own culture and how it has shaped their values and beliefs (Develop, Reflect)
- Integrate continuous global learning into their academic and personal lives and explore international opportunities after returning home (Experience, Reflect)

As the program has grown we wanted to assess the design of the program and its impact on students. Our initial assessment goals were centered on how students understood and created meaning from our FYE Abroad academic courses. We wanted to understand the narratives that students had about the experience and examine how they aligned with our overall student learning outcomes. To accomplish this, we used a qualitative research approach to examine our spring 2013 FYE Abroad cohort's experience in two of our courses – History and Sociology of English Football and Biomedical Ethics and Genetics in Berlin. We ran a series of focus groups that captured 50% of course participants and then followed up with these two groups using an online questionnaire (n= 14 of 24). Our analysis of the transcripts from our focus group interviews revealed four general data categories that best represent the student experiences that we captured: *Student Development, Trip Experiences, Study Abroad Preparation*, and *Course Reflection.*

Student Development Outcomes: The FYE Abroad program was intentionally designed to have an Express I (half semester) academic component that met weekly for the 7-8 weeks prior to the travel experience. Students indicated that this was a crucial part of the experience that prepared them for their in-country experience and separates these experiences from a one-week tourist-style experience to a particular location.

> "*I think that is the difference between the course and if we had just gone on vacation [or] just gone [on a] trip [sic]. That would have been a lot of fun and everything, but by connecting it with the journal and the class it really made it more of a full experience with their culture.*"

This comment is typical of the group as a whole. Students appreciated creating connections to the subject matter and preparing for the place-based learning they would be doing while abroad. The course would not be as successful without this academic component. In fact while the travel component was attractive to students, all of the students indicated that it was the academic subject matter that was the primary attraction to the program.

Trip Experience Outcomes: One concern we had in developing this program was that it would be difficult to create an intercultural experience in just one week of in-country time. It was important that the trip was grounded in an experience that was much more than a tourist-style trip. In many ways the student narratives suggest that we have accomplished some of that goal in regards to an intercultural experience, through the intellectual connections to culture the courses make. Despite the abbreviated experience, our students were able to observe distinct aspects of our host cultures:

> "*I think it's important because especially in Germany with its divided history. It gave us a chance to see what it was like, to compare the former Soviet Union and the west and you can really see that difference through the museum we saw, the memorials, even the architecture, you could see the difference and it is important to understand the difference."*

But there was also the recognition that a truly immersive experience required a longer stay:

> "*I think that for global learning. I think that we would have to sit in a German classroom to get that effect. I think we can go over as a group and do our own thing and not get how they learn over in Germany."*

This idea was carried over into student narratives that also revealed an interest in a more direct experience with student culture in a foreign city:

> "*I wanted to spend a little more time with the Manchester students. I liked how they gave us a tour around everything. I thought it was …it gave people an idea of what the [student] culture was all about."*

Finally, it was important to the students to have a balance to the trip in which academic experiences were also coupled with the ability for students to explore the city on their own. One of the students described this not as free time, but rather as "experience-time."

As the program has matured we have been able to create intentional moments where students interact with the host country cultures, while also giving them some freedom to create those connections on their own as they explored the city. In Germany we partner with Culture Junction (http://culture-junction.com/) to do an intercultural seminar to discuss intercultural learning and to directly discuss U.S. and German culture. While not necessarily our intention at the outset, it is also clear that connections to student culture were an important and impactful part of our UK trip. The College has several strong connections to universities in the region that facilitate this type of intercultural experience. Based on our assessment we hope to encourage building these connections for students in our future courses.

Study Abroad Preparation Outcomes: One of the learning objectives of the FYE abroad program is to give them the confidence to consider the idea of longer experiences and help them prepare for a longer experience later in their academic career. The narratives students share with us support this notion from the simple level of confidence in leaving the country:

> "*Learning like the flying route internationally, checking in, learning to exchange money and all that is something you are going to have to do no matter where you go…"*

The students also indicated how these high impact experiences fit into their educational goals:

> "*I have always thought that international experiences are a good idea, especially during college since it's a main time for self-development. This program re-emphasized this for me and illustrated to me the many options of study lengths."*

The practicalities of study abroad are also examined early to allow for preparation and understand some of the exchanges that are set-up between institutions:

"I think that a lot of people are scared of the transferring of going abroad and I think this trip gave kids a good idea of how well organized the sister schools are. It seems like transferring back and forth is really easy and fitting in is pretty good and really easy. But everything, it definitely makes you want to study abroad more. Gives you confidence…."

One of the explicit goals of the program is to encourage students to think about study abroad at a time in their college career when they can most effectively plan for a future, more extensive experience such as a summer or semester long programs. After the completion of an FYE Abroad course we hope that students have become more literate about intercultural perspectives and eager to engage in a longer academic stay in another country to further their connection to a particular country and explore possible global career opportunities. This is directly connected to our learning outcome of encouraging continuous global learning. We are doing ongoing assessment of this by tracking student engagement in study abroad in subsequent years to have a more quantitative picture of future study abroad engagement.

Reflection Outcomes: Reading responses and reflections have been built into the FYE abroad program curriculum as the courses have developed. Instructors saw them as important ways to prepare for the trip and record student experience while on the trip. Student experiences reinforce this key component of the courses. They saw it as an important part of the pre-travel course and one of the important academic components of the trip experience:

"*Reflection questions were helpful in the retention of activities and information, and in forming an overall mental connectivity of the learning. I found these to be very helpful in forming opinions and actually having "take-aways" from the experience."*

The conversations students had about the trip constantly came back to the journaling and reflecting that forged connections between the trip and the subject matter they were studying. Our assessment suggests that this should remain a key, required component of our FYE Abroad curriculum development. In addition, it is a natural place to observe student learning in this program to assess how well our students are achieving the overall program learning objectives.

Finally, to assess both the academic content outcomes and intercultural learning at the end of the courses, we have encouraged faculty to design final papers that ask the students to demonstrate their academic knowledge and connect that to a reflection on the intercultural learning that they have experienced in the courses. For instance, the *Genetics and Ethics in Berlin* course asks students to examine the current regulatory differences in the United States and Germany in regards to pre-implantation genetic diagnosis technology. This final assignment allows students to draw on their experiences in Germany to begin to see how cultural differences and historical perspectives can impact current policy decisions. In addition to allowing students to demonstrate their academic learning, it may be possible to use these final writing assignments to more broadly assess global learning/intercultural learning across the program in reference to Hovland's working definitions – a more difficult goal, but one that can provide both qualitative and quantitative support for student success in achieving learning outcomes.

In addition to connecting the history of biology and neuroscience to study abroad opportunities, it is becoming clear that career development is another avenue for further developing study abroad in the first year. We have had ongoing conversations at our own institutions and within Faculty for Undergraduate Neuroscience (FUN) about how best to advise our students about the variety of career opportunities available to students who pursue neuroscience. The global nature of research and medicine provides an excellent opportunity to integrate the academic study of neurological disease with an abroad experience in Germany or Denmark (or any other country) that engages students with the variety career opportunities on a global scale. Students would gain perspective on how academic research, biotechnology, public health, and media play a role in addressing the issue. In addition to an early exposure to possible future career paths, this approach would also engage students in global learning by exposing them to how different societies may develop unique solutions based on their cultural philosophy. Planting the seed in the first year of a student's college career can help them to shape their academic curriculum to fit in longer study abroad stays in later years and prepare themselves for the possibility of living and working outside of the United States.

NEUROSCIENCE SEMINAR IN GERMANY

Neuroscience Seminar in Germany (blogs.cofc.edu/germanneuro/) is a four-week summer study abroad course that has been offered by the College of Charleston since 2011. It is led by faculty members Chris Korey and Michael Ruscio, and recruits student applicants from across North America. The course is conducted in collaboration with two universities associated with the German Graduate Schools of Neuroscience: Munich Center for Neurosciences – Ludwig Maximilians Universität (MCN-LMU) and Charité – Universitätsmedizin, Berlin (a joint institution of the Freie Universität and the Humboldt-Universität). Details of the program's inception content and assessment are discussed in more detail elsewhere (Ruscio and Korey, 2012). Here, we briefly discuss how the format of this program lends itself to global learning in the neurosciences and potentially fits into an existing curriculum.

At the inception of this program we recognized that there were limited study abroad opportunities for students in the neurosciences. Although this fact is driven by several factors, one of the more pertinent seemed to be that a neuroscience undergraduate curriculum (major or minor) is typically rigorous and it is difficult for a student to incorporate a semester abroad experience. Furthermore, neuroscience students often are engaged in laboratory research during both the academic year and summer. A four-week program at the beginning of the summer (May-

June) was designed based upon optimal timing to attract students after their spring semesters and potentially prior to summer research. The letters of intention in the student applications further reflect the efficacy of this approach:

> "*Until coming to the College of Charleston nearly three years ago, I had never deeply considered the prospect of getting the chance to carry out a career as a neuroscientist while living in a foreign country. However, upon learning about this program I began to contemplate the potential of working in Europe. Particularly, Germany boasts impressive research institutes directly related to my field of interest. By participating on this trip I can develop an understanding of the existing scientific community in Berlin and Munich."*

> "*At the time, many of my friends were pursuing potential options for studying abroad next year. The sheer number of requirements for my major, along with the fact that I spent much of my freshman year fulfilling general education requirements, essentially guaranteed that I would not be able to study abroad in the traditional manner. Before I heard about your program, I was a bit disheartened because I thought that I would have to miss out on the experience of studying in another country altogether*."

This strategy behind the duration and timing of the course has worked well thus far, and we have been fortunate that the applicants to our program are dedicated and intrepid young neuroscientists. However, this strategy is not unique. Approximately 60% of all U.S. students studying abroad in 2012-2013 were enrolled in short-term study abroad courses (including summer programs and 8-week programs) (Institute for International Education, Open Doors Report, 2014).

Global learning and cultural immersion in such a short time window is challenging and requires reasonable expectations and goals. With only two weeks in each city (Berlin and Munich) one cannot be expected to come away with the same experience as a semester abroad. However, students do get a flavor of the culture and history of each city. We facilitate this dialogue with an intercultural competency seminar with Culture Junction; designed for professionals to become aware of the unique aspects of German culture, academic culture more specifically, and how to form collaborative partnerships. This, in turn, may inspire further travel or inquiry into these new cultures as well as the recognition of unique aspects of their own cultures.

The general design of the class is lecture and laboratory. Students are exposed to 3-4 individual research programs at each location. This includes presentations and discussion from the primary investigator followed by an afternoon with a laboratory tour and experience. Additionally, at each location students interact with Master's and graduate students through academic presentations and social events. For many of the students in the program, this was the first opportunity they had in their academic careers to speak with any graduate students. These interactions are scheduled during the first few days to allow students to develop relationships at each location. They provide our students with a unique window into the world of graduate school, as well as the academic and social culture in Germany. Finally, at both locations there are presentations from the graduate program directors and admissions. This is particularly useful as it outlines differences in the programs in Germany (in relation to Master's and Ph.D. programs) and the details regarding the application process for international students.

One of our goals for the Neuroscience Seminar in Germany course is to inspire a continued global approach to neuroscience and associated career trajectories for our students at a time when they are more seriously considering their post-undergraduate options. Germany provides fertile ground for this. The number of foreign students studying in Germany in 2012-2013 increased to approximately 300,000, just behind America, Britain and Australia as the most popular destinations (The Economist, 2014). Also the number of Master's programs in English is increasing throughout Europe (Brenn-White and Faethe, 2013). Master's and graduate programs at both partner universities associated with the program (LMU and Charité) are taught exclusively in English, so German language proficiency is not a requirement for these programs. Neuroscience Seminar in Germany appears to increase the affinity students have to applying to one of these programs. Assessment data from the program demonstrates that 100% of enrolled students were highly likely to consider (7 on a 7 point scale) applying to a graduate program in Germany. Evaluations were all extremely positive (with no measure falling below a 5 and a modal value of 7 across measures). This represents data from 26 students across three offerings or the course. Detailed quantitative assessment with a limited number of students is challenging. Beyond extensive exit surveys and class evaluations we also rely upon qualitative data from narratives and student descriptions of their experiences. We have found their responses to be extremely useful in conveying specific sentiments about what they valued most in their study abroad experience. Some of our students have either applied to graduate school in Germany, enrolled in another study abroad program or undertaken an internship in Germany or elsewhere in Europe. They have also established an unofficial alumni network amongst themselves.

DIS - DANISH INSTITUTE FOR STUDY ABROAD

Students looking for a full semester neuroscience program that has the possibility of research experiences can look to the Danish Institute for Study Abroad (DIS). DIS is an independent, nonprofit, teaching institution located in the center of Copenhagen that provides diverse English-language academic and co-curricular programming/student services for American undergraduate students, both in the semester and the summer. Students come from more than 175 American universities with approximately 80% of the students from the most selective private colleges. The semester-long programs of study, 100% financed by tuition, provide integrated course-specific study tours throughout Europe. In addition, diverse housing options, that can include homestays in Copenhagen, add both

experiential learning and cultural immersion to the program of study.

***Curriculum Design and Experiential Learning*:** Flexibility and personalization are key components of the semester-long programs at DIS. Students enroll in a program core course that includes two faculty-led study tours that are built upon classroom content. In addition to the core course, students choose between three and four electives from among more than 200 courses (each typically 3-credits). This flexibility gives students the opportunity to pick courses, typically a mix of science and non-science courses, that are relevant to their home university curriculums allowing them to earn credit for their major and, if appropriate, general education requirements. DIS works closely with their partner universities to ensure the continuous offering and development of upper level courses that take advantage of local competencies and strengths, are relevant for science majors, and are designed to be eligible for credit transfer. All courses offered within the neuroscience curriculum at DIS have upper level pre-requisites (e.g., neuroscience, biology, chemistry, psychology). DIS typically does not offer any standard introductory level science lecture or laboratory courses.

DIS prides itself on its hands-on learning style that uses engaging pedagogies that have been proven to be conducive to higher levels of learning. Student learning takes place in a variety of formats and venues depending on the course and can include: field studies that use Copenhagen as a classroom (Uhrskov, 2012), study tours, expert guest lecturers, case studies, problem based learning, research labs, and practicum. Study tours are faculty-led, course integrated visits to other European cities and academic/research institutions, which are highly valued by students. Surveys of DIS student alumni 2012 (1840 students, 40% response rate) reveal the benefits they perceive from spending the semester in Copenhagen: 98% said that the emphasis on experiential learning at DIS was an especially valuable dimension of their college learning experience, 96% see the world from a more global perspective, 95% gained better insight into themselves, and 91% discovered new insights related to their major.

***Neuroscience majors at DIS*:** In the fall of 2013, DIS developed a Neuroscience program (NSC) to fill a void in study abroad programs that served the growth of Neuroscience majors and minors in the United States. From the outset, there has been significant interest in the NSC program, with approximately 50 students enrolled in each semester. The Neuroscience program targets juniors and seniors majoring in neuroscience, biology, bio-chemistry, health science, psychology or public health. Neuroscience majors coming to DIS now primarily enroll in the NSC Program, but a few students enroll in other related programs, such as Biomedicine (BMD), Psychology (PSY), or the Medical Practice & Policy (MPP) program (Figure 2). Figure 2 shows the number of neuroscience majors choosing particular programs since their inceptions at DIS. Prior to 2013, DIS primarily attracted pre-medical focused neuroscience majors to the MPP program. A significant jump in neuroscience majors coming to Copenhagen coincided with the launch of the pre-clinical research-based NSC program (Figure 3).

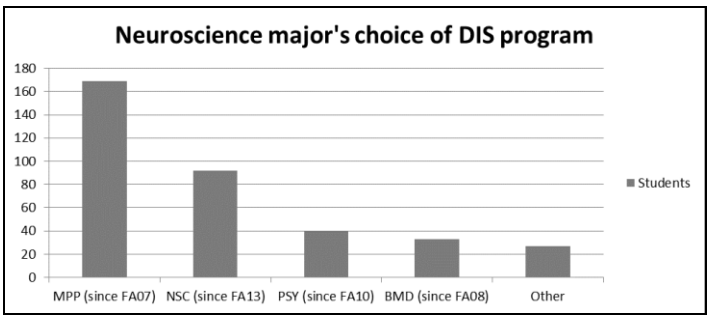

Figure 2. Neuroscience Program Choices at DIS. MPP – Medical Practice and Policy, NSC – Neuroscience, PSY – Psychology, BMD – Biomedicine.

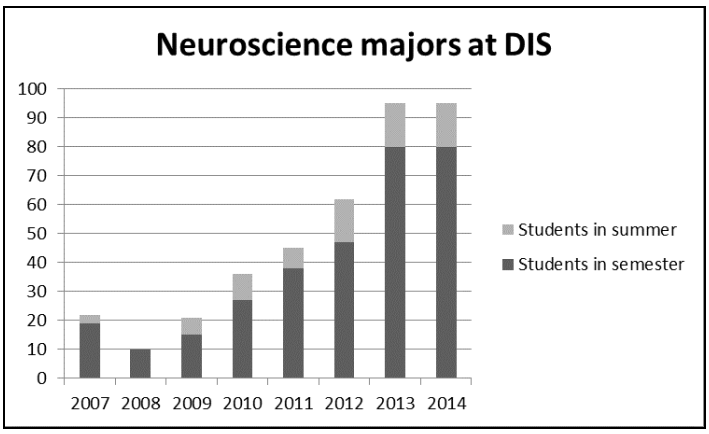

Figure 3. Neuroscience Enrollment Patterns at DIS.

***The NSC Program and Student Outcomes*:** Students in the Neuroscience Program at DIS take the core course "Psychopharmacology – Substances and the Brain." In the classroom, students explore the neurobiology and neuroanatomy of psychiatric disorders and gain insight into their pharmacological treatment. This classroom-based curriculum is then connected to the cutting-edge clinical and basic research programs that are based in prominent European research, pharmaceutical, and educational institutions.

During the program students:

- Learn to explain how psychoactive drugs affect the function of the brain
- Expand their understanding of the history of psychopharmacology, societal attitudes and stigmas surrounding these treatments, and clinical and lab-based research in pharmacology/drug development
- Gain exposure to various neuroscience careers through visits and lectures with leading figures working within prominent neuroscience research and education institutions

Doing a full semester study abroad program means that students in the Neuroscience program get to know and understand the international and collaborative nature of science. Course faculty are also research active and can give students a European and Scandinavian perspective on current issues in the field. Experiential learning takes place by faculty bringing real-life expertise from their field into the classroom, by doing explorative lab exercises at the faculty's own research lab, and by giving students direct access to resources and networks both in Copenhagen and on study tours to other research institutions throughout Europe. During the study tours, students meet and network with top-scientists and leading professionals during visits to prominent/world-renown research centers, clinics and pharmaceutical companies such as the Institute of Drug Design and Pharmacology, University of Copenhagen, the Neurobiology Unit Biomedical Center, Lund University, the Max Planck Institute, Munich, Ludwig Maximilian University, Munich, and Lundbeck A/S, Copenhagen. In addition to laboratory visits, DIS works with 15 research institutions in Copenhagen to offer research practicums for a very select group of dedicated and excellent students. Each student works 15-20 hours per week and develops a research project with their supervisor that is part of a larger ongoing project within the active research group. These practicums give students an opportunity to be part of a research group and to get a feeling of what it entails to work as a scientist.

Career development is a key component of undergraduate education in the rapidly changing landscape of biomedical research. Through learning about different scientist's and clinician's daily work and their choice of career paths within neuroscience, students acquire a better understanding of what their own future study and career opportunities may be. Study abroad experiences can open doors for future career-enhancing opportunities:

"Through this course and interacting with the faculty of DIS and professionals met throughout Denmark and Munich, I was able to step out of my comfort zone and earn an internship at the Brown University's Advanced Baby Imaging Lab this summer where I will be assisting in conducting MRI research."

Studying abroad is, therefore, a great opportunity for neuroscience students to get another perspective on their major and their life. DIS faculty help students integrate what they study at DIS with their own experiences and observations of the Scandinavian and European contexts, to struggle with real dilemmas, propose tentative solutions, and embrace complexities — just as they will in their future lives:

"My background in neurobiology and psychology was transformed into a unique and interdisciplinary approach….The world literally became my classroom as we traveled to different research institutions and universities throughout Europe to learn about novel treatment options and basic research being done in the field. Neuroscience was no longer some static entity only to be practiced and studied within the confines of the research institutions I knew of in America; it became a global approach of which I was inspired to form the basis of my thesis research on."

DIS will continue to develop more neuroscience related courses and research opportunities to meet the growing demand and interest for undergraduate neuroscience courses such as "Cognitive Neuroscience of Consciousness." Taken all together, DIS offers neuroscience students the possibility to get insight into and explore different neuroscience research environments and careers. Students immerse themselves academically by expanding their understanding of (and the connection between) psychiatric history and practice, as well as clinical and lab-based research. In this way students get a more holistic view, including different perspectives on the subject, be it from a more cellular approach or a behavioral one.

THE FUTURE OF GLOBAL LEARNING IN NEUROSCIENCE

FUN, as an organization, is ideally positioned to continue to foster the growth of international neuroscience and global learning at the undergraduate level. Simply making students aware of study abroad as a possibility in their curriculum is an important step for a student to determine if he or she is interested in these opportunities. Curricular designs also need to be flexible by identifying methods that allow a study abroad experience to count as credit towards the progression of a particular degree (major or minor in neuroscience). Oftentimes, a study abroad experience can detract from a student's ability to develop as a neuroscientist at their home institution by limiting their ability to engage in research or similar experience for the time they are abroad. The goal of these exchange programs is to make an international experience a catalyst, rather than a hindrance to a student's evolution toward professionalism in neuroscience or her or his chosen field. With our examples from FYE courses, to summer courses to the versatile opportunities at DIS, we hope to demonstrate that an international experience can be effective at any level of the curriculum. Furthermore, it can co-exist with high level learning experiences in neuroscience in the classroom and laboratory. These experiences are further enhanced when they take place in a novel international setting and reveal new opportunities and new career prospects.

In addition to increasing awareness and advising students effectively, perhaps one of the more significant hurdles for students in undertaking a study abroad experience is funding. For many semester-long programs there is a manageable cost, as tuition at a student's home university can be applied to the host institution in the study abroad locale. Conversely, summer programs are an additional cost beyond annual tuition. Many colleges and universities in the U.S. offer a variety of scholarships for these students. A commitment to financial or infrastructural support from the home university or college can be critical in making a program accessible to a wider range of students. Furthermore, external funding opportunities (e.g., Fulbright, DAAD German Academic Exchange Scholarship, International Institute of Education, DIS) also exist and are awarded based upon academic achievement and financial need. For the determined student with limited

economic resources, funding opportunities exist.

As we consider ways in which exchanges can develop, they can move beyond classroom-focused approaches towards the laboratory and research-based experiences. This approach can work well at the undergraduate level or the Master's level, although the logistics of setting up such an individualized experience can be difficult. Through the College of Charleston's partnering with German universities we have also begun to explore these opportunities. Currently in development, the goals of these programs revolve around common research interests (rather than an aspect of the undergraduate curriculum) and take the form of an internship or research assistantship for a semester or summer. Awarding academic credit at the Master's level between two programs can be convoluted, in part due to wider variability in program requirements at the Master's level in comparison to the undergraduate level. Therefore, goals of these exchanges rest on providing a quality research experience and the resulting research products (presentations or papers). And as with our undergraduate programs, they aim to develop students as global learners with increased career opportunities.

As we have made our continual forays into study abroad and exchange programs, we have also come to recognize that throughout FUN there are numerous faculty members who have developed unique and successful study abroad and exchange programs. Our challenge moving forward is to more fully assess the impact of these programs on student learning and student intercultural learning. While we have evidence from student performance that they are successfully engaging with the Neuroscience material, we also need to turn our attention to what the students are actually learning in the abroad setting. What intercultural and career outcomes are they achieving? (Vande Berg et al., 2012). This should be a key component of FUN's focus in the area of study abroad – leading the way in the use of holistic assessment to ensure that we are providing the necessary pathways for student learning in the study abroad setting.

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Address correspondence to: Dr. Michael G. Ruscio, Psychology Department, 57 Coming St., College of Charleston, Charleston, SC 29401. Email: rusciom@cofc.edu