Proposal for a B.S. in Cognitive Science

I. Introduction

This is a proposal for the establishment of an undergraduate major (B.S.) in cognitive science at the University of Delaware. The degree will be housed in the Department of Linguistics and Cognitive Science. The Department of Linguistics is currently in the process of changing its name to the Department of Linguistics and Cognitive Science. This name change is dealt with in a separate document. The Department of Linguistics is currently the academic home for the M.A. in Linguistics and Cognitive Science and for the undergraduate Minor in Cognitive Science and the Minor in Linguistics. The proposed B.S. is intended to bridge the gap between the Minor in Cognitive Science and the M.A. in Linguistics and Cognitive Science.

The major is designed to capitalize on existing faculty research and teaching strengths and to provide a formal curriculum and degree in one of the most influential new fields of study. Moreover, specialized concentrations in such sub-areas of speech science and linguistic science will meet the needs of a potentially significant number of students not currently served by an existing University curriculum.

II. Rationale and Demand

1. Institutional Factors

Cognitive science studies the human mind viewed as a computational process. It lies at the confluence of computer science, educational and cognitive development, linguistics, neuroscience, neurobiology, philosophy, psychology, and certain areas of mathematics. Cognitive science has arguably been the most important development in the study of human thinking in the past twenty years; its influence can be seen across a wide variety of disciplines, from logic to communication disorders. Numerous other schools have had the foresight to establish formal programs in the area (e.g., Brown, Johns Hopkins, MIT, UCSD, UCI, Washington University, among others), and we propose to follow suit.[1]

As a discipline, cognitive science seeks to model and explain such phenomena as language, reasoning and perception. The goal of cognitive science as a theoretical discipline is to determine those knowledge structures and processes that characterize organisms as biological information processing systems, as well as to explain how these organisms come to possess this knowledge. Applied cognitive science takes the results of this research to such diverse areas as language technology, cognitive approaches to education, human computer interaction etc. The latter field addresses the most effective use of technology by people and includes the study of user interfaces, graphical displays, visualization of data, virtual reality, technology-based education, intelligent agents, and computer-based assistive technology for persons with disabilities.

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[1] Program descriptions for a number of these programs are provided to allow comparison of the proposed UD program and that at other universities.

The University of Delaware has a number of faculty members with strengths in both applied and theoretical cognitive science (see section V). For years, an informal research group has met regularly to discuss recent research in Cognitive Science, and the Program in Cognitive Science has offered a stimulating program of lectures to student body, public and faculty. At present, however, there is little in the way of formal educational opportunities for undergraduate students to pursue this cross-disciplinary study. There is a minor in cognitive science (administered by the Department of Linguistics), but, as a minor, this option remains a secondary choice to students and not the focus of significant curricular development. There is no available formal program for speech science—a natural preliminary for graduate study in speech pathology as well as a natural offshoot of applied cognitive science—even as a minor area of study. While the Department of Linguistics has provided a curriculum for students interested in preparing for graduate work in speech pathology and language pathology, this has been handled in an ad hoc fashion and, therefore, has not fully met the needs of the students or of the State of Delaware. We propose to correct these problems through the creation of a new undergraduate major in cognitive science.

2. Student Demand and Employment Factors

A B.S. in cognitive science can have great impact at the undergraduate level, where it can feed into a variety of professional careers (e.g., cognitive engineering, user interface design) and graduate programs (e.g., computer science, education, linguistics, psychology, philosophy, speech pathology and cognitive science graduate programs). Graduate opportunities in cognitive science are already in place to a great extent. The Department of Linguistics offers an M.A. in Linguistics and Cognitive Science. The Doctoral programs of three departments, Linguistics, Psychology and Computer and Information Science offer the possibility of Doctoral programs encompassing major aspects of cognitive science. Thus, while we plan to revisit in the future the question of whether a stand-alone Doctoral program in cognitive science should be offered, our immediate concern is in providing opportunities to UD undergraduates.

The relationship between cognitive science and graduate speech pathology is particularly important for the establishment of this degree at Delaware. The need for speech pathologists in the state is evidenced by the availability of public support dollars for graduate students who agree to work in Delaware after finishing their degrees. Nonetheless, with the exception of the ad hoc program currently offered by the Department of Linguistics, the University does not currently provide any formal curriculum for students planning to enter graduate school in speech pathology. We hope to remedy that deficit with this program.

III. Enrollment, Admissions and Financial Aid

1. Enrollment

There are currently about 30 students in the ad hoc pre-graduate speech pathology program organized by the Department of Linguistics. The number of students that we agree to allow into this informal program has been artificially limited, so we anticipate the demand by qualified students to be initially about 20 students per year (a conservative estimate). In addition, the Department receives about 15 inquiries a year by students not considering a career in speech

science who would like to major in cognitive science. So far, most of these inquiries have been from current UD undergraduates, but with publicity there could easily be an additional 15-25 students per year applying for the program from outside the University. Thus, we estimate that within a short while the number of majors enrolling each year will be at least 35, and perhaps as many as 50.

We would like to emphasize, however, that the major reason to initiate the program is not because it will draw large numbers of students. Rather, we envisage this program as an attraction that will draw superior students to Delaware. As a discipline, cognitive science has been attractive to many of the very best students in the University. Of the students who have constructed a major in Cognitive Science as Liberal Studies majors and Dean's Scholars, a disproportionate number have received Rhodes and Marshall Scholarships, Warner and Taylor awards (best female and male student) etc. Among such students are the following:

Douglas Mauro de Lorenzo (B.A. 1998, Rhodes Scholar and Taylor Award; M.A. Linguistics; currently a Ph.D. candidate in refugee studies at Oxford)

Matt Huenerfauth (B.A. 2001, Marshall Scholarship [declined in favor of Mitchell Scholarship]; George Mitchell Scholarship; Minor in Cognitive Science, M.A. University of Dublin; currently a Ph.D. candidate in artificial intelligence at U Penn)

Thomas Pellathy (B.A. 2000, Rhodes Scholar and Taylor Award; M.A. Linguistics; currently a Ph.D. candidate at Oxford)

Katherine Wong (1999 Warner Award, RA on Linguistics NSF project & MA student in Linguistics; currently a professional musician in New York)

In addition to serving students already on campus, this program is being created to attract to Delaware students like the above and to provide exciting but structured opportunities for such students. The Department is less concerned with reaching particular enrollment goals than with maintaining the highest academic standards and attracting the most academically able students.

2. Admission Requirements

It is anticipated that most graduates of the program will seek postgraduate training in order to satisfy their professional aspirations. In order to ensure that students interested in cognitive science, and related fields like linguistics, speech science and speech pathology and other areas as well, will be admitted to the best graduate schools, students will only be formally admitted to the program based on their college GPA. During the freshman year students may declare a Cognitive Science Interest Major, but admission to the program as a Cognitive Science Major requires the completion of at least 30 credits of study. The minimal GPA for admission to the program will be 3.0. Once in the program, students whose current (not cumulative) GPA for required courses and courses with CGSC and LING designations falls below 3.0 will be placed on probation. If the current GPA for required courses and courses with CGSC and LING

designations is not raised to 3.0 by the end of the following semester, they will be dropped from the major.

IV. Curriculum Specifics

1. Institutional Factors

The Degree to be awarded is the bachelor of science (B.S.) in cognitive science. We are proposing a B.S. rather than a B.A. because, in order to achieve sufficient interdisciplinary coverage and specialization, this program requires 124 credit hours with at least 43 credits in the major. For a significant number of students it will be necessary for the major to consist of 50 credit hours or more. In contrast, the B.A. typically requires 30-35 credits in the major and no more than 45 credits are permitted. Thus, the degree of bachelor of arts is not appropriate for this major.[2] Students will also have to meet University and College requirements as specified below. As is usual for B.S. degrees, the requirements are tailored to meet the needs of the curriculum.

2. Description of Curriculum

a. Core requirements

At the foundation of the major is the introductory survey course in cognitive science, which has heretofore been taught within the Department of Linguistics. Further, all majors will be required to do work in the contributory subfields and methodologies of the cognitive sciences. This is a feature of the existing minor that we bring unchanged into the major. The specific course distribution and requirements for this "core curriculum" are as follows:

Required Courses (25 hours/credits)

All of the following:

CGSC 270	Introduction to Cognitive Science (foundation course)	3 hrs

[2] At the University of Delaware the designation of "B.S." indicates that a program is highly focused rather than that it is one that is based primarily on laboratory science courses. Examples of B.S. programs at UD that do not require a large component of laboratory science courses are International Business Studies, (which focuses on advanced language skills and international area studies to accompany business courses), marketing and other business majors; Elementary teacher Education, Early Childhood Education and other education majors; Apparel Design/Fashion Merchandising, Hotel, Restaurant and Institutional Management, Human Services, Education and Public Policy, Leadership and many others (see the current catalog). What these programs have in common is that their requirements are more focused than those of B.A. programs.

While the proposed B.S. in Cognitive Science is by nature in fact more science oriented than many of the above B.S. degrees, the choice of the B.S. rather than the B.A. is motivated by the need to allow greater focus than is possible in B.A. degrees rather than by the science orientation of the degree.

CGSC 314	Brain and Behavior	3 hrs
CGSC 485	Seminar in Cognitive Science (senior seminar)	3 hrs
LING 101	Introduction to Linguistics	3 hrs
PSYC 100	General Psychology	3 hrs

and

One of the following:

BISC 104	Principles of Biology with Laboratory	4 hrs
or		
BISC 207	Introductory Biology I	4 hrs

and

One of the following:

CISC 105	General Computer Science	3 hrs
or		
CISC 103	Introduction To Computer Science with Web Applications	3 hrs
or		
CISC 181	Introduction to Computer Science	3hrs
or		
CISC 280	Program Development Techniques	3 hrs

and

One of the following:

PHIL 205	Logic	3 hrs
or		
MATH 201	Introduction to Statistical Methods I	3 hrs
or		
MATH 205	Statistical Methods	4 hrs
or		
PSYC 209	Measurement and Statistics	3 hrs

b. Concentrations and Individualized Study

In addition to completing the required core, students will develop, with the aid of a faculty advisor, a concentration program individualized to their interests. Some students might wish to pursue the linguistic focus of speech science or linguistics; others may wish to study natural language processing and artificial intelligence and have course work in computer science etc.

The faculty advisor must be among the faculty listed in Section V of this proposal. Upon approval of the major, an up-to-date list will be maintained on the Department website. Further, the concentration program must be proposed by the student, approved by the student's faculty advisor and approved by the Undergraduate Studies Committee of the Department. All concentration programs will have at least 18 credits drawn from a list of eligible courses which will be maintained on the Department's website. The credits needed for some concentrations (e.g. Speech/Language Pathology) will exceed 18 hours because additional courses are needed to prepare students for graduate work in these specialized areas. The list of eligible courses will be updated and posted annually on the Departmental website. Substitute courses may be proposed by the student with the approval of the faculty advisor. The following list of courses is presently available in the 2006-2007 academic year or the courses have been proposed for the 2007-2008 academic year:

ANTH 102	Introduction to Biological Anthropology	3 hrs
ANTH 202	Human Evolution and the Fossil Record	3 hrs
ANTH 205	Anthropology and Human Nature	3 hrs
ANTH 300	Primatology	3 hrs
BISC 107	Elementary Evolutionary Ecology	3 hrs
BISC 195	Biological Evolution	3 hrs
CGSC 327	Race,Gender and Science (existing PHIL course submitted for cross listing with CGSC))	3 hrs
CGSC 330	Philosophy of Mind	3 hrs
CGSC 340	Cognition	3 hrs
CGSC 404	Animal Minds (new course submitted for approval)	3 hrs
CGSC 421	Philosophy, Biology, Society (new course submitted for approval)	3 hrs
CGSC 450	Recent Topics in Philosophy of Mind	3 hrs
CGSC 379	Audiology (new course subject to approval)	3 hrs
CGSC 481	Artificial Intelligence	3 hrs
CGSC496	Psycholinguistics	3 hrs
CISC 220	Data Structures	3 hrs
CISC 280	Program Development Techniques	3 hrs
CISC 304	Logic and Programming	3 hrs
CISC 409	Topics in Artificial Intelligence	3 hrs
LING 102	Language, Mind and Society	3 hrs
LING 203	Languages of the World	3 hrs
LING 222	Language and Gender	3 hrs
LING 253	Laboratory Phonetics	3 hrs
LING 265	Studies in Language	3 hrs
LING 376	Introduction to Communication Disorders	3 hrs
LING 377	Clinical Principles and Procedures in Speech Pathology	3 hrs
LING 378	Anatomy and Physiology of Speaking	3 hrs
LING 383	Language, Power and the Law	3 hrs
LING 385	Language and Law: Court Interpretation	3 hrs
LING 390	English Linguistics	3 hrs
LING 401	Historical Linguistics	3 hrs
LING 407	Phonology I	3 hrs
LING 409	Syntax I	3 hrs

LING 417	Language Planning	3 hrs
LING 433	Introduction to Acoustic Phonetics	3 hrs
LING 462	Language Acquisition	3 hrs
LING 476	Second Language Acquisition and Bilingualism	3 hrs
LING 477	The Structure of English	3 hrs
LING 480	Introduction to Sociolinguistics	3 hrs
LING 491	Semantics I	3 hrs
LING 610	Syntax II	3 hrs
MATH 205	Statistical Methods	4 hrs
MATH 210	Discrete Mathematics I	3 hrs
MATH 315	Discrete Mathematics II	3 hrs
PHIL 306	Philosophy of Science	3 hrs
PHIL 320	Theory of Knowledge	3 hrs
PHIL 330	Philosophy of the Mind	3 hrs
PHIL 421	Philosophy, Biology, Society (new course submitted for approval)	3 hrs
PHIL 450	Recent Topics in Philosophy of Mind	3 hrs
PSYC 207	Research Methods	3 hrs
PSYC 209	Measurement and Statistics	3 hrs
PSYC 310	Sensation and Perception	3 hrs
PSYC 316	Biological Basis of Behavior	3 hrs
PSYC 320	Introduction to Neuroscience	3 hrs
PSYC 344	Psychology of Language	3 hrs
PSYC 350	Developmental Psychology	3 hrs
PSYC 380	Psychopathology	3 hrs
PSYC 390	Social Psychology	3 hrs
PSYC 411	Ideas in Biopsychology	3 hrs
PSYC 442	Perception, Memory and Imagination	3 hrs

The concentrations will provide individualized learning experiences which are currently either unattainable at Delaware or obtained only in an ad hoc manner through such programs as the BALS or Dean's Scholar.

c. First Year Experience and Discovery Learning

All first-year students in the Cognitive Science Interest major must complete a first year experience (FYE). The Department is in the process of developing an FYE tailored to students interested in Cognitive Science.

All students are required top participate in a discovery or experiential learning program. As in the case of FYE, the Department is in the process of determining which discovery experiences would be of particular value for students in Cognitive Science. The Department currently offers opportunities for study abroad and internship possibilities which could meet this requirement.

d. Capstone Course

Senior majors will be brought together for a seminar on topics in cognitive science: CGSC 485 Seminar in Cognitive Science. This course may be team taught by a rotating group of faculty and will center around the application of the field's

divergent methodologies to solving problems in the study of mind. The course will require participants to engage in a research project that demonstrates grasp of the issues in the field as a whole and in their chosen focus. The research reported on may be collaborative research with a member of the faculty of the program or research conducted in a laboratory directed by a member of the cognitive science faculty. This work may lead to an Honors Thesis for qualified students.

3. Curriculum Enhancements

Because the faculty associated with the major come from a range of fields, we envision that this program will provide a number of unusual opportunities for students in terms of out of classroom educational experiences. Students studying language development might get involved in ongoing research projects at the University either from an experimental vantage or from a more theoretical perspective investigating linguistic or computational issues. We also expect students in some tracks of the major to be able to find summer internships in local speech and hearing clinics, enroll in the various summer institutes in cognitive science and its contributing disciplines, such as the summer institutes of the Linguistic Society of America, the Cognitive Science Institute, and the various workshops on processing and modeling at the Association for Computational Linguistics.

There are few programs in existence which permit students to engage in such exciting interdisciplinary study. We have no doubt that students coming out of this program will have the potential to go on to the very best graduate programs in the disciplines of cognitive science, linguistics, speech pathology and audiology, or work in emerging industrial fields such as speech technology, the development of human-computer interfaces (aka human factors), and other aspects of cognitive engineering.

4. Sample Student Program

The following is a typical sequence of coursework taken by a student majoring in Cognitive Science with a concentration in language development. It illustrates how such a student would meet requirements for the degree.

Year 1 Fall: CGSC 270, LING 101, CISC 105, PSYC 100 plus A&S/University requirement
Spring: PHL 209, BISC 104, PSYC 100 plus A&S/University requirement

Year 2: Fall: CGSC 314, LING 480 plus A&S/University requirements/electives
Spring: LING 376, CGSC 340, plus A&S/University requirements/electives

Year 3: Fall: LING 462 , LING 407, plus A&S/University requirements/electives
Spring: CGSC 496, plus A&S/University requirements/electives

Summer between yrs 3&4: internship in language development lab

Year 4: Fall: LING 409, plus electives
Spring: CGSC 485 (Seminar), plus electives

5. University and College requirements

As is usual in the case of B.S. degrees in the College of Arts and Science, the University and College requirements are adapted to the needs of the curriculum.

a. University Requirements
In order to receive the degree of B.S. in Cognitive Science all students must meet the University requirements for a bachelor's degree as specified in the University Catalog:

- A scholastic average of C (GPA of 2.0) in all work taken at the University.
- Completion of either 90 of the first 100 credits or 30 of the last 36 credits, full- or part-time, at the University of Delaware.
- One incoming semester of First Year Experience (FYE) completed with a passing letter grade, or a grade of P for courses graded only Pass/Fail. The number of credits will depend on the designated FYE (see FYE website: www.ugs.udel.edu/FYE).
- One semester of Freshman English (ENGL 110), completed with a minimum grade of C-.
- Three credits of Discovery Learning Experience (DLE) completed with a passing letter grade, or a grade of P for courses graded only Pass/Fail. DLE includes experiences such as internship, service learning, independent study, undergraduate research, and study abroad which are designated DLE (see DLE website: www.ugs.udel.edu/DLE).
- Three credits in an approved course or courses stressing multi-cultural, ethnic, and/or gender related content. The purpose of the multicultural requirement is to provide students with some awareness of and sensitivity to cultural pluralism–an increasing necessity for educated persons in a diverse world. This requirement may be fulfilled through a course or courses taken to complete other course requirements, but cannot be fulfilled with any course taken on a pass/fail basis. Only course sections that are designated as multicultural in the registration booklet for a specific semester can be used to fulfill this requirement.
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b. College Skills Requirements
In order to receive the degree students must meet the following skill requirements of the College of Arts and Science:
Second Writing Requirement: . . . . . 3 credits
A second writing course involving significant writing experience including two papers with a combined minimum of 3,000 words to be submitted for extended

faculty critique of both composition and content. This course must be taken after completion of 60 credit hours. Appropriate writing courses are designated in the semester's Registration Booklet. (See list of courses approved for second writing requirement.)

Mathematics: . . . . . 0-4 credits

(one of the following three options

OPTION ONE:

MATH 114 College Mathematics and Statistics
(designed for students who do not intend to continue the study of mathematics)
MATH 115 Pre-Calculus
(designed for students who intend to continue the study of mathematics)

OPTION TWO:

Successful completion of any mathematics course at or above the 200-level except MATH 201, MATH 202, MATH 205, MATH 250, MATH 251, MATH 252, MATH 253, MATH 266, MATH 300 or MATH 450.

OPTION THREE:

Successful performance on a proficiency test in mathematics administered by the Department of Mathematical Sciences. (0 credits awarded)

The math requirement must be completed by the time a student has earned 60 credits. Students who transfer into the College of Arts and Sciences with 45 credits
or more must complete this requirement within two semesters.

Foreign Language: . . . . . 0-12 credits

Completion of the intermediate-level course (107 or 112 or 214) in an ancient or modern language. The number of credits needed and initial placement will depend on the number of years of high school study of foreign language. Students with four or more years of high school work in a single foreign language may attempt to fulfill the requirement in that language by taking an exemption examination through the Foreign Languages and Literatures Department.

c. College Breadth Requirements

Group A 9

Analysis and appreciation of the creative arts and humanities.
Nine credits of courses representing at least two departments or appropriate instructional units.

Group B 9

The study of culture and institutions over time.
Nine credits of courses representing at least two departments or appropriate instructional units.

Group C. 9

Empirically based study of human beings and their environment.
Nine credits of courses representing at least two departments or appropriate instructional units.

Group D 9

The study of natural phenomena through experiment or analysis.

Nine credits of courses representing at least two departments or appropriate instructional units and including a minimum of one course with an associated laboratory.
If the grade earned is sufficient, a course may be applied toward more than one requirement (e.g., breadth and major requirements), but the credits are counted only once toward the total credits for graduation. If all but one course in a group has been taken in one department or program, a course cross-listed with that program will not satisfy the distribution requirement.

It should be noted that, as is usual for B.S. degrees, the number of credits required for College breadth requirements is reduced in comparison with B.A. degrees. This is due to the fact that the requirements for the major exceed those usual for a B.A.

6. Requirements for Honors B.S. in Cognitive Science
The recipient must complete:
1. All requirements for the Bachelor of Science degree in Cognitive Science:
--A cumulative GPA of at least 3.400 at the time of graduation
--At least 30 credits earned in Honors courses:
--At least 12 credits in the major department or in courses in collateral disciplines specifically required for the major;
--At least 12 credits in 300-level courses or higher, not including the first-year interdisciplinary Honors colloquium;
--Three credits in an Honors Degree seminar or Honors capstone course or comparable senior experience approved by the major and the Honors Program, to be completed in one of the last two semester of the student's degree program.

2. All of the University's generic requirements for the Honors Baccalaureate degree.

3. The student's grade point average for courses in the major must be at least 3.50 at the time of graduation.

7. Plans to Offer at Least 9-12 Honors Credits on a Regular Basis
The following core courses in the program have in recent years been offered with Honors sections on at least an annual basis. In the case of CGSC and LING courses, the department plans to offer these courses as Honors courses at least once a year as specified below. The major is highly individualized, so we cannot guarantee that courses offered by other departments will include honors sections, but for courses offered under the CGSC and LING rubric, the opportunity will be made available to students to take the course on an Honors basis (course to include Honors enrichment component for Honors students):

LING 101 (separate Honors section frequently offered)
CGSC 270 (separate Honors section frequently offered)

CGSC 485 (probably as individual Honors section)
CISC 105 (separate Honors section frequently offered)
PHIL 330 (separate Honors section frequently offered)
PSYC 100 (separate Honors section frequently offered)

8. Honors Capstone Course
The Department plans to submit CGSC 485, the senior seminar required by the major, for approval as an Honors capstone course.

9. Combined B.S. and M.A. Option
Qualified undergraduate students in the in the B.S. in Cognitive Science as well as students completing a Bachelors degree in related fields like Anthropology, Computer and Information Science, Philosophy and Psychology (and other fields by application) may apply for the Combined B.S. and M.A. option, which combines the requirements of the undergraduate and master's degree programs in Cognitive Science and Cognitive Science and Linguistics. Whereas the traditional programs for the B.S. and M.A. degrees in Cognitive Science, and Linguistics and Cognitive Science involve 4 years of undergraduate work and 2 years of graduate work, the Combined B.S. and M.A. option enables students to earn both degrees in a 5-year period. Students who complete the Combined B.S. and M.A. program will graduate with both a Bachelor of Science degree in Cognitive Science and a Master of Arts degree in Linguistics and Cognitive Science. Students who are candidates for the Combined B.S. and M.A. option, and who complete the requirements for the B.S. but fail to complete the additional M.A. requirements, will receive the B.S. degree.

a. Admission into the Combined B.S. and M.A. Program
Students may apply for admission to the Combined B.S. and M.A. program at the end of the sophomore year. The application process requires submission of a completed graduate application form for review by the Departmental Graduate Studies Committee. Initial admission will be based upon the student's ability to meet the following recommended entrance criteria:

- Combined mathematics and verbal SAT scores of at least 1200
- An undergraduate GPA of at least 3.25
- Completion of all core courses for the B.S. other than CGSC 485
- Submission of an in-person writing sample, based on work completed in a Cognitive Science course

Admission is competitive so meeting the minimal requirements for admission does not guarantee admission nor does the failure to meet a requirement result in an automatic rejection. The GRE is not required for admission to the Combined B.S. and M.A. program by UD undergraduates.

b. Maintaining Status within the Program
Upon admission into the program and prior to the start of the junior year of study, the student will meet with his graduate advisor and submit a planned program of study, including all elective courses, to the Graduate Studies Committee. Planned programs of study are due by the end of fall semester of the student's junior year.

Continuation in the Combined B.S. and M.A. program is contingent upon maintaining a cumulative GPA of at least 3.25 in undergraduate courses with CGSC and LING designations and in graduate coursework. Satisfactory progress includes following the prescribed program of study.

Each student's progress and GPA will be evaluated at the end of each academic year by the student's advisor and the Graduate Studies Committee. Students who fail to meet the minimum GPA requirements or fail to show progress toward the degree will be dropped from the Combined B.S. and M.A. program. They may, however, continue in the undergraduate major unless their undergraduate progress is unsatisfactory according to the rules in effect for the B.S. program.

c. Degree Requirements for the Master of Arts in Linguistics and Cognitive Science and the B.S. in Cognitive Science

The graduate level course requirements for students in the Combined B.S. and M.A. option are the same as those for the M.A. in Linguistics and Cognitive Science. The course requirements for the degree include 30 credit hours planned in consultation with the student's advisor and the Director of Graduate Studies, which must include at least 21 credit hours in the Linguistics Department and at least one 800-level seminar. The M.A. in Linguistics and Cognitive Science is a flexible program of study that provides training in both Linguistics and Cognitive Science. Separate tracks are provided for students whose emphasis is clearly in Cognitive Science or in Linguistics. In addition, students may propose a program of study that combines elements of the Linguistics and Cognitive Science tracks. See the Department's Graduate Policy Statement for additional information. Students in the Combined B.S. and M.A. option must fulfill all graduate and undergraduate course requirements for both the M.A. and their undergraduate degree.

d. Course Overlap
In the event that a student in the Combined B.S. and M.A. option completes a required graduate course as an undergraduate, and elects to count that course toward the bachelors degree, he will be permitted to substitute another graduate course, the choice requiring approval of the Director of Graduate Studies. When a student completes a 400-level undergraduate course that has content very similar to that of a parallel 600-level graduate course, he may petition the Director of Graduate Studies to substitute another graduate course for the 600-level course in question.

e. Distribution of Credits in Combined B.S. and M.A. Program
The following table illustrates a typical distribution of graduate and undergraduate credits for a student in the Combined B.S. and M.A. program. This sample program is based on the assumption that the policy of the University is not to permit any reduction in undergraduate courses for students in the Combined B.S. and M.A. option. Thus, students in the program complete both

the full 124 credit hours of the B.S. and the full thirty credit hours of the M.A. It should be noted that, unless the student takes the maximal possible course load of 17 credit hours during several semesters, it may necessary for the student to participate in as many as two special sessions in order to complete the program in five calendar years.

In the sample program below, the student participates in one winter session consisting of two three credit courses and one summer session (an internship). For example, the Department of Linguistics conducts a summer and a winter session course in Italy each year that would be appropriate for many of the students. Summer session would also be an appropriate time for an internship relevant to the student's academic interests, as in the example below.

	UG Credits	Grad Credits
Freshmen Year		
Fall	16	0
Winter	0	0
Spring	15	0
Summer	0	0
Sophmore Year		
Fall	16	0
Winter	6	0
Spring	15	0
Summer	0	0
Junior Year		
Fall	16	0
Winter	0	0
Spring	12	3
Summer	4 [e.g. internship]	0
Senior Year		
Fall	12	3
Winter	0	0
Spring	12	3
Year 5		
Fall		9
Spring		12

2. Revisions to Planned Program of Study in Combined B.S. and M.A. Option
Students who wish to make changes to their program of study must first obtain permission from their advisor. The advisor must then make a written request to the Graduate Studies Committee to revise the program of study.

V. Resources Available

1. Learning Resources

Cognitive Science has been an area of research for University faculty for at least the last 15 years. Library holdings are already excellent and are improving

steadily. The Department of Linguistics has been ordering audio-visual materials in support of cognitive science as well. We do not envisage that that this degree will require an increase in the availability of learning resources.

2. Faculty / Administrative Resources

a. Administration

The degree will be housed in the Department of Linguistics and Cognitive Science. In a separate document, the Department of Linguistics has proposed a change in the name of the Department from Department of Linguistics to Department of Linguistics and Cognitive Science.

b. Faculty

As was mentioned previously, the Department of Linguistics is expanding to become the Department of Linguistics and Cognitive Science. Thus, it is appropriate to list both the core faculty of the Department and the membership of the program in Cognitive Science:

i. Core Faculty of the Department of Linguistics
Adams, Frederick R, Professor and Chair
Andreasen, Robin O, Associate Professor
Bruening, Benjamin T, Assistant Professor and Director of Graduate Studies
Cole, Peter, Professor and Director of Undergraduate Studies
Hermon, Gabriella, Professor
Hurewitz, Felicia Dawn, Assistant Professor
Poliquin, Gabriel Christopher, Assistant Professor
Schweda-Nicholson, Nancy, Professor
Tomioka, Satoshi, Associate Professor
Vogel, Irene Barrie, Professor
*The department is currently searching to fill two positions: one in phonology/phonetics, one in computational linguistics or psycholinguistics

ii. Faculty with Secondary Appointments in Linguistics
Arena, Louis Anthony, Professor Emeritus
Bunnell, H Timothy, Research Associate Professor
Sandra Carberry, Professor
Chester, Daniel Leon, Associate Professor
Golinkoff, Roberta, H. Rodney Sharp Professor
Idsardi, William J, Adjunct Professor
McCoy, Kathleen F, Professor
Mineo, Beth A, Associate Professor
Papafragou, Anna, Assistant Professor
Vijay K. Shanker, Associate Professor
Tadmor, Uri, Adjunct Assoc Professor

iii. Faculty in Cognitive Science
Ackerman, Brian, Psychology, Professor
Case, John, Computer and Information Sciences, Professor
Ferretti, Ralph, Education, Professor
Ginsburg-Block, Marika, Education, Assistant Professor
Hiebert, James, Education, Robert J. Barkley Professor

Hoffman, James, Psychology, Professor
Intraub, Helene, Psychology, Professor
Jordan, Nancy, Education, Professor
Kambhamettu, Chandra, Computer and Information Sciences, Associate Professor
Lavigne, Nancy, Education, Assistant Professor
Lehrman, Alexander, Foreign Language and Literature, Associate Professor
MacArthur, Charles, Education, Professor
McLaughlin, John P, Psychology, Associate Professor
Mosberg, Ludwig, Education, Professor Emeritus
Steve Most, Psychology, Assistant Professor
Mouza, Chrystalla, Education, Assistant Professor
Murray, Frank, Education, H. Rodney Sharp Professor
Northmore, David, Psychology, Professor
Pemberton, Elizabeth, Education, Assistant Professor
Pust, Joel, Philosophy, Associate Professor
Quinn, Paul, Psychology, Professor
Rasmussen, Christopher, Computer and Information Sciences, Assistant Professor
Rocek, Tom, Anthropology, Associate Professor
Rosenberg, Karen, Anthropology, Associate Professor and Chair
Satinoff, Evelyn, Psychology, Professor
Stanton, Mark, Psychology, Associate Professor
Walpole, Sharon, Education, Assistant Professor

VI. Resources Required

1. Learning Resources
The University currently has excellent learning resources (e.g. library holdings) for the major.
2. Personnel Resources
As an interdisciplinary program, Cognitive Science relies on courses contributed by the membership of the program as well as courses taught by faculty budgeted to the unit (i.e. those budgeted to the current Department of Linguistics, future Department of Linguistics and Cognitive Science). It is important to note that the core courses in the major are courses that are already offered on a regular basis. Thus, required courses will be available regularly. The only core course that has not been offered on a regular basis is CGSC 485, the senior seminar. This course will be offered annually as soon students reach senior status. The current faculty (including currently authorized new hires) is sufficient for these purposes.

While additional faculty are not essential for the major, the Department has been authorized to make the previously mentioned two new hires and further hires in subsequent years. These hires will further enrich the program.

3. Budgetary Needs
While additional funds above those already committed to the Department would enrich the major and help to produce a premiere program, current funding is sufficient for the introduction of the major.

VII. Implementation and Evaluation

1. Implementation Plan
The implementation will consist of design of the major (06F), departmental approval (06F), college and university senate committee approvals (06F/07S), Provost, President, and BOT approvals (07S), creation or cross-listing of relevant courses (06F), co-ordination of program offerings of participating departments in the cognitive sciences (06F/07S), preparation of materials for use in admissions and publicity (07S), enrollment of new students into the major (07F).

2. Assessment Plan
A committee has been appointed to come up with an assessment plan for the Cognitive Science Major. The committee includes Robin Andreasen (chair) and Benjamin Bruening. The committee members will draft a plan that specifies at least three clear, concise, and measurable learning goals as well as the course(s) that ensure that our students have the opportunity to achieve these goals. The plan will also propose a method of measurement to assess whether the desired outcomes are being achieved as well as ways in which the Department of Linguistics and Cognitive Science can use the results for improving instruction and strengthen the major. The committee will consult with the Department as well as the Office of Educational Assessment in the development of this plan. We hope to have the plan completed by the end of Spring semester 2007.

VIII. APPENDICES

Letters of Approval from Contributing Departments