

SUBSTANTIVE DEGREE PROGRAM PROPOSAL
TITLE PAGE

This copy to System 12/09/03

NAME OF INSTITUTION:

The University of Texas at Dallas

NAME OF PROPOSED PROGRAM:

Cognition and Neuroscience (Ph.D.)
Communication Sciences and Disorders (Ph.D.)
Psychology (Ph.D. and M. S.)

Display how proposed program(s) would appear on the Coordinating Board inventory, include Texas CIP code designation(s).

| | |
|--|-----------------------------|
| Cognition and Neuroscience, Ph.D. | CIP Code: 30.9999.09 |
| Communication Sciences and Disorders, Ph.D. | CIP Code: 51.0201.00 |
| Psychology, Ph.D. | CIP Code: 42.0101.00 |
| Psychology, M. S. | CIP Code: 42.0101.00 |

How would name(s) of program(s) appear on student diplomas?

Doctor of Philosophy in Cognition and Neuroscience, or
Communication Sciences and Disorders, or
Psychology
Master of Science in Psychology

How would name(s) of program(s) appear on student transcripts?

Cognition and Neuroscience Ph.D.
Communication Sciences and Disorders Ph.D.
Psychology Ph.D.
Psychology M. S.

Administrative Unit(s) responsible for the program(s):

School of Behavioral and Brain Sciences

Proposed date for implementation of program:

Fall 2004

Person to be contacted for further information about proposed program(s):

Name: **Bert Moore, Ph.D.** Title: **Dean, School of Behavioral and Brain Sciences**

Phone: **972-883-2355**

Signatures:

Campus Chief Executive Officer

Date

System Chief Executive Officer

Date

(As appropriate)

Governing Board approval date: _____

**SCHOOL OF BEHAVIORAL AND BRAIN SCIENCES
THE UNIVERSITY OF TEXAS AT DALLAS**

Proposal for Graduate Programs in:

**COGNITION AND NEUROSCIENCE
COMMUNICATION SCIENCES AND DISORDERS
PSYCHOLOGY**

Executive Summary

The School of Behavioral and Brain Sciences (formerly the School of Human Development) has, since its founding, supported a single Ph.D. program. The initial Ph.D. degree, in Communication Disorders, reflected the School's early focus on speech, language, and hearing disorders and the research strengths of its component Callier Center for Communication Disorders. Rapid expansion of academic programs within the School left the Ph.D. in Communication Disorders too narrowly focused to accommodate the School's developing research strengths and its growing population of Ph.D. students with diverse interests and career goals. In 1984 the Ph.D. in Communication Disorders was replaced by the Ph.D. in Human Development and Communication Sciences. The new Ph.D. capitalized on the academic trend toward interdisciplinarity and served as the doctoral degree for the many disciplines encompassed within the School including communication sciences and disorders, psychology, cognitive science, and neuroscience. Students enrolled in the program selected a major disciplinary focus in communication sciences, cognition and neuroscience, or developmental psychology, but followed degree plans that encouraged coursework and research experiences spanning the major fields represented in the School.

Now, nearly 20 years later it is evident that this unique blending of disciplines has led to research initiatives and doctoral study in high profile fields at the intersection of cognitive science, neuroscience, psychology, and communication sciences and disorders. These include brain imaging of cognitive processes; connectionist modeling of language and perception; cognitive and social development; the multidisciplinary study of stroke, autism, and Alzheimer's Disease; brain plasticity in development and recovery from injury; and cochlear implants. The Centers for Advanced Hearing Research; *BrainHealth*; and Brain, Cognition, and Behavior have been a direct outgrowth of the School's interdisciplinarity and play a fundamental role in doctoral education and research in the School.

Although the interdisciplinary research training spawned by the Ph.D. in Human Development and Communication Sciences has been a distinctly positive outcome, the degree name, itself, has become an impediment obscuring the School's disciplinary strengths in psychology, neuroscience, and cognitive science. In fact, the failure of the name to communicate accurately the content of the Ph.D. program has negatively impacted both student recruiting and employability of program graduates. An evaluation of the School conducted recently by a team of distinguished internal and external site visitors praised the content and structure of the School's graduate programs. However, a change in name of both the School and the Ph.D. program was recommended to bring both more

closely in register with the School's mission, goals, and research strengths. The name changes, it was suggested, should allow for greater external recognition of the School's disciplinary and interdisciplinary research efforts. It should also set the stage for the School's future growth by facilitating component disciplines to evolve to meet market and research needs within an environment supporting a multidisciplinary approach to research and student training.

In response to the site visit recommendations and following extensive discussion among the faculty, we propose to divide the current Ph.D. degree in Human Development and Communication Sciences into 3 distinct, but mutually supportive Ph.D. degrees. Each of the proposed degrees corresponds to an existing track in the current Ph.D. in Human Development and Communication Sciences. The three proposed Ph.D. degrees are: Cognition and Neuroscience, Communication Sciences and Disorders, and Psychology. Under this proposal, the basic content and structure of the existing Ph.D. program will be retained, but students will follow a course of study leading to a degree titled more appropriately to the student's background, research, and career interests. A breadth requirement will preserve the interdisciplinary context that marks the current program. The proposed changes will not substantively affect the content, structure, or administration of the doctoral program nor will it affect student research options. The principal impact of the changes will be to allow graduates greater opportunity to seek employment in positions where a disciplinary degree is more readily recognized and to better position the School to attract students seeking a program with clear disciplinary, as well as interdisciplinary, strengths.

Although the names of the Ph.D. programs will become more recognizable, it is not our intent to evolve toward traditional disciplinary Ph.D. programs. Rather, the School will maintain its current role in offering alternatives to traditional disciplinary programs in Cognitive Science, Communication Sciences, Neuroscience, and Psychology and will grow by emphasizing areas of research and inquiry in which significant scientific advances are an outcome of interactions between disciplines. For example, the proposed Ph.D. program in Cognition and Neuroscience will incorporate a systems rather than cellular or molecular approach to study of the brain. This includes coursework and laboratory experience in the application of advanced human brain imaging and brain-mapping techniques to measure cortical responses during cognitive activity. Students will also participate in coursework and research using computer-based models of neural circuits to help inform research on brain activity and apply understanding of cortical circuitry in the development of computer-based intelligent systems.

The proposed Ph.D. in Communication Sciences and Disorders will offer study of hearing and hearing impairment from perceptual, developmental, and neuroscientific perspectives. The School's large and active research program in cochlear implants will serve as a focus for brain imaging and mapping studies of cortical plasticity correlated with the acquisition of speech, language, and auditory perceptual skills. Students will also have opportunities to participate in research on stroke, neurodegenerative disease, and autism spectrum disorders viewed from the perspectives of language, social behavior, and brain activity.

The proposed Ph.D. program in Psychology will draw from the existing track in developmental psychology, but will include faculty who will also contribute to the proposed Ph.D. programs in Cognition and Neuroscience and Communication Sciences and Disorders. This will allow substantially greater breadth of course offerings and research opportunities in Psychology than are currently available through the developmental psychology track. There will remain within the Psychology Ph.D. a distinct strength in typical and atypical developmental processes viewed from a life-span perspective and covering the linguistic, cognitive, perceptual, and social domains. However, there will be additional strengths in other areas including cognitive psychology, behavioral neuroscience, and language. In cognitive psychology, there is already considerable research and supporting coursework in pattern recognition, memory, and other complex cognitive processes such as face recognition, speech perception, music, text comprehension, and cognitive change associated with aging and dementia. In behavioral neuroscience, there is animal research on aging and memory and sensory system plasticity, and human studies on the neurological basis of autism and cortical evoked and event-related potential changes in development and aging. Coursework and research opportunities in language include patterns of early language acquisition, bilingualism, discourse processes, and neurolinguistics encompassing studies of aphasia, right hemisphere stroke, dementia, traumatic brain injury, and normal aging.

We are also requesting authorization for a terminal Master of Science degree in Psychology to accompany the proposed Ph.D. in Psychology. Both the Ph.D. programs in Cognition and Neuroscience and Communication Sciences and Disorders have accompanying master's degrees in Applied Cognition and Neuroscience and Communication Disorders, respectively. The M.S. in Psychology will be available to students who do not complete the Ph.D., but who have completed specified coursework to qualify them for the master's.

Because the proposed changes are in name and in the organization of existing coursework, no additional faculty, staff, library acquisitions, or facilities are required to launch the new degree programs. All the changes proposed can be accomplished with minimal transition effort and no added cost or call on resources other than those consequent to growth as the new degree options achieve recognition. The courses in the new Ph.D. programs will be drawn from the existing Ph.D. program in Human Development and Communication Sciences including courses shared with the School's other graduate programs in Applied Cognition and Neuroscience (M.S.), Audiology (Au.D.), Communication Disorders (M.S.), and Human Development and Early Childhood Disorders (M.S.) These graduate programs and parallel undergraduate programs in Psychology, Speech-Language Pathology and Audiology, Cognitive Science, and Neuroscience provide the faculty needed to support the proposed Ph.D. programs. Because these faculty are already involved in doctoral teaching and research supervision, their participation in the new Ph.D. programs will not detract from the School's other degree offerings and will assure that the relevant expertise is available to make the proposed Ph.D. programs successful. There are also four active faculty searches in the areas of cognitive development, auditory neurophysiology, language acquisition, and language disorders in children. Successful conclusion of these

searches will further enhance the proposed programs and open new and complementary areas of doctoral teaching and research.

The facilities and resources available to the proposed Ph.D. programs are truly exceptional and include the Callier Center for Communication Disorders and its new satellite building on the University's Richardson campus; cooperative programs with various departments at The University of Texas Southwestern Medical Center; and the Psychology, Cognitive Science, and Neuroscience laboratories on the UTD Richardson campus. All are resources for the current Ph.D. program and are positioned to support expansion as the new doctoral programs grow. In addition to physical resources, the School's faculty have generated \$4.5 million in grant support in the last year. This represents a substantial increase over the previous year and assures the presence of the high level of research activity essential for strong and vigorous doctoral programs.

The proposed revision is an essential step in the development of the School of Behavioral and Brain Sciences and a key to maximizing the impact of the School's resources in doctoral education and research. The more recognizable array of Ph.D. programs will help clarify the School's mission and its strengths to those outside the university, and position the School for future growth. That we can accomplish this transition without major new investment or disruption of ongoing activities makes our request one of potentially significant impact without significant cost.

If the proposed revision is approved, students in the pipeline would choose either to remain in the existing Human Development and Communication Sciences program or elect one of the three new degree programs. No new students would be admitted to the Human Development and Communication Sciences program as it is phased out.

FORMAT FOR SUBSTANTIVE DEGREE PROGRAM REQUESTS

I. PROGRAM ADMINISTRATION

A. Describe how the program would be administered.

1. Indicate name and title of person(s) who would be responsible for curriculum development and on-going review.

Bert Moore, Ph.D., Dean of the School of Behavioral and Brain Sciences will be responsible for overseeing curriculum development and ongoing review. The Graduate Studies Committee, composed of representatives of each of the three proposed Ph.D. programs, will conduct ongoing evaluation of the graduate curricula and will review and make recommendations to the Dean regarding curricular modifications proposed by the faculty in each Ph.D. program. The Graduate Studies Committee is a standing committee of the School of Behavioral and Brain Sciences charged with coordination of graduate program policy including curriculum review, catalog preparation, and course scheduling. The Graduate Studies Committee is chaired by the Associate Dean for Graduate Studies.

2. Describe responsibilities for student advisement and supervision.

Student advisement and supervision is the responsibility of the tenure/tenure track faculty of the School of Behavioral and Brain Sciences. Individual advisement and supervisory assignments will be made by the Graduate Studies Committee in consultation with faculty in the relevant Ph.D. program.

3. If the program would be administered by more than one administrative unit, what factors make this necessary?

Not applicable

- #### B. If a non-academic unit, e.g., "institute," or "center" would be involved in administering the program, describe the relationships.

Not applicable

- #### C. If a new organizational unit would be created or an existing organizational entity modified as a result of this program, identify and describe the anticipated result. (Reference: "Format for Administrative Change Request," Fall 1992.)

Not applicable

II. PROGRAM DESCRIPTION

A. Educational Objectives

1. Describe the educational objectives of the program. (Include reference to preparation of students for licensure or certification if appropriate and any special

outcomes or competencies which the program would provide that are not available from existing degree programs.)

The primary educational objective of the proposed Ph.D. programs is to prepare students for careers in which disciplinary knowledge and interdisciplinary experience in cognitive science; neuroscience; speech, language, and hearing science; or psychology will place them at the forefront of their fields. The programs will prepare students whose research and scholarly endeavors, now and in the future, will significantly advance knowledge, technology, and clinical practice.

Each proposed Ph.D. degree program: Cognition and Neuroscience, Communication Sciences and Disorders, and Psychology will have a strong disciplinary identity. But, it is the intersection of these programs and the well-established environment of interdisciplinary collaboration in the School of Behavioral and Brain Sciences that make each degree distinct from those awarded in traditional disciplinary degree programs. It is a further objective of each doctoral program to retain the flexibility in curriculum and research opportunities inherent in interdisciplinarity which allows faculty and students to be participants in the rapidly occurring scientific advances and technological innovations affecting the fields of cognition and neuroscience, communication sciences and disorders, and psychology. To assure immediate inclusion of scientific advances in the curriculum, the interdisciplinary research centers (the Advanced Hearing Research Center; the Center for Brain, Behavioral, and Cognition; and the Center for BrainHealth) housed within the School of Behavioral and Brain Sciences will continue to play an important supportive role in doctoral education. These centers which conduct research, often in collaboration with faculty at The University of Texas Southwestern Medical Center at Dallas, will provide technologically advanced and clinically relevant research opportunities for students in each of the proposed Ph.D. programs. The two campuses of the Callier Center for Communication Disorders, components of the School of Behavioral and Brain Sciences, will provide model clinical and research programs accessible to doctoral students. Participation in the activities of the Callier Center will allow students, first hand, to experience the interdependence of research and clinical practice and the application of an interdisciplinary approach to the identification, treatment, and prevention of cognitive and communicative impairment.

Each of the three proposed programs, in addition to the strengths derived from interdisciplinary collaboration, will have focal strengths allowing them to stand out among competing programs nationally in their disciplines. For the program in Cognition and Neuroscience, the strengths will include brain imaging of cognitive processes; neural plasticity; and computational modeling of cognition, perception, and language. For the program in Communication Sciences and Disorders, the strengths will include cochlear implants and aural habilitation, autism spectrum disorders, and speech and language disorders associated with development, aging, and neurological disease. For the program in Psychology, the strengths will include infant perceptual development, language development, psycholinguistics, family and peer relationships, memory and aging, face recognition, and neurophysiological measures of development and aging. For each Ph.D. program, the specialized research experiences and interdisciplinary opportunities will be built upon a strong foundation of basic disciplinary knowledge and familiarity with current research methodologies and data treatment approaches.

The master's program in Psychology will be designed to serve as a terminal degree for students who do not complete the Ph.D. program in Psychology. Attainment of the M.S. in Psychology will reflect successful completion of the common core courses for the Ph.D. program, major and minor field core courses, a selection of advanced electives, and a research experience.

2. If the program design includes multiple curricula (concentrations, emphases, options, specializations, tracks, etc.), describe the educational objectives of each. (Each of these curricula must be identified on the title page, including Texas CIP code. Reference: "Guidelines for recognition and Classification of Courses and Degree Program Offerings," adopted July 20, 1979 and revised to conform to new CIP codes, Fall 1992.)

None of the proposed degree programs will offer multiple tracks. However, each program will offer flexibility in coursework selection within and across the three doctoral programs. Beyond the basic core, students will develop individualized doctoral degree plans under the guidance of their advisors. It is anticipated that some students will remain more disciplinarily focused while others will seek more interdisciplinary opportunities as their research interests and career goals dictate.

B. Admissions Standards

1. State admission requirements for the program. (If there are different categories of admission, e.g., unconditional, probationary, etc., describe each.)

The admissions criteria for each of the proposed degree programs will meet or exceed the standards of the university. Admission will be determined by portfolio review which includes evaluation of transcripts of previous academic work, scores on the Graduate Records Examination, TOEFL examination (where appropriate), letters of recommendation, and the student's written statement of purpose. There are no specific minimum test scores or grade-point averages which qualify or disqualify a student for admission and no quantitative formula will be used in the admission process. All faculty associated with the Ph.D. program to which the student is applying participate in the review of each applicant file. At least one faculty member must consent to serve as the student's mentor before a student may be admitted.

Students may be admitted either unconditionally or conditionally according to the university's admission policy. As in the past, it is anticipated that nearly all admissions will be unconditional. Students admitted conditionally will be required to meet specified conditions (e.g. minimum grades in core courses) in order to remain in the program.

C. Degree Requirements:

1. In tabular form, indicate the semester credit hour (SCH) requirements in each of the following categories applicable to the proposed program; include the total SCH requirement for the degree:
 - a. Foundation Courses
 - (1) general education/core curriculum

It is assumed that, as a minimum, students will have completed 120 undergraduate hours and hold a bachelor's degree.

- b. courses required of all students in the proposed program

The courses listed under School-Wide Doctoral Proseminar and Research Methods are required of all students in the three proposed Ph.D. programs and the proposed Master's program in Psychology. Major and Minor Field Core requirements and Advanced Elective coursework are listed separately by Ph.D. program.

School-Wide Doctoral Proseminar (6 SCH):

HCS 6302 Issues in Behavioral and Brain Sciences I
HCS 6303 Issues in Behavioral and Brain Sciences II

Research Methods Core (6 SCH):

HCS 6312 Research Methods I
HCS 6313 Research Methods II

- b.1. courses required of all students in the proposed

Ph.D. in Cognition and Neuroscience

Major Field Core: (6 SCH):

HCS 6330 Cognitive Science
HCS 6346 Systems Neuroscience

Minor Field Core (Choose 2, 6 SCH):

COMD 6317 Language and Linguistics
HCS 6368 Language Development
COMD 6305/ Speech Science
AUD 6306
HCS 6331 Cognitive Development
HCS 6350 Social Development
AUD 6303 Hearing Science
AUD 6305 Anatomy and Physiology of Audition

- c.1. elective courses prescribed for those students in the proposed

Ph.D. in Cognition and Neuroscience

Advanced Electives (Choose 5, 15 SCH):

HCS 6345 Cognitive Science II
HCS 5314 Cognitive and Neural Modeling Lab
HCS 6347 Intelligent Systems Analysis
HCS 6349 Intelligent System Design
ACN 7366 Human Computer Interactions I
HCS 7322 Computational Models of Language Understanding
HCS 7349 Text Comprehension Seminar
HCS 73XX Neural Net Mathematics
HCS 63XX Fundamentals of Functional Brain Imaging
HCS 73XX Functional Brain Imaging Practica
HCS 73XX Advanced Functional Brain Imaging
HCS 6337 Seminar in Neural Plasticity and Behavior
HCS 6340 Cellular Neuroscience

| | |
|----------|--|
| HCS 7344 | Functional Human Neuroanatomy |
| HCS 73XX | Analysis of Brain Data |
| HCS 6335 | Seminar in Auditory Cortical Processing |
| HCS 6336 | Principles of Developmental Neuroscience |
| HCS 7343 | Neuropharmacology |
| HCS 7345 | Neuroanatomy Lab |
| HCS 7351 | Aging and the Nervous System |
| HCS 6372 | Pathophysiology of Disorders of the Nervous System |
| HCS 73XX | Computational Neuroscience |

b.2. courses required of all students in the proposed

Ph.D. in Communication Sciences and Disorders

Major Field Core (Choose 2, 6 SCH):

| | |
|------------|------------------------------------|
| COMD 6305/ | Speech Science |
| AUD 6306 | |
| COMD 6317 | Language and Linguistics |
| HCS 6368 | Language Development |
| AUD 6303 | Hearing Science |
| AUD 6305 | Anatomy and Physiology of Audition |

Minor Field Core (Choose 2, 6 SCH):

| | |
|----------|-----------------------|
| HCS 6330 | Cognitive Science |
| HCS 6346 | Systems Neuroscience |
| HCS 6331 | Cognitive Development |
| HCS 6350 | Social Development |

c.2. elective courses prescribed for those students in the proposed

Ph.D. in Communication Sciences and Disorders

Advanced Electives (Choose 5, 15 SCH):

| | |
|-----------|---|
| HCS 73XX | Psycholinguistics |
| HCS 7352 | Seminars in Language Impairments |
| HCS 6356 | Atypical Development |
| HCS 7312 | Applied Research Design |
| HCS 6358 | Affective Development |
| HCS 7376 | Child Psychopathology |
| HCS 7379 | Current Research in Child Disorders- Autism |
| COMD 7305 | Communication and the Aging Brain |
| HCS 6333 | Memory |
| COMD 7302 | Seminar in Aphasiology |
| HCS 7351 | Aging and the Nervous System |
| HCS 7372 | Fundamentals of Functional Brain Imaging |
| HCS 6337 | Seminar in Neural Plasticity and Behavior |
| COMD 7389 | Alzheimer's Disease and Related Disorders |
| HCS 6367 | Speech Perception |
| HCS 6369 | Brain Mechanisms in Hearing |
| AUD 73XX | Auditory Processing Disorders |
| COMD 7324 | Seminar in Cochlear Implants |

HCS 6335 Seminar in Auditory Cortical Processing
HCS 7367 Speech Perception Lab

b.3. courses required of all students in the proposed

M.S. and Ph.D. Programs in Psychology

Major Field Core (Choose 2, 6 SCH):

HCS 6331 Cognitive Development
HCS 6350 Social Development
HCS 63XX Personality

Minor Field Core (Choose 2, 6 SCH):

COMD 6317 Language and Linguistics
HCS 6368 Language Development
COMD 6305/ Speech Science
AUD 6306
AUD 6303 Hearing Science
AUD 6305 Anatomy and Physiology of Audition
HCS 6330 Cognitive Science
HCS 6346 Systems Neuroscience

c.3. elective courses prescribed for those students in the proposed

M.S. and Ph.D. Programs in Psychology

Advanced Electives: M.S. Program in Psychology (Choose 2, 6 SCH), Ph.D. Program in Psychology (Choose 5, 15 SCH):

HCS 6353 Family Processes
HCS 6358 Affective Development
HCS 7374 Peer Relationships and Interpersonal Processes
HCS 6356 Atypical Development
HCS 7376 Child Psychopathology
HCS 73XX Adult Psychopathology
HCS 7355 Relationships and Development
HCS 7312 Applied Research Design
HCS 6332 Perception
HCS 6333 Memory
COMD 7302 Seminar in Aphasiology
HCS 73XX Psycholinguistics
HCS 7351 Aging and the Nervous System
HCS 6367 Speech Perception
HCS 7367 Speech Perception Lab
HCS 63XX Fundamentals of Functional Brain Imaging
HCS 6337 Seminar in Neural Plasticity and Behavior
COMD 7389 Alzheimer's Disease and Related Disorders

d. courses freely elected by students,

Courses on the above lists not taken to meet requirements may be freely elected in each of the proposed programs. In addition, students seeking clinical certification and Texas State Licensure

in Speech-Language Pathology or Audiology may take the appropriate coursework as free electives. Students may also select topical seminars offered on a one-time basis in response to student interest or unique opportunity (e.g. course taught by a visiting faculty member.)

e. other, specify.

Students in the Ph.D. programs must enroll in HCS 8V80 Research or HCS 8V99 Dissertation for a sufficient number of hours to complete the minimum 90 SCH's required for the Ph.D. Students in the M.S. program in Psychology must complete a minimum of 6 SCH's of HCS 8V80.

Summary Credit-Hour Requirements by Program:

| | <u>CN (Ph.D.)</u> | <u>Semester Credit Hours</u> | | |
|-------------------------|-------------------|------------------------------|--------------------|-------------------|
| | | <u>CSD (Ph.D.)</u> | <u>PSY (Ph.D.)</u> | <u>PSY (M.S.)</u> |
| School-Wide Core | 6 | 6 | 6 | 6 |
| Research Methods Core | 6 | 6 | 6 | 6 |
| Major Field Core | 6 | 6 | 6 | 6 |
| Minor Field Core | 6 | 6 | 6 | 6 |
| Advanced Electives | 15 | 15 | 15 | 6 |
| Free Electives/Other | 51 | 51 | 51 | 6 |
| (Research/Dissertation) | | | | |
| Total | 90 | 90 | 90 | 36 |

2. Identify and describe special requirements for the program, e.g., clinicals, field experience, internship, practicum, thesis, etc.

All students in the three proposed Ph.D. programs must complete a qualifying research project and qualifying written critical literature review under the supervision of their research advisor prior to advancing to candidacy. The purpose is to assure that each student possesses the necessary research skills and knowledge of the scientific literature to prepare for and complete the doctoral dissertation. For students in the Ph.D. programs in Communication Sciences and Disorders and Psychology the research project and critical literature review may be combined in a single document, or submitted as separate projects. In the Ph.D. program in Cognition and Neuroscience, students will conduct a qualifying research project, but may prepare a mock grant proposal in lieu of a critical literature review. All projects will be evaluated by faculty following a professional journal editorial review procedure. Papers may be accepted with or without revision, or may be failed. Papers requiring revision will be returned to the student for necessary changes. Students who fail a qualifying paper more than once may be dropped from the program.

Prior to initiating dissertation research, each student, in consultation with his/her dissertation committee, will prepare a written dissertation proposal which must be presented to and defended before the faculty. A majority vote of the faculty in attendance will determine whether the student may proceed with the dissertation research or must revise and re-present the proposal. A Ph.D. dissertation and successful oral defense of the dissertation is required for each of the proposed Ph.D. degrees. All of these procedures are in place with the current Ph.D. program in Human Development and Communication Sciences.

Students in the proposed M.S. program in Psychology will complete a research project under the supervision of an *ad hoc* faculty committee appointed by the Graduate Studies Committee.

3. If transfer students would be admitted to the program, list agreements completed, in negotiation, or planned.

The University's policy for transfer credit at the graduate level are stated on pages 19-20 of the 2002-2004 Graduate Catalog and may be found on the web at:

<http://www.utdallas.edu/student/catalog/grad02>

D. Curriculum

1. Identify by prefix, number, title, and description (including prerequisites) courses to be required or elected in the proposed program. (Identify with an asterisk(*) courses added during the last 3 academic years, and with 2 asterisks(**) courses to be added if the program is authorized.)

Courses listed below with a single asterisk, but with XX in place of the final 2 digits are courses which have been taught previously as "Topics" courses and which will be submitted for inclusion in the U.T. Dallas 2004-06 Graduate Catalog regardless of the outcome of the proposed substantive revision. Highlighted courses with a double asterisk and XX in place of the final 2 digits are courses which are entirely new and will be added if the proposed programs are authorized. Course titles are as they will appear in the 2004-2006 U.T. Dallas Graduate Catalog.

***ACN 7366 Human Computer Interactions I (3 semester hours)** Methods and principles of human-computer interaction (HCI), user-centered design (UCD), and usability evaluation. Provides broad overview of HCI and how HCI informs UCD processes throughout product development lifecycle.

AUD 6303 Hearing Science (3 semester hours) Basic acoustics and psychoacoustics.

AUD 6305 Anatomy and Physiology of Audition (3 semester hours) Structure and function of the auditory system including external, middle, and inner ear, and central auditory mechanisms.

AUD 6306 Speech Science (3 semester hours) Principles of physiological and acoustic processes underlying speech production and perception, including respiration, phonation, and articulation.

***AUD 73XX Auditory Processing Disorders (3 semester hours).** Discussion of auditory processing disorders with respect to underlying etiologies, and behavioral and electrophysiological procedures for diagnosis and therapeutic management.

COMD 6305 Speech Science (3 semester hours) Anatomy, physiology, and functional organization of speech. Mechanisms of normal speech production and perception in a clinical setting.

COMD 6317 Language and Linguistics (3 semester hours) Basic processes underlying language including phonology, morphology, syntax and semantics. Biological and social aspects of language.

COMD 7302 Seminar in Aphasiology (3 semester hours) Current issues in neurolinguistics. Models of brain and language; classification, symptoms, and etiology of aphasia and analysis of aphasic language with respect to phonology, morphology, syntax, and semantics.

COMD 7305 Communication and the Aging Brain (3 semester hour) Social and biological factors affecting language and communication in normal aging. Pathological changes in aphasia and dementia. Assessment and intervention strategies.

COMD 7324 Seminar in Cochlear Implants (3 semester hours) Prosthetic alternatives available for individuals with profound hearing impairments. Topics include speech perception in children and

adults, signal processing, aural rehabilitation techniques, prosthetic devices such as tactile aids, cochlear implants, and hearing aids, and techniques for using such devices.

COMD 7389 Alzheimer's Disease and Related Disorders (3 semester hours) Differential diagnosis, evaluation, and treatment of adults with progressive neurogenic disorders, such as Alzheimer's disease, frontal lobe dementias, and vascular dementia within an interdisciplinary model of care.

***HCS 5314 Cognitive and Neural Modeling Lab (3 semester hours)** Auto-associative, associative, competitive learning, recurrent, and back-propagation artificial neural network architectures in a "hands-on" micro-computer laboratory environment using special simulation software. Applications to perceptual, cognitive, computational, and neuroscience modeling problems.

HCS 6302 Issues in Behavioral and Brain Sciences I (3 semester hours) Doctoral proseminar on current theory and research in communication sciences, developmental psychology, and neuroscience and cognition.

HCS 6303 Issues in Behavioral and Brain Sciences II (3 semester hours) Continuation of the doctoral proseminar on current theory and research in communication sciences, developmental psychology, and neuroscience and cognition.

HCS 6312 Research Methods I (3 semester hours) Applying, understanding, and interpreting various statistical techniques in behavioral science context. Participants have the opportunity to learn appropriate statistical details for basic descriptive and inferential statistics, the interrelationships among techniques, and computer skills required for data analyses.

HCS 6313 Research Methods II (3 semester hours) Topics in general linear modeling including regression analysis correlation, simple analysis of variance, factorial analysis of variance, analysis of covariance, between and within subject designs, and multiple regression. Prerequisite: HCS 6312 or consent of instructor.

HCS 6330 Cognitive Science (3 semester hours) Interdisciplinary approaches to human information processing in perception, attention, memory, thought, and language.

HCS 6331 Cognitive Development (3 semester hours) Survey of cognitive development theories and research in a variety of domains including perception, memory, language, and problem solving.

HCS 6332 Perception (3 semester hours) Psychophysical, neurophysiological, and computational foundations of sensation and perception. Basic senses of vision, audition, chemoreception, and tactile processing, with emphasis on understanding the processes that take us from neurons to perception and action.

HCS 6333 Memory (3 semester hours) Theoretical frameworks for knowledge acquisition and representation. Includes information processing and neuropsychological perspectives.

HCS 6335 Seminar in Auditory Cortical Processing (3 semester hours) Basic principles of neural information processing with special emphasis on the central nervous system processes underlying hearing and speech perception.

HCS 6336 Principles of Development Neuroscience (3 semester hours) Molecular and cellular events underlying neuronal differentiation, axon guidance, synapse formation, neurotrophic factors, and neural death, with special emphasis on activity-dependent plasticity and its role in generating and maintaining the extraordinary precision of connections found in the nervous system.

***HCS 6337 Seminar in Neural Plasticity and Behavior (3 semester hours)** Critical readings from the interfaces between the behavioral neurosciences, biophysics, and biochemistry. Neural mechanisms

of learning and memory and of plasticity compensating for peripheral or central nervous system damage are among the topics discussed.

HCS 6340 Cellular Neuroscience (3 semester hours) Basic neural biology and physiology and principles of synaptic transmission.

HCS 6345 Cognitive Science II (3 semester hours) Theories and phenomena of motor control systems, heuristics of judgment and decision-making, parallel distributed processing, and artificial intelligence.

HCS 6346 Integrative Neuroscience (3 semester hours) Integrative systems level study of the nervous system. Aspects of neural mechanisms and circuitry underlying regulation of motor behaviors, sensory and perceptual processing, biological homeostasis, and higher cognitive functions.

HCS 6346 Systems Neuroscience (3 semester hours) Integrative systems level study of the nervous system. Aspects of neural mechanisms and circuitry underlying regulation of motor behaviors, sensory and perceptual processing, biological homeostasis, and higher cognitive functions.

***HCS 6347 Intelligent Systems Analysis (3 semester hours)** Mathematical tools for investigating the asymptotic behavior of both deterministic and stochastic nonlinear dynamical systems. Topics include: artificial neural network architectures, Lyapunov stability theory, and stochastic approximation theory. Applications to artificial neural network models of brain and behavior.

***HCS 6349 Intelligent Systems Design (3 semester hours)** Mathematical tools for the design and evaluation of artificially intelligent deterministic and stochastic nonlinear dynamical systems. Topics include: nonlinear optimization theory, Markov random fields, asymptotic statistical theory. Applications to theory and model construction in the behavioral and brain sciences as well as the field of artificial intelligence.

HCS 6350 Social Development (3 semester hours) Foundations of social and personality development. Includes survey of psychodynamic, social learning, behavior genetic, family systems, and social-cognitive approaches to the study of attachment, parenting, aggression, peer relationships, sex typing, and other contemporary issues.

HCS 6353 Family Process (3 semester hours) Family processes involved in development including topics such as parent-child relations, development in atypical families, intergenerational relations, parent-adolescent relations, sibling relations, and theoretical views of family processes.

HCS 6356 Atypical Development (3 semester hours) Disorders of development from conception to age three, emphasizing etiology symptoms, diagnosis and treatment. Impact of delays in the acquisition and integration of various developmental skills as they relate to specific disorders of sensory and motor skills, language and cognition, and personality and socialization.

HCS 6358 Affective Development (3 semester hours) Theory and research on emotions and emotional development. Includes perspectives on the links between emotions, socialization and behavior, and marital and family processes and emotion regulation.

HCS 6367 Speech Perception (3 semester hours) Current topics and theories in speech perception. Topics include the acoustic correlates of speech sounds and the problem of invariance, the perception of speech under adverse conditions, the effects of hearing impairment, and models of speech perception.

HCS 6368 Language Development (3 semester hours) Advanced study of normal oral language development. Focus on research in child language and recent theories of language acquisition.

HCS 6369 Brain Mechanisms in Hearing (3 semester hours) Neuroanatomical and neurophysiological bases of stimulus processing in the auditory neuraxis.

HCS 6372 Pathophysiology of Disorder of the Nervous System (3 semester hours) Pathophysiology of disorders such as movement disorders and pain with emphasis on the role of neural plasticity in causing symptom-s and signs.

***HCS 63XX Fundamentals of Functional Brain Imaging (3 semester hours).** This course covers topics such as principles of tracer techniques, neuroimaging instrumentation, safety issues, brain physiology (perfusion, metabolism, and receptor function), image processing and analysis, fundamentals of SPECT, PET and fMRI, and critical evaluation of the functional neuroimaging literature.

****HCS 63XX Personality (3 semester hours)** Survey of cognitive, analytic, and learning theory approaches to study of personality. Emphasis on intensive exploration of selected concepts and related research.

HCS 7312 Applied Research Design (3 semester hours) Formal principles of research design, how to apply these principles to published work and original investigations.

***HCS 7322 Computational Models of Language Understanding (3 semester hours)** Probabilistic methods for natural language understanding. Use of the MATLAB computer language for instantiating specific knowledge-based computational theories of natural language understanding.

HCS 7343 Neuropharmacology (3 semester hours) Biology of neurotransmission in the central nervous system. Includes ionotropic and metabotropic coupling of all known classes of receptors to both their cellular and systemic effects. Clinical efficacy, side effects, and other issues related to drug use and abuse are covered.

HCS 7344 Functional Human Neuroanatomy (3 semester hours) Function of each major brain system as related to the organization and synaptic connections of their principal nuclei. Function of each system related to the neurological disorders associated with disease or lesions at specific locations.

HCS 7345 Neuroanatomy Lab (3 semester hours) Laboratory experience with neural tracing techniques employed in neuroscience research. Prerequisite: HCS 7344 or consent of instructor.

HCS 7349 Text Comprehension Seminar (3 semester hours) Current readings in the field of text comprehension and memory.

HCS 7351 Aging and the Nervous System (3 semester hours) Critical evaluation of research and theory concerning the impact of aging on neuronal function. Cognitive dysfunctions, dementias, and underlying neuropathologies, as well as neurophysiological and neurochemical changes that accompany normal aging.

HCS 7352 Seminar in Language Impairments in Children (3 semester hours) Advanced study of language impairments in children emphasizing research issues related to these diverse clinical populations. Topics may include SLI, SCI, SELD, deafness, autistic spectrum disorders among others.

HCS 7367 Speech Perception Laboratory (3 semester hours) Introduction to the field of speech processing by computer, with primary application to research techniques in the study of speech perception.

HCS 7374 Peer Relationships and Interpersonal Processes (3 semester hours) Theory and research on children's and adolescents' peer groups, friendships, and romantic relationships, as well as the social skills that are called for in these relationships.

HCS 7376 Child Psychopathology (3 semester hours) Major classes of childhood psychopathology manifested during infancy through adolescence. Normal personality development as a basis for identifying psychopathology. Issues of etiology, diagnosis, prognosis and social policy.

HCS 7379 Current Research in Child Disorders-Autism (3 semester hours) Advanced seminar addressing current issues in the field of autism; topics vary and may include various theoretical approaches to autism, diagnosis and assessment of children with autism, and affective reciprocity in both typically developing children and children with autism.

***HCS 73XX Computational Neuroscience (3 semester hours).** Construction of biologically realistic simulations of neurons and small neural circuits using state-of-the-art simulation software. Students will construct simulations that shed light on the neural basis of higher functions such as visual contrast enhancement, perceptual oscillation, sensory localization, and motor pattern generation.

***HCS 73XX Functional Brain Imaging Practica (3 semester hours).** This course applies learned skills to short research projects in a small group format. Projects include: 1) acquisition of new data in SPECT, PET or fMRI in association with ongoing funded research sponsored by various faculty at UTSW or UTD; 2) mentored analysis of existing data sets from these sources; and 3) experimental design projects in which more advanced trainees will develop a full experimental protocol, including informed consent procedures, acquisition parameters and data analysis plans. All projects are reviewed in a biweekly group meeting to facilitate learning across groups.

***HCS 73XX Advanced Functional Brain Imaging (3 semester hours).** This course explores more in-depth topics such as neuroimaging detection systems, clinical applications of functional neuroimaging, experimental design, statistical techniques in image analysis and reviews of pertinent literature using functional brain imaging to illuminate various cognitive/perceptual processes, such as language, memory, hearing and vision.

***HCS 73XX Neural Net Mathematics (3 semester hours).** Vector calculus and vector calculus-based probability theory with artificial neural network modeling applications.

***HCS 73XX Relationships and Development (3 semester hours).** Theory and research on relationship processes involved in development. Topics include parent-child and parent-adolescent relations, sibling relations, peer and friendship relations, romantic relationships, and marital/couple relations. Linkages among relationships are also emphasized.

****HCS 73XX Adult Psychopathology (3 semester hours).** Theory and research on the origins classification, and treatment of psychological disorders of adulthood, with consideration of whether these disturbances exist on continua with normal behavior. Critical examination of diagnoses, with an emphasis on how scientific research can guide our understanding of etiology and treatment.

****HCS 73XX Analysis of Brain Data (3 semester hours).** Analysis of brain-imaging data obtained from diverse techniques such as PET, SPECT, fMRI, and EEG. Includes "standard analyses" with packages such as SPM02 and AFNI as well as pattern analyses approaches (e.g. partial least squares regression, correspondence. Discriminant, and principal component analyses.

****HCS 73XX Psycholinguistics (3 semester hours).** Classic and current research in psycholinguistics. Include concepts from linguistics, the biological bases of speech and language processing, and child language acquisition. Hands-on exercises include labs on speech perception, language acquisition, and language comprehension.

2. If the program design includes multiple curricula (concentrations, emphases, options, specializations, tracks, etc.), identify courses unique to each alternative.

Not applicable

3. Provide a semester-by-semester projection for offering of the required and prescribed courses during the first five years.

| YEAR 1 – FALL | | | |
|---------------------------|---|---|---|
| | Cognition and Neuroscience | Communication Sciences and Disorders | Psychology |
| School-Wide | HCS 6302 Issues in Behavioral and Brain Sciences I | HCS 6302 Issues in Behavioral and Brain Sciences I | HCS 6302 Issues in Behavioral and Brain Sciences I |
| Research Methods | HCS 6312 Research Methods I | HCS 6312 Research Methods I | HCS 6312 Research Methods I |
| Major Field | HCS 6330 Cognitive Science | COMD 6305/AUD 6306 Speech Science | HCS 6350 Social Development |
| | | HCS 6368 Language Development | |
| | | AUD 6303 Hearing Science | |
| | | AUD 6305 Anatomy and Physiology of Audition | |
| Minor Field | HCS 6368 Language Development | HCS 6330 Cognitive Science | HCS 6330 Cognitive Science |
| | HCS 6350 Social Development | HCS 6350 Social Development | HCS 6368 Language Development |
| | AUD 6303 Hearing Science | | AUD 6303 Hearing Science |
| | AUD 6305 Anatomy and Physiology of Audition | | AUD 6305 Anatomy and Physiology of Audition |
| | COMD 6305/AUD 6306 Speech Science | | COMD 6305/AUD 6306 Speech Science |
| Advanced Electives | HCS 6347 Intelligent Systems Analysis | HCS 6356 Atypical Development | HCS 6356 Atypical Development |
| | HCS 63XX Fundamentals of Functional Brain Imaging | HCS 63XX Fundamentals of Functional Brain Imaging | HCS 63XX Fundamentals of Functional Brain Imaging |
| | HCS 7344 Functional Human Neuroanatomy | COMD 7305 Communication and the Aging Brain | HCS 73XX Adult Psychopathology New Course |
| | HCS 7343 Neuropharmacology | COMD 7324 Seminar in Cochlear Implants | |
| | HCS 6340 Cellular Neuroscience | AUD 73XX Auditory Processing Disorders | |

| YEAR 1 – SPRING | | | |
|------------------------|--|--|--|
| | Cognition and Neuroscience | Communication Sciences and Disorders | Psychology |
| School-Wide | HCS 6303 Issues in Behavioral and Brain Sciences II | HCS 6303 Issues in Behavioral and Brain Sciences II | HCS 6303 Issues in Behavioral and Brain Sciences II |
| Research | HCS 6313 Research Methods | HCS 6313 Research Methods | HCS 6313 Research Methods |

| YEAR 1 – SPRING | | | |
|--------------------|---|---|------------------------------------|
| | Cognition and Neuroscience | Communication Sciences and Disorders | Psychology |
| Methods | II | II | II |
| Major Field | HCS 6346 Systems Neuroscience | COMD 6317 Language and Linguistics | HCS 6331 Cognitive Development |
| Minor Field | COMD 6317 Language and Linguistics | HCS 6346 Systems Neuroscience | COMD 6317 Language and Linguistics |
| | COMD 6331 Cognitive Development | COMD 6331 Cognitive Development | HCS 6346 Systems Neuroscience |
| | COMD 6305/AUD 6306 Speech Science | | |
| Advanced Electives | HCS 6345 Cognitive Science II | HCS 6356 Atypical Development | HCS 6356 Atypical Development |
| | HCS 6349 Intelligent Systems Design | HCS 7376 Child Psychopathology | HCS 7376 Child Psychopathology |
| | HCS 6336 Principles of Developmental Neuroscience | COMD 7302 Seminar in Aphasiology | COMD 7302 Seminar in Aphasiology |
| | | HCS 7352 Seminar in Language Impairments | |
| | HCS 73XX Functional Brain Imaging Practica | HCS 7379 Current Research in Child Disorders – Autism | |

| YEAR 1 – SUMMER | | | |
|--------------------|---|--------------------------------------|---------------------------------|
| | Cognition and Neuroscience | Communication Sciences and Disorders | Psychology |
| School-Wide | | | |
| Research Methods | | | |
| Major Field | | | HCS 63XX Personality New Course |
| Minor Field | | | |
| Advanced Electives | HCS 7322 Computational Models of Language Understanding | HCS 6369 Brain Mechanisms in Hearing | |
| | HCS 73XX Computational Neuroscience | | |

| YEAR 2 – FALL | | | |
|------------------|--|--|--|
| | Cognition and Neuroscience | Communication Sciences and Disorders | Psychology |
| School-Wide | HCS 6302 Issues in Behavioral and Brain Sciences I | HCS 6302 Issues in Behavioral and Brain Sciences I | HCS 6302 Issues in Behavioral and Brain Sciences I |
| Research Methods | HCS 6312 Research Methods I | HCS 6312 Research Methods I | HCS 6312 Research Methods I |
| Major Field | HCS 6330 Cognitive Science | COMD 6305 Speech Science | |
| | | HCS 6368 Language Development | HCS 6350 Social Development |
| | | AUD 6303 Hearing Science | |
| | | AUD 6305 Anatomy and Physiology of Audition | |

| YEAR 2 – FALL | | | |
|---------------------------|--|--|--|
| | Cognition and Neuroscience | Communication Sciences and Disorders | Psychology |
| Minor Field | HCS 6368 Language Development | HCS 6330 Cognitive Science | HCS 6368 Language Development |
| | HCS 6350 Social Development | HCS 6350 Social Development | HCS 6330 Cognitive Science |
| | COMD 6305 Speech Science | | COMD 6305 Speech Science |
| | AUD 6303 Hearing Science | | AUD 6303 Hearing Science |
| | AUD 6305 Anatomy and Physiology of Audition | | AUD 6305 Anatomy and Physiology of Audition |
| Advanced Electives | HCS 63XX Fundamentals of Functional Brain Imaging | HCS 63XX Fundamentals of Functional Brain Imaging | HCS 63XX Fundamentals of Functional Brain Imaging |
| | HCS 6367 Speech Perception | HCS 6367 Speech Perception | HCS 6367 Speech Perception |
| | HCS 7344 Functional Human Neuroanatomy | HCS 6356 Atypical Development | HCS 6356 Atypical Development |
| | HCS 73XX Advanced Functional Brain Imaging | COMD 7389 Alzheimer's Disease and Related Disorders | COMD 7389 Alzheimer's Disease and Related Disorders |
| | HCS 6340 Cellular Neuroscience | HCS 73XX Psycholinguistics New Course | HCS 73XX Psycholinguistics New Course |
| | | COMD 7305 Communication and the Aging Brain | HCS 6332 Perception |
| | | AUD 73XX Auditory Processing Disorders | |
| | | COMD 7324 Seminar in Cochlear Implants | |

| YEAR 2 – SPRING | | | |
|---------------------------|--|--|--|
| | Cognition and Neuroscience | Communication Sciences and Disorders | Psychology |
| School-Wide | HCS 6303 Issues in Behavioral and Brain Sciences II | HCS 6303 Issues in Behavioral and Brain Sciences II | HCS 6303 Issues in Behavioral and Brain Sciences II |
| Research Methods | HCS 6313 Research Methods II | HCS 6313 Research Methods II | HCS 6313 Research Methods II |
| Major Field | HCS 6346 Systems Neuroscience | COMD 6317 Language and Linguistics | HCS 6331 Cognitive Development |
| Minor Field | COMD 6317 Language and Linguistics | HCS 6346 Systems Neuroscience | COMD 6317 Language and Linguistics |
| | COMD 6331 Cognitive Development | COMD 6331 Cognitive Development | HCS 6346 Systems Neuroscience |
| | COMD 6305/AUD 6306 Speech Science | | |
| Advanced Electives | HCS 6345 Cognitive Science II | HCS 6356 Atypical Development | HCS 6356 Atypical Development |
| | ACN 7366 Human Computer Interactions | HCS 6358 Affective Development | HCS 6358 Affective Development |
| | HCS 6372 Pathophysiology of Disorders of the Nervous System | HCS 7376 Child Psychopathology | HCS 7376 Child Psychopathology |
| | HCS 7349 Text Comprehension Seminar | HCS 6333 Memory | HCS 6333 Memory |

| YEAR 2 – SPRING | | | |
|-----------------|----------------------------|---|----------------------------------|
| | Cognition and Neuroscience | Communication Sciences and Disorders | Psychology |
| | | COMD 7302 Seminar in Aphasiology | COMD 7302 Seminar in Aphasiology |
| | | HCS 7379 Current Research in Child Disorders – Autism | |

| YEAR 2 – SUMMER | | | |
|--------------------|--|--|---|
| | Cognition and Neuroscience | Communication Sciences and Disorders | Psychology |
| School-Wide | | | |
| Research Methods | | | |
| Major Field | | | HCS 63XX Personality New Course |
| Minor Field | | | |
| Advanced Electives | HCS 6335 Seminar in Auditory Cortical Processing | HCS 6335 Seminar in Auditory Cortical Processing | HCS 7374 Peer Relationships and Interpersonal Processes |
| | HCS 7345 Neuroanatomy Lab | HCS 7312 Applied Research Design | HCS 7312 Applied Research Design |
| | HCS 73XX Computational Neuroscience | | |

| YEAR 3 – FALL | | | |
|--------------------|--|--|--|
| | Cognition and Neuroscience | Communication Sciences and Disorders | Psychology |
| School-Wide | HCS 6302 Issues in Behavioral and Brain Sciences I | HCS 6302 Issues in Behavioral and Brain Sciences I | HCS 6302 Issues in Behavioral and Brain Sciences I |
| Research Methods | HCS 6312 Research Methods I | HCS 6312 Research Methods I | HCS 6312 Research Methods I |
| Major Field | HCS 6330 Cognitive Science | COMD 6305 Speech Science | HCS 6350 Social Development |
| | | HCS 6368 Language Development | |
| | | AUD 6303 Hearing Science | |
| | | AUD 6305 Anatomy and Physiology of Audition | |
| Minor Field | HCS 6350 Social Development | HCS 6350 Social Development | HCS 6330 Cognitive Science |
| | HCS 6368 Language Development | HCS 6330 Cognitive Science | HCS 6368 Language Development |
| | COMD 6305 Speech Science | | COMD 6305 Speech Science |
| | AUD 6303 Hearing Science | | AUD 6303 Hearing Science |
| | AUD 6305 Anatomy and Physiology of Audition | | AUD 6305 Anatomy and Physiology of Audition |
| Advanced Electives | HCS 7351 Aging and the Nervous System | HCS 7351 Aging and the Nervous System | HCS 7351 Aging and the Nervous System |
| | HCS 63XX Fundamentals of Functional Brain Imaging | HCS 63XX Fundamentals of Functional Brain Imaging | HCS 63XX Fundamentals of Functional Brain Imaging |
| | HCS 6337 Seminar in Neural | HCS 6337 Seminar in Neural | HCS 6337 Seminar in Neural |

| YEAR 3 – FALL | | | |
|---------------|--|---|---|
| | Cognition and Neuroscience | Communication Sciences and Disorders | Psychology |
| | Plasticity and Behavior | Plasticity and Behavior | Plasticity and Behavior |
| | HCS 6347 Intelligent Systems Analysis | HCS 6356 Atypical Development | HCS 6356 Atypical Development |
| | HCS 6340 Cellular Neuroscience | | HCS 73XX Adult Psychopathology New Course |
| | HCS 7344 Functional Human Neuroanatomy | | |
| | HCS 73XX Analysis of Brain Data New Course | | |
| | HCS 7343 Neuropharmacology | COMD 7305 Communication and the Aging Brain | HCS 6332 Perception |
| | HCS 5314 Cognitive and Neural Modeling Lab | AUD 73XX Auditory Processing Disorders | |
| | | COMD 7324 Seminar in Cochlear Implants | |

| YEAR 3 – SPRING | | | |
|--------------------|---|---|---|
| | Cognition and Neuroscience | Communication Sciences and Disorders | Psychology |
| School-Wide | HCS 6303 Issues in Behavioral and Brain Sciences II | HCS 6303 Issues in Behavioral and Brain Sciences II | HCS 6303 Issues in Behavioral and Brain Sciences II |
| Research Methods | HCS 6313 Research Methods II | HCS 6313 Research Methods II | HCS 6313 Research Methods II |
| Major Field | HCS 6346 Systems Neuroscience | COMD 6317 Language and Linguistics | |
| Minor Field | COMD 6305/AUD 6306 Speech Science | HCS 6346 Systems Neuroscience | HCS 6346 Systems Neuroscience |
| | COMD 6317 Language and Linguistics | COMD 6331 Cognitive Development | COMD 6317 Language and Linguistics |
| | COMD 6331 Cognitive Development | | |
| Advanced Electives | HCS 6345 Cognitive Science II | HCS 7352 Seminar in Language Impairments | HCS 7355 Relationships and Development |
| | HCS 6336 Principles of Developmental Neuroscience | HCS 6356 Atypical Development | HCS 6356 Atypical Development |
| | HCS 6349 Intelligent Systems Design | HCS 7376 Child Psychopathology | HCS 7376 Child Psychopathology |
| | HCS 73XX Functional Brain Imaging Practica | HCS 7379 Current Research in Child Disorders – Autism | |
| | HCS 73XX Neural Net Mathematics | COMD 7302 Seminar in Aphasiology | |

| YEAR 3 – SUMMER | | | |
|-----------------|----------------------------|--------------------------------------|------------|
| | Cognition and Neuroscience | Communication Sciences and Disorders | Psychology |
| School-Wide | | | |

| YEAR 3 – SUMMER | | | |
|--------------------|---|--------------------------------------|------------------------------------|
| | Cognition and Neuroscience | Communication Sciences and Disorders | Psychology |
| Research Methods | | | |
| Major Field | | | HCS 63XX Personality New Course |
| Minor Field | | | |
| Advanced Electives | HCS 7367 Speech Perception Lab | HCS 7367 Speech Perception Lab | HCS 7367 Speech Perception Lab |
| | HCS 7322 Computational Models of Language Understanding | HCS 6369 Brain Mechanisms in Hearing | |
| | HCS 73XX Computational Neuroscience | | |

| YEAR 4 – FALL | | | |
|--------------------|--|---|---|
| | Cognition and Neuroscience | Communication Sciences and Disorders | Psychology |
| School-Wide | HCS 6302 Issues in Behavioral and Brain Sciences I | HCS 6302 Issues in Behavioral and Brain Sciences I | HCS 6302 Issues in Behavioral and Brain Sciences I |
| Research Methods | HCS 6312 Research Methods I | HCS 6312 Research Methods I | HCS 6312 Research Methods I |
| Major Field | HCS 6330 Cognitive Science | COMD 6305 Speech Science | HCS 6350 Social Development |
| | | HCS 6368 Language Development | |
| | | AUD 6303 Hearing Science | |
| | | AUD 6305 Anatomy and Physiology of Audition | |
| Minor Field | HCS 6350 Social Development | HCS 6350 Social Development | HCS 6330 Cognitive Science |
| | AUD 6303 Hearing Science | HCS 6330 Cognitive Science | AUD 6303 Hearing Science |
| | AUD 6305 Anatomy and Physiology of Audition | | AUD 6305 Anatomy and Physiology of Audition |
| | HCS 6368 Language Development | | HCS 6368 Language Development |
| | COMD 6305 Speech Science | | COMD 6305 Speech Science |
| Advanced Electives | HCS 63XX Fundamentals of Functional Brain Imaging | HCS 63XX Fundamentals of Functional Brain Imaging | HCS 63XX Fundamentals of Functional Brain Imaging |
| | HCS 6367 Speech Perception | HCS 6367 Speech Perception | HCS 6367 Speech Perception |
| | HCS 7344 Functional Human Neuroanatomy | HCS 6356 Atypical Development | HCS 6356 Atypical Development |
| | HCS 73XX Advanced Functional Brain Imaging | COMD 7389 Alzheimer's Disease and Related Disorders | COMD 7389 Alzheimer's Disease and Related Disorders |
| | HCS 6340 Cellular Neuroscience | COMD 7305 Communication and the Aging Brain | |
| | | HCS 73XX Psycholinguistics New Course | HCS 73XX Psycholinguistics New Course |
| | | AUD 73XX Auditory Processing Disorders | |

| | | | |
|--|--|--|--|
| | | COMD 7324 Seminar in Cochlear Implants | |
|--|--|--|--|

| YEAR 4 – SPRING | | | |
|--------------------|---|---|---|
| | Cognition and Neuroscience | Communication Sciences and Disorders | Psychology |
| School-Wide | HCS 6303 Issues in Behavioral and Brain Sciences II | HCS 6303 Issues in Behavioral and Brain Sciences II | HCS 6303 Issues in Behavioral and Brain Sciences II |
| Research Methods | HCS 6313 Research Methods II | HCS 6313 Research Methods II | HCS 6313 Research Methods II |
| Major Field | HCS 6346 Systems Neuroscience | COMD 6317 Language and Linguistics | HCS 6331 Cognitive Development |
| Minor Field | COMD 6305/AUD 6306 Speech Science | HCS 6346 Systems Neuroscience | HCS 6346 Systems Neuroscience |
| | COMD 6317 Language and Linguistics | COMD 6331 Cognitive Development | COMD 6317 Language and Linguistics |
| | COMD 6331 Cognitive Development | | |
| Advanced Electives | HCS 6345 Cognitive Science II | HCS 6356 Atypical Development | HCS 6356 Atypical Development |
| | ACN 7366 Human Computer Interactions | HCS 7376 Child Psychopathology | HCS 7376 Child Psychopathology |
| | HCS 6372 Pathophysiology of Disorders of the Nervous System | HCS 6333 Memory | HCS 6333 Memory |
| | | COMD 7302 Seminar in Aphasiology | COMD 7302 Seminar in Aphasiology |
| | | HCS 73XX Psycholinguistics | HCS 73XX Psycholinguistics |
| | | HCS 6358 Affective Development | |
| | | HCS 7379 Current Research in Child Disorders – Autism | |

| YEAR 4 – SUMMER | | | |
|--------------------|-------------------------------------|--------------------------------------|----------------------------------|
| | Cognition and Neuroscience | Communication Sciences and Disorders | Psychology |
| School-Wide | | | |
| Research Methods | | | |
| Major Field | | | HCS 63XX Personality New Course |
| Minor Field | | | |
| Advanced Electives | HCS 7345 Neuroanatomy Lab | HCS 7312 Applied Research Design | HCS 7312 Applied Research Design |
| | HCS 73XX Computational Neuroscience | | |

| YEAR 5 – FALL | | | |
|---------------|----------------------------|--------------------------------------|------------|
| | Cognition and Neuroscience | Communication Sciences and Disorders | Psychology |

| YEAR 5 – FALL | | | |
|--------------------|--|--|--|
| | Cognition and Neuroscience | Communication Sciences and Disorders | Psychology |
| School-Wide | HCS 6302 Issues in Behavioral and Brain Sciences I | HCS 6302 Issues in Behavioral and Brain Sciences I | HCS 6302 Issues in Behavioral and Brain Sciences I |
| Research Methods | HCS 6312 Research Methods I | HCS 6312 Research Methods I | HCS 6312 Research Methods I |
| Major Field | HCS 6330 Cognitive Science | COMD 6305 Speech Science | HCS 6350 Social Development |
| | | HCS 6368 Language Development | |
| | | AUD 6303 Hearing Science | |
| | | AUD 6305 Anatomy and Physiology of Audition | |
| Minor Field | HCS 6368 Language Development | HCS 6350 Social Development | HCS 6368 Language Development |
| | HCS 6350 Social Development | HCS 6330 Cognitive Science | HCS 6330 Cognitive Science |
| | COMD 6305 Speech Science | | COMD 6305 Speech Science |
| | AUD 6303 Hearing Science | | AUD 6303 Hearing Science |
| | AUD 6305 Anatomy and Physiology of Audition | | AUD 6305 Anatomy and Physiology of Audition |
| Advanced Electives | HCS 63XX Fundamentals of Functional Brain Imaging | HCS 63XX Fundamentals of Functional Brain Imaging | HCS 63XX Fundamentals of Functional Brain Imaging |
| | HCS 6337 Seminar in Neural Plasticity and Behavior | HCS 6337 Seminar in Neural Plasticity and Behavior | HCS 6337 Seminar in Neural Plasticity and Behavior |
| | HCS 7351 Aging and the Nervous System | HCS 7351 Aging and the Nervous System | HCS 7351 Aging and the Nervous System |
| | HCS 6347 Intelligent Systems Analysis | HCS 6356 Atypical Development | HCS 6356 Atypical Development |
| | HCS 6349 Intelligent Systems Design | | HCS 6353 Family Processes |
| | HCS 7344 Functional Human Neuroanatomy | COMD 7305 Communication and the Aging Brain | HCS 73XX Adult Psychopathology New Course |
| | HCS 73XX Analysis of Brain Data New Course | AUD 73XX Auditory Processing Disorders | |
| | HCS 7343 Neuropharmacology | COMD 7324 Seminar in Cochlear Implants | |
| | HCS 6340 Cellular Neuroscience | | |

| YEAR 5 – SPRING | | | |
|------------------|---|---|---|
| | Cognition and Neuroscience | Communication Sciences and Disorders | Psychology |
| School-Wide | HCS 6303 Issues in Behavioral and Brain Sciences II | HCS 6303 Issues in Behavioral and Brain Sciences II | HCS 6303 Issues in Behavioral and Brain Sciences II |
| Research Methods | HCS 6313 Research Methods II | HCS 6313 Research Methods II | HCS 6313 Research Methods II |
| Major Field | HCS 6346 Systems | COMD 6317 Language and | HCS 6331 Cognitive |

| YEAR 5 – SPRING | | | |
|--------------------|---|---|--|
| | Cognition and Neuroscience | Communication Sciences and Disorders | Psychology |
| | Neuroscience | Linguistics | Development |
| Minor Field | COMD 6317 Language and Linguistics | HCS 6346 Systems Neuroscience | COMD 6317 Language and Linguistics |
| | COMD 6331 Cognitive Development | COMD 6331 Cognitive Development | HCS 6346 Systems Neuroscience |
| Advanced Electives | HCS 6345 Cognitive Science II | HCS 6356 Atypical Development | HCS 6356 Atypical Development |
| | HCS 6336 Principles of Developmental Neuroscience | HCS 7376 Child Psychopathology | HCS 7376 Child Psychopathology |
| | HCS 73XX Computational Neuroscience | COMD 7302 Seminar in Aphasiology | COMD 7302 Seminar in Aphasiology |
| | HCS 73XX Functional Brain Imaging Practica | HCS 7379 Current Research in Child Disorders – Autism | HCS 6358 Affective Development |
| | | COMD 7302 Seminar in Aphasiology | HCS 7355 Relationships and Development |

| YEAR 5 – SUMMER | | | |
|--------------------|---|--------------------------------------|---|
| | Cognition and Neuroscience | Communication Sciences and Disorders | Psychology |
| School-Wide | | | |
| Research Methods | | | |
| Major Field | | | HCS 63XX Personality New Course |
| Minor Field | | | |
| Advanced Electives | HCS 7367 Speech Perception Lab | HCS 7367 Speech Perception Lab | HCS 7374 Peer Relationships and Interpersonal Processes |
| | HCS 7322 Computational Models of Language Understanding | | HCS 7367 Speech Perception Lab |

4. Describe arrangements that would serve non-traditional students, e.g., non-traditionally scheduled classes, delivery of instruction by telecommunications and/or off-campus instruction sites, library services, student advisement, etc., if applicable.

Many of the core courses, including the research methods sequence, are typically offered in the evenings. This will accommodate part-time students. There are no plans for offering the program or any components via distance learning.

5. If the general education/core curriculum component of the proposed program differs from that required for all or most undergraduate programs at the institution, indicate how and why.

Not applicable

- E. Supporting Fields

1. Identify existing degree programs and non-degree supporting fields that would complement the proposed program; describe the relationship of each to the proposed program.

The School of Behavioral and Brain Sciences currently has strong and active master's programs in Applied Cognition and Neuroscience, Communication Disorders, and Human Development and Early Childhood Disorders. It also offers the doctorate in Audiology (Au.D.) These programs complement the proposed Ph.D. programs by offering students a wealth of applied coursework and experiences. Ph.D. students seeking professional certification and state licensure in Speech-Language Pathology or Audiology, or certification as an Early Childhood Interventionist may enroll in the relevant courses to qualify for professional credentials. For students seeking academic/research positions in speech-language pathology or audiology, possession of professional credentials may be mandatory. Through careful construction of the degree plan, students can obtain professional credentials while completing the coursework and research requirements for the Ph.D. Such students will have not only the requisite skills for employment in certain academic/research position, but the advantage of having acquired clinical skills in a research environment and research skills in an environment where clinical issues are addressed.

Students also have available to them supporting coursework and laboratory access through the U.T. Dallas Departments of Computer Science, Electrical Engineering, Mathematical Sciences, and Molecular and Cell Biology. Students whose interests include neurobiology, sensory prostheses, or computational modeling will be encouraged to seek supplemental coursework or laboratory experience outside the boundaries of the School of Behavioral and Brain Sciences. Sharing of students between programs is ongoing and has served to supplement the education of students in the School's current doctoral program. The certificate program in Evaluation Research, jointly offered by the School of Behavioral and Brain Sciences and the School of Social Sciences, offers coursework in statistical techniques and research methodologies for students whose interests involve program evaluation and treatment efficacy.

The University of Texas Southwestern Medical Center at Dallas, including the Departments of Otorhynolaryngology, Neurology, Pediatrics, and Psychiatry and the Scottish Rite Hospital of Dallas are important resources for the proposed Ph.D. programs. Participation of U.T. Southwestern Medical Center faculty on dissertation committees and occasional teaching as well as the opportunities they provide for doctoral research is a continuing strength. In particular, these faculty and their facilities provide doctoral students access to advanced brain-imaging equipment and a variety of patient populations available only at a large research-oriented medical institution.

2. If the existing programs or supporting fields would require updating or expansion because of the new program, explain how and why.

Each of the existing master's programs and the Doctor of Audiology program are autonomous and would not require updating or expansion by the proposed Ph.D. programs. Some of the courses in both the Communication Disorders (COMD) and Audiology (AUD) programs serve as core courses in the current Ph.D. program in Human Development and Communication Sciences and would continue to serve this function. Some jointly utilized courses might experience a small increment in enrollment due either to increased overall Ph.D. enrollment or to additional Ph.D. students seeking supplemental coursework, practical experiences, and/or professional certification and licensure.

F. Effect on Existing Programs

1. Describe how existing courses would be affected by enrollments generated in the proposed program, including, but not limited to, the potential need for additional sections or increased class sizes, faculty, library resources, equipment, supplies, and/or space.

Each of the proposed Ph.D. programs and the proposed M.S. program will be carved from the current Ph.D. program in Human Development and Communication Sciences. Thus, the courses, faculty, library resources, supplies, and space are all presently available. No dramatic increase in enrollment is anticipated, although steady enrollment growth is expected as the School of Behavioral and Brain Sciences achieves greater recognition for its disciplinary as well as interdisciplinary strengths.

2. For a graduate program, describe how related undergraduate programs would be affected by enrollments in the proposed program, including changes anticipated in the rank and/or credentials of faculty teaching in the undergraduate program, and use of graduate student Teaching Assistants, Graduate Assistants, Assistant Instructors, etc., and their credentials. Provide evidence that faculty (full-time, part-time, or TA's) in the proposed program, or who would replace current faculty reassigned to the proposed program, would meet Southern Association minimum standards for credentials and experience.

Implementation of the three proposed Ph.D. programs and the proposed M.S. program will have no significant impact on undergraduate instruction. The faculty teaching courses in the proposed doctoral programs are already teaching doctoral courses and will remain available to continue their current involvement in undergraduate teaching. There will be no increased usage of TA's or part-time faculty for undergraduate instruction as a consequence of implementation of the new Ph.D.'s.

G. Accreditation

1. If there is a professional program accreditation procedure in this field, attach current standards.

There are no professional accreditations necessary for the proposed programs.

2. State intention regarding accreditation.

No professional accreditation will be sought.

III. Evaluation

- A. Describe procedures for evaluation of the program and its effectiveness in the first five years of the program, including admission and retention rates, program outcomes assessments, placement of graduates, changes of job market need/demand, ex-student/graduate survey, or other procedures. How would evaluations be carried out?

As a component of the long-range planning process, the School of Behavioral and Brain Sciences has in place an ongoing self-study procedure for periodic and comprehensive evaluation of its graduate programs. These consist of both internal and external review, and evaluation of formative and outcome data. All university programs undergo periodic review by a team of distinguished site visitors on a 5-year cycle. The School's previous review occurred in June 2001. Both the School's name change and this proposal for the establishment of disciplinary doctoral

programs were recommendations of that external review. The curriculum in each graduate program undergoes biennial review in conjunction with the preparation of the University's Graduate Catalog. The curriculum review conducted by faculty and overseen by the Graduate Studies Committee, includes evaluative data regarding enrollments, course effectiveness (including student evaluations), and currency of content (evaluated through review of course syllabi.) Information from these biennial reviews is used to modify and update the curriculum increasing the effectiveness of coursework and laboratory experiences and assuring courses remain current in content and focus. Other formative data will include tracking the number of student authored and co-authored professional presentations, publications, and extramural grants, and the pace of student achievement of various academic milestones including retention/completion rate. In addition, the Graduate Studies Committee meets periodically with the doctoral students (at least annually) to gather informal information regarding program strengths and weaknesses. Outcome data will be gathered on employability and placement of graduates, application rates, and applicant characteristics. Questionnaires sent to graduates 1, 3, and 5 years post graduation and exit interviews will be used to evaluate satisfaction with the programs, current employment, and perceived strengths and weaknesses in the students' preparation for employment.

IV. Program Need/Demand

A. Identify similar programs at:

1. Texas public and independent universities.

There are no Ph.D. programs in Texas in Cognition and Neuroscience. However, The University of Texas at Austin offers the Ph.D. in Neuroscience and provides opportunity, through its Institute for Neuroscience, for interdisciplinary study across 12 academic departments. Although the degree title differs, this program is the closest in focus and mission to the proposed Ph.D. program in Cognition and Neuroscience.

The University of Texas at Austin offers a Ph.D. in Communication Sciences and Disorders. However, the U.T. Dallas and U.T. Austin programs have different strengths and emphases. A major difference is that the U.T. Austin program is closely aligned with the Department of Linguistics while the U.T. Dallas program is closely aligned with the doctoral program in Cognition and Neuroscience. In addition, the U.T. Dallas program offers a broader spectrum of research opportunities in the areas of hearing and hearing impairment.

There are a number of Ph.D. programs in Psychology offered in Texas. Those at public universities include: Texas A&M University, Texas Tech University, Texas Woman's University, University of Houston, University of North Texas, U.T. Arlington, U.T. Austin, and U.T. El Paso. Those at independent universities include: Rice, Southern Methodist University, and Texas Christian University. The number of doctoral programs in Psychology reflects, in part, the high demand for training in Clinical and Counseling Psychology. Individual components of the proposed U.T. Dallas Ph.D. in Psychology are available at other universities in Texas (e.g. universities offering emphases in cognitive psychology, developmental psychology, or behavioral neuroscience) and both U.T. Austin and Texas A&M University offer comprehensive Psychology Ph.D. programs. However, the proposed Ph.D. in Psychology at U.T. Dallas would likely draw students attracted to the combination of coursework available in cognitive science, neuroscience, communication science, and developmental psychology. The integrated programs of study designed for the current Ph.D. program remain unique in Texas and nationally and would be retained with the new degrees. It is not anticipated that the proposed program would directly compete with other universities in the

region for students. Instead, it would complement existing programs and offer students expanded opportunities for the study of behavioral and brain sciences within the state of Texas.

2. Out-of-state institutions, if the proposed program would be unique in Texas.

Not applicable

- B. Describe justification for the proposed program in terms of the following, as applicable:

1. Local, regional, state, national and international needs. NOTE: State need is the preeminent criterion for consideration of new degree programs (Reference: Coordinating Board "Standards for Consideration of New Doctoral Program Requests," July 1982 and revised Fall 1992).

The proposed Ph.D. programs are designed to prepare the next generation of scientists who will advance the fields of healthcare, education, and technology. Each of these fields depends on a continuing supply of well-prepared Ph.D. level researchers in both basic and applied sciences. Furthermore, the expansion of knowledge and increasing complexity of problems demanding solution require scientists who are well-grounded in disciplinary knowledge, but experienced at working and thinking in an interdisciplinary context. Graduates from each of the three proposed Ph.D. programs will be contributors to the advancement of knowledge and the application of knowledge to the solution of real-world problems. Their contributions will have impact at all levels: local, regional, statewide, national, and international.

There exists a need in Texas for new Ph.D. programs in Cognition and Neuroscience, Communication Sciences and Disorders, and Psychology. No Ph.D. programs similar in emphasis exist within commuting distance of the DFW Metroplex and few within Texas can offer students the wealth of on-campus and community resources available through the School of Behavioral and Brain Sciences. Furthermore, the North Texas region has an unusually high concentration of research-oriented healthcare facilities and high-tech industries which could serve as a feeder to the programs and absorb many of their graduates.

For the School of Behavioral and Brain Sciences to serve effectively as a resource for Texas (and the nation), the names of its Ph.D. programs require more transparency. It has been a continuing concern that students whose interests correspond to the School's strengths in psychology, cognitive science, and neuroscience never apply because web searches fail to locate it. Furthermore, in interviews with prospective students, a common concern has been recognition of the current degree when seeking employment. It is probable that the School's resources at the Ph.D. level are currently underutilized because students are unaware of all the opportunities available to them in Cognition and Neuroscience, Communication Sciences and Disorders, and Psychology.

2. The long-range academic plan of the institution.

The U.T. Dallas Strategic Plan for 2001-2005: "...focuses on the new knowledge bases that will drive the 21st century and the new Texas economy." The University's primary strategic intentions are: "First and foremost, UTD will emphasize education and research in engineering, science, technology, and management of advanced technologies. Second, it will maintain programs of focused excellence in other academic areas." The proposed Ph.D. programs in Cognition and Neuroscience, Communication Sciences and Disorders, and Psychology are in concert with the university's long-range goals and will help position the university to achieve them. The scientific study of the brain and behavior underlies each of the three proposed Ph.D. programs. Education and research associated with cochlear implants, human-computer interactions, and intelligent

systems all focus on innovative technology, require advanced knowledge of brain and behavior, and utilize and underpin advances in engineering. Additionally, the university's long-standing and continuing commitment to education and research in the fields of Communication Disorders and Human Development will be supported by the proposed revision of the Ph.D. program.

3. Demand from prospective students.

This proposal to divide the current Ph.D. program into three separate Ph.D. degrees stems primarily from our effort to offer degrees that are clearly recognizable in the academic and professional communities. Prospective students have expressed concern that their degree will not be recognized or will make them less competitive when they seek post-graduate employment. Students with interests in the area of cognitive science and neuroscience have been especially concerned because the current degree title fails to reference their area of specialization. The plan articulated in this proposal: to maintain current interdisciplinary opportunities while allowing both disciplinary focus and attainment of a recognizable disciplinary degree, should prove attractive to prospective students.

4. Job market needs (identify specific potential employers and supply names, addresses and phone numbers where possible).

It is most likely that many of the graduates from each of the proposed Ph.D. programs will seek employment in academic and research positions at universities and medical schools. In addition, some students who earn the Ph.D. in Cognition and Neuroscience will be eligible for private sector positions in research and development in the pharmaceutical and in high tech industries. Some Psychology graduates will likely seek employment in research-oriented public service positions, program administration, and education. Some Ph.D. graduates in Communication Sciences and Disorders who are clinically certified, may seek positions in healthcare administration.

5. Educational and cultural needs of the community.

The proposed Ph.D. programs are not designed specifically to address the educational and cultural needs of the community. However, as is the case with the current Ph.D. in Human Development and Communication Sciences, many students will be drawn from the local area. The current Ph.D. program has historically attracted students with backgrounds in industry, education, and healthcare. In addition, the availability of a broad range of coursework is attractive to students seeking specific information or experience, even if they are not currently seeking an advanced degree. Finally, the presence of active and growing Ph.D. programs attracts speakers to the area, new scientists to the university, and enriches the delivery of clinical services and public education for the community.

V. PROGRAM POTENTIAL

- A. Estimate the cumulative headcount and full-time equivalent (FTE) enrollment for each of the first 5 years (majors only, considering expected attrition and graduation) and indicate the number expected to be new to the institution each year.

A.1. Ph.D. Program in Cognition and Neuroscience

| | Majors (FT) | Majors (PT)* | Attrition (FTE) | Graduation (FTE) | Majors (Total) | FTE's |
|---|----------------|-----------------|--------------------|---------------------|-------------------|-------|
| 1 | 2 | 0 | 0 | 0 | 2 | 2 |
| 2 | 2 | 0 | 0 | 0 | 4 | 4 |
| 3 | 3 | 2 | 0 | 0 | 9 | 8 |
| 4 | 3 | 2 | 1 | 0 | 13 | 11 |
| 5 | 3 | 2 | 1 | 2 | 15 | 12 |

*Defined as half-time

A.2. Ph.D. Program in Communication Sciences and Disorders

| | Majors (FT) | Majors (PT)* | Attrition (FTE) | Graduation (FTE) | Majors (Total) | FTE's |
|---|----------------|-----------------|--------------------|---------------------|-------------------|-------|
| 1 | 2 | 2 | 0 | 0 | 4 | 3 |
| 2 | 2 | 2 | 0 | 0 | 8 | 6 |
| 3 | 3 | 2 | 0 | 0 | 13 | 10 |
| 4 | 3 | 2 | 1 | 0 | 17 | 13 |
| 5 | 3 | 2 | 1 | 2 | 19 | 14 |

*Defined as half-time

A.3. Ph.D. Program in Psychology

| | Majors (FT) | Majors (PT)* | Attrition (FTE) | Graduation (FTE) | Majors (Total) | FTE's |
|---|----------------|-----------------|--------------------|---------------------|-------------------|-------|
| 1 | 2 | 2 | 0 | 0 | 4 | 3 |
| 2 | 3 | 4 | 0 | 0 | 11 | 8 |
| 3 | 4 | 4 | 1 | 0 | 18 | 13 |
| 4 | 4 | 4 | 3 | 0 | 21 | 16 |
| 5 | 4 | 4 | 3 | 2 | 22 | 17 |

*Defined as half-time

A.4. M.S. Program in Psychology

| | Majors (FT) | Majors (PT)* | Attrition (FTE) | Graduation (FTE) | Majors (Total) | FTE's |
|---|----------------|-----------------|--------------------|---------------------|-------------------|-------|
| 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 1 | 0 | 0 | 1 | 0 | 0 |
| 4 | 2 | 2 | 0 | 3 | 0 | 0 |
| 5 | 2 | 2 | 0 | 3 | 0 | 0 |

B. Explain assumptions used in making these estimates.

B.1 Ph.D. Program in Cognition and Neuroscience

The above estimates are based on the number of additional students anticipated to enroll (new to the university) beyond those expected to enroll in the Cognition and Neuroscience track of the current Ph.D. program in Human Development and Communication Sciences, if the program continued. Typically, 6 new full-time and 2 new part-time students select the Cognition and Neurosciences track of the current Ph.D. program each year. The proportion of full-time to part-time students, attrition rate, and rate of graduation are based on patterns observed in this track over the past 3 years.

B.2. Ph.D. Program in Communication Sciences and Disorders

The above estimates are based on the number of additional students anticipated to enroll (new to the university) beyond those expected to enroll in the Communication Sciences track of the current Ph.D. program in Human Development and Communication Sciences, if the program continued. Typically, 5 new full-time and 3 new part-time students select the Communication Sciences track of the current Ph.D. program each year. The proportion of full-time to part-time students, attrition rate, and rate of graduation are based on patterns observed in this track over the past 3 years.

B.3. Ph.D. Program in Psychology

The above estimates are based on the number of additional students anticipated to enroll (new to the university) beyond those expected to enroll in the Developmental Psychology track of the current Ph.D. program in Human Development and Communication Sciences, if the program continued. Typically, 5 new full-time and 3 new part-time students select the Developmental Psychology track of the current Ph.D. program each year. The proportion of full-time to part-time students, attrition rate, and rate of graduation are based on patterns observed in this track over the past 3 years.

B.4. M.S. Program in Psychology

The above estimates are based on the presumed attrition from the Ph.D. program in Psychology. Students who do not complete the Ph.D. in Psychology but have completed the requirements for the M.S. in Psychology would be admitted to the M.S. program in Psychology and graduate with the terminal M.S. degree that same year. Because the students would be admitted and graduate in the same year, the head count of majors and FTE's appear on the above table (A.4.) as zero.

VI. RESOURCES

A. Personnel

1. Describe any personnel additions or changes in the past three years made in anticipation of the program.

No faculty or staff have been added in anticipation of the proposed programs. However, recent retirements and resignations have resulted in 4 ongoing faculty searches in the areas of Auditory Neuroscience, Cognitive Development, Language Acquisition, and Language Disorders in Children. Successful completion of these searches will enhance both opportunities for student research and breadth of teaching in the proposed Ph.D. programs.

2. Indicate for the first five years the cumulative number of FTE personnel who would be involved in delivery of the program in each of the following categories:

The following estimates are cumulative across the three proposed Ph.D. degrees and the proposed M.S. degree. Because faculty will be teaching courses which apply to two or more programs, attempting to divide FTE responsibility for each program would exaggerate the number of FTE's needed for the proposed revision of the current Ph.D. program.

- a. released time for administration and other services,

A total of 1 FTE each year beginning in Year 1.

- b. full-time faculty,

A total of 31 existing faculty members will participate in the delivery of the proposed three doctoral programs. In addition, the School is currently engaged in faculty searches for 4 new positions. Assuming these searches are successfully completed, there will be a total of 35 faculty participating in the 3 proposed Ph.D. programs. One new FTE faculty position will be added in Year 3. The total FTE faculty participation is estimated to be 36.

- c. part-time faculty

None

- d. graduate student assistants

None

- e. clerical/support staff, and

A total of 2 FTE existing clerical/support staff will participate in the delivery of the proposed three doctoral programs. One new FTE position will be added beginning in Year 1.

- f. others, specify

None

3. List current faculty members, indicating highest earned degree/institution, field of study, current teaching and research assignments, dates of appointment, and anticipated contribution to the program. Specify course(s) each faculty member would teach.

The table below does not include specific faculty assignments to research or to supervision of student research and independent study. All faculty are expected to conduct independent and collaborative research and mentor doctoral students. Research responsibilities and doctoral student supervision are in addition to the faculty member's responsibilities for organized courses. Faculty who hold extramural grants may reduce their annual teaching responsibilities in proportion to the extramural salary funding they receive. However, they are expected to continue their roles as supervisors of student research.

The courses listed are those taught by each faculty member over the past 3 years. Bolded courses are those currently offered for Ph.D. students in the program in Human Development and Communication Sciences. Those same courses constitute their anticipated contribution to the new Ph.D. programs. Additional courses, not previously taught or currently taught by faculty who will

no longer be here when the proposed programs are implemented are the only courses included under the “Anticipated Contribution” column. Faculty are listed according to their primary Ph.D. program affiliation. In a few cases, where their contributions are evenly divided, faculty are listed under 2 programs. Faculty who do not have a specific Ph.D. course listed will contribute to the Ph.D. programs through their supervision of doctoral research, independent study, and occasional special topic courses. These include faculty with reduced organized teaching assignments due to their responsibilities for extramurally-funded grants or program administration.

| Cognition and Neuroscience | | | | | |
|-----------------------------------|---|--------------------------|--|------------------------|--|
| Faculty | Degree/ Institution | Field of Study | Current Teaching | Date of Appointment | Anticipated Contribution |
| Abdi, Herve | Ph.D., Univ of Aix-en-Provence (France) | Memory | HCS 7310 Advanced Research Methods in HCS HCS 6313 Research Methods in HCS – Part II HCS 6345 Cognitive Science II | 9/89 | HCS 73XX Analysis of Brain Data |
| Assmann, Peter | Ph.D., Univ of Alberta (Canada) | Psychoacoustics | PSY 3364 Animal Communication PSY 3393 Experimental Projects AUD 6306 Speech Science PSY 3660 Historical Perspectives on Psychology: Mind and Machines HCS 6367 Speech Perception HCS 7367 Speech Perception Lab | 1/89 | AUD 6303 Hearing Science |
| Bartlett, James | Ph.D., Yale Univ | Perception and Memory | PSY 2301 Introduction to Psychology PSY 4364 Memory CGS (PSY) 3361 Cognitive Psychology | 9/75 | |
| Cauler, Lawrence | Ph.D., Northeastern Ohio Universities College of Medicine | Neuroscience | NSC 4353 Neuroscience Lab Methods NSC 4356 Neurophysiology NSC 4366 Neuroanatomy HCS 7345 Neuroanatomy Lab HCS 7372 Computational Neuroscience | 1/92 | |
| Dowling, Jay | Ph.D., Harvard Univ | Perception and Memory | PSY 3360 Historical Perspectives on Psychology: Mind and Machines HCS 6334 Attention PSY 3393 Experimental Projects PSY 4365 Psychology of Music HCS 6332 Perception | 9/75 | |
| Golden, Richard | Ph.D., Brown Univ | Neural Network Models | HCS 5314 Cognitive and Neural Modeling Lab CGS 3340 Empirical Methods Cognitive Science CGS 3342 Quantitative Models in Cognition PSY 3393 Experimental Projects ACN 6V81 Neural Net Math HCS 7322 Computer Based Lang Processing HCS 6347 Intelligent Systems Analysis HCS 6349 Intelligent Systems Design HCS 7349 Text Comprehension Seminar | 9/90 | |
| Golden (cont'd) | | | | | |

| Cognition and Neuroscience | | | | | |
|-----------------------------------|--|--------------------------------------|--|------------------------|---|
| Faculty | Degree/ Institution | Field of Study | Current Teaching | Date of Appointment | Anticipated Contribution |
| | | | ACN 7366 Human Computer Interaction | | |
| Jerger, James | Ph.D., Northwestern Univ | Diagnostic Audiology | AUD 7371 Electrophys Meas Aud Processing | 9/97 | |
| Kilgard, Michael | Ph.D., Univ of California at San Francisco | Auditory Neuroscience | NSC 4352 Cellular Neuroscience NSC (PSY) 4367 Developmental Neurobiology HCS 8V50 Sensory Neuroscience HCS 6335 Seminar in Auditory Cortical Processing HCS 6336 Principles of Developmental Neuroscience | 1/99 | |
| Lomber, Steven | Ph.D., Boston Univ School of Medicine | Visual and Auditory Processing | NSC 4361 Behavioral Neuroscience HCS 7372 Current Topics in Visual Neuroscience NSC 3361 Behavioral Neuroscience HCS 8V50 Sensory Neuroscience HCS 7344 Functional Human Neuroanatomy | 7/01 | |
| Moller, Aage | Ph.D. (D. Med. Sci.) Karolinska Institute, Stockholm, Sweden | Auditory Neuroscience | HCS 6373 Intraoperative Monitoring NSC 4V90 Sensory Neurophysiology NSC 4V90 Disorder Caused by Neural Plasticity NSC 4V90 Disorders of the Nervous System HCS 6372 Pathophysiology AUD 6305 Anatomy & Physiology of Audition HCS 7372 Scientific Writing | 9/97 | HCS 6369 Brain Mechanisms in Hearing |
| O'Toole, Alice | Ph.D., Brown Univ | Face Recognition | HCS 6330 Cognitive Science CGS 2301 Cognitive Science | 7/89 | |
| Thompson, Tres | Ph.D., Univ of Virginia | Systems Neuroscience | NSC 4354 Integrative Neuroscience NSC 4363 Neuropharmacology HCS 6346 Integrative Neuroscience HCS 7343 Neuropharmacology HCS 7351 Aging and the Nervous System HCS 6315 Grant Writing for Researchers HCS 7378 Advanced Neurophysiology Methods HCS 6337 Seminar – Neural Plasticity & Behavior | 8/97 | |

| Communication Sciences and Disorders | | | | | |
|---|--|-----------------------------------|---|------------------------|---|
| Faculty | Degree/ Institution | Field of Study | Current Teaching | Date of Appointment | Anticipated Contribution |
| Assmann, Peter | Ph.D., Univ of Alberta (Canada) | Psychoacoustics | PSY 3364 Animal Communication PSY 3393 Experimental Projects AUD 6306 Speech Science PSY 3360 Historical Perspectives on Psychology: Mind and Machines HCS 6367 Speech Perception HCS 7367 Speech Perception Lab | 1/89 | AUD 6303 Hearing Science |
| Chapman, Sandra | Ph.D., Univ of Texas at Dallas | Brain Injury | COMD 7389 Alzheimer's Disease and Related Disorders | 9/03 | |
| Jerger, James | Ph.D., Northwestern Univ | Diagnostic Audiology | AUD 7371 Doctoral Seminar in Audiology | 9/97 | |
| Jerger, Susan | Ph.D., Baylor College of Medicine | Auditory Cognition | PSY 3361 Cognitive Psychology PSY 3393 Experimental Projects PSY 4375 Honors Seminar | 9/97 | |
| Katz, William | Ph.D., Brown Univ, | Speech Science | COMD 6305 Speech Science SPAU 3343 Phonetics COMD 7302 Seminar in Aphasiology SPAU 3303 Normal Language Development | 9/90 | HCS 73XX Psycholin- guistics |
| Moller, Aage | Ph.D. (D. Med. Sci.) Karolinska Institute, Stockholm, Sweden | Auditory Neuroscience | HCS 6373 Intraoperative Monitoring NSC 4V90 Sensory Neurophysiology NSC 4V90 Disorder Caused by Neural Plasticity NSC 4V90 Disorders of the Nervous System AUD 6305 Anatomy & Physiology of Audition HCS 7372 Scientific Writing | 9/97 | HCS 6369 Brain Mechanisms in Hearing |
| Roeser, Ross | Ph.D., Florida State Univ | Diagnostic Audiology | AUD 6310 Advanced Clinical Audiology AUD 6311 Diagnostic Audiology COMD 7V91 Physiologic Assessment of the Vestibular System | 9/75 | |
| Rollins, Pamela | Ph.D., Florida State Univ | Language Development | HCS 6312 – Research Methods in HCS Part 1 HCS 7312 Applied Research Design COMD 7377 Assessment And Intervention of Children with Severe Language Disorders HCS 7379 Current Research in Child Disorders-Autism | 9/94 | HCS 7352 Seminar in Language Development |
| Sharma, Anu | Ph.D., Northwestern Univ | Auditory Electrophysiolog y | AUD 73XX Auditory Processing Disorders AUD 7353 Clinical Electrophysiology | 9/01 | |
| Stillman, Robert | Ph.D., Syracuse Univ | Preverbal Communication | HCS 6302 Issues in HCS Part I HCS 6303 Issues in HCS – Part II | 9/73 | |

| Communication Sciences and Disorders | | | | | |
|---|---------------------------------|----------------------|--|------------------------|-----------------------------|
| Faculty | Degree/ Institution | Field of Study | Current Teaching | Date of Appointment | Anticipated Contribution |
| Stillman (cont'd) | | | COMD 7354 Seminar in Brain & Communicative Development | | |
| Thibodeau, Linda | Ph.D., Univ of Minnesota | Aural Habilitation | AUD 7321 Theories of Amplification SPAU 4395 Issues in the Management of Persons with Hearing-Impairment AUD 7326 Aural Habilitation of Children | 7/96 | |
| Tobey, Emily | Ph.D., City Univ of New York | Cochlear Implants | COMD 7324 Cochlear Implants & Technology for Persons with Hearing Impairment HCS 7372 Fund of Functional Brain Imaging HCS 7372 Brain Imaging Practica HCS 7372 Advanced Brain Imaging HCS 8V50 Ethics In Research | 1/95 | |
| Ulatowska, Hanna | Ph.D., Edinburgh Univ | Neurolinguistics | COMD 7305 Communication and the Aging Brain COMD 7306 Cultural Issues in Communication COMD 6317 Language and Linguistics SPAU 4393 Language in Culture and Society | 9/73 | |

| Psychology | | | | | |
|----------------------|---|--------------------------|---|------------------------|--|
| Faculty | Degree/ Institution | Field of Study | Classes Teaching | Date of Appointment | Anticipated Contribution |
| Abdi, Herve | Ph.D., Univ of Aix-en-Provence (France) | Memory | HCS 7310 Advanced Research Methods in HCS HCS 7310 Analysis of Brain Data HCS 6313 Research Methods in HCS – Part II HCS 6330 Cognitive Science II | 9/89 | HCS 73XX Analysis of Brain Data |
| Assmann, Peter | Ph.D., Univ of Alberta (Canada) | Psychoacoustics | PSY 3364 Animal Communication PSY 3393 Experimental Projects AUD 6306 Speech Science PSY 3360 Historical Perspectives on Psychology: Mind and Machines HCS 6367 Speech Perception HCS 7367 Speech Perception Lab | 1/89 | AUD 6303 Hearing Science |
| Bartlett, James | Ph.D., Yale Univ | Perception and Memory | PSY 2301 Introduction to Psychology PSY 4364 Memory PSY 3361 Cognitive Psychology | 9/75 | |
| Bower, Thomas | Ph.D., Cornell Univ | Infant Development | PSY 3363 Evolution of Behavior PSY 1390 Journey of Life COMD 7362 Seminar in Autism | 9/88 | |
| Buhrmester, Duane | Ph.D., Univ of Denver | Relationships | PSY 4V90 Issues in Psychology: Careers HCS 6350 Social Development PSY 2301 Introduction to | 9/89 | HCS 63XX Personality |

| Psychology | | | | | |
|------------------------|---|--------------------------|---|------------------------|---|
| Faculty | Degree/ Institution | Field of Study | Classes Teaching | Date of Appointment | Anticipated Contribution |
| Buhrmester (cont'd) | | | Psychology PSY 3310 Child Development HCS 7355 Peer Relationships and Interpersonal Processes PSY 3100 Careers in Psychology | | |
| Dowling, Jay | Ph.D., Harvard Univ | Perception and Memory | PSY 3360 Historical Perspectives on Psychology: Mind and Machines HCS 6334 Attention PSY 3393 Experimental Projects PSY 4365 Psychology of Music HCS 6332 Perception | 9/75 | |
| Jerger, James | Ph.D., Northwestern Univ | Diagnostic Audiology | AUD 7371 Doctoral Seminar in Audiology | 9/97 | |
| Jerger, Susan | Ph.D., Baylor College of Medicine | Auditory Cognition | PSY 3361 Cognitive Psychology PSY 3393 Experimental Projects PSY 4375 Honors Seminar | 9/97 | |
| Katz, William | Ph.D., Brown Univ, | Speech Science | COMD 6305 Speech Science SPAU 3343 Phonetics COMD 7302 Seminar in Aphasiology SPAU 3303 Normal Language Development | 9/90 | HCS 73XX Psycholin- guistics |
| Moore, Bert | Ph.D., Stanford Univ | Child Development | PSY 4394 Internship in Psychology | 9/85 | |
| Nezworski, Teresa | Ph.D., Univ of Minnesota | Psychopathology | PSY 4344 Child Psychopathology HCS 6356 Atypical Development HCS 7376 Child Psychopathology PSY 3342 Exceptional Children | 9/97 | |
| O'Toole, Alice | Ph.D., Brown Univ | Face Recognition | HCS 6330 Cognitive Science CGS 2301 Cognitive Science | 7/89 | |
| Owen, Margaret | Ph.D., Univ of Michigan | Family Processes | HDCE 5330 Intervention Paradigms HCS 6350 Social Development HCS 6358 Affective Development HCS 7355 Advanced Seminar: Relationships and Development | 9/95 | |
| Prager, Karen | Ph.D., Univ of Texas | Relationships | PSY 4331 Personality COMD 6348 Counseling – COMD Professional PSY 3324 Psychology of Gender | 9/79 | |
| Rollins, Pamela | Ed.D., Harvard Graduate School of Education | Language Development | HCS 6312 – Research Methods in HCS Part 1 HCS 7312 Applied Research Design COMD 7377 Assessment and Intervention of Children with Severe Language Disorders HCS 7379 Current Research in Child Disorders-Autism | 9/94 | HCS 7352 Seminar in Language Development |
| Santrock, John | Ph.D, The Univ of Minnesota | Family Processes | PSY 3339 Educational Psychology PSY 4334 Lifespan Development PSY 3338 Adolescence HCS 6353 Family Processes | 9/85 | |

| Psychology | | | | | |
|----------------------|---|-----------------------|---|------------------------|---|
| Faculty | Degree/ Institution | Field of Study | Classes Teaching | Date of Appointment | Anticipated Contribution |
| Spence, Melanie | Ph.D., Univ of North Carolina at Greensboro | Infant Perception | HD CD 5311 The Developing Child: Infant and Toddlers (Birth to 3yrs) HD CD 6320 The Developing Child: Toddler and Preschool Years PSY 3362 Cognitive Development PSY 3310 Child Development HD CD 6V81 Issues in Infant Development HCS 6331 Cognitive Development | 9/88 | |
| Ulatowska, Hanna | Ph.D., Edinburgh Univ | Neurolinguistics | COMD 7305 Communication and the Aging Brain COMD 7306 Cultural Issues in Communication COMD 6317 Language and Linguistics SPAU 4393 Language in Culture and Society | 9/73 | |
| Underwood, Marion | Ph.D., Duke Univ | Emotion Regulation | PSY 2301 Introduction to Psychology PSY 4343 Abnormal Psychology | 9/98 | HCS 73XX Adult Psychopathol- ogy |

4. If current faculty would be teaching new courses, how would their teaching assignments change, and how would their current assignments be accommodated?

Any new doctoral courses taught by current faculty would replace existing doctoral courses. It is anticipated that some new courses, especially doctoral electives, may be taught periodically while other new courses may replace doctoral courses no longer deemed essential to the students' degrees. There is no planned reallocation of teaching responsibilities across degree levels and no significant net increase in the total number of doctoral courses offered each semester across the three proposed Ph.D.'s compared to the number offered under the current Ph.D. program in Human Development and Communication Sciences.

5. List all new positions (faculty, graduate assistant, clerical/support, etc.) required during the first five years of the program and indicate whether the positions would be additions or reassignments. If reassignments, indicate the source.

One new faculty FTE will be added in the third year to support the increased teaching and supervisory loads brought on by the anticipated increased enrollment across the three Ph.D. programs. In addition, recent faculty retirements and resignations have resulted in the initiation of searches for tenure-track faculty in the following areas: Auditory Neuroscience, Cognitive Development, Language Acquisition, and Language Disorders in Children. Each new faculty member will participate in one or more of the proposed Ph.D. programs as part of her or his overall teaching, research, and mentoring assignments. There is no plan to reassign faculty from their existing responsibilities in master's and undergraduate teaching.

Each Ph.D. program will employ one additional graduate assistant per year, for a total of three, new graduate assistants each year. In addition, one additional clerical/support person will be hired due to the additional administrative load related to recruiting, record keeping, and tracking for the separate Ph.D. programs.

6. Describe qualifications that would be sought in new faculty, indicate the expected level of appointment and anticipated contributions to the program (including research grants, contract resources, etc.)

There is no plan to seek additional faculty other than those for whom searches have already been initiated. All tenure-track faculty are expected to hold the Ph.D. degree or equivalent and to have a demonstrated record of funded research or a clear potential for research funding. Teaching excellence is necessary and expected.

7. For graduate programs:
 - a. describe departmental faculty policy regarding chairing or serving on thesis/dissertation committees, numbers of students supervised at one time, etc.

Criteria for chairing or serving on dissertation committees are established by the university. The School of Behavioral and Brain Sciences adheres to university policy in making assignments to dissertation committees. Appointment of all dissertation committees requires the approval of the School's Graduate Studies Committee. There are no fixed limits on the number of dissertation committees on which a faculty member may serve nor the number of students they may supervise. However, there is a limit to the number of students a faculty member is expected to supervise and as a rule, no faculty member supervises more than 5 doctoral students or more than two students at the dissertation stage. The Graduate Studies Committee will carefully monitor the assignment of doctoral students to faculty to assure that each student receives expert and individualized mentoring, adequate opportunities to participate in supervised research, and sufficient access to laboratories and other research facilities to sustain a reasonable rate of progress toward the Ph.D.

- b. identify faculty who would supervise theses, dissertations, and internships, etc.; provide examples of their ongoing research projects +

Hervé Abdi

Research Interests: Psychology of memory, neural networks, statistics

Publications: Posamentier, M., & Abdi, H. (2003). Processing faces and facial expressions. *Neuropsychology Review*, 13(3): 113-144.

Abdi, H., Valentin, D., & Edelman, B. (1999). *Neural Networks*. Newbury Park, CA: Sage University Series.

Peter F. Assmann

Research Interests: Auditory and perceptual processes underlying speech communication

Publications: Katz, W.F. & Assmann, P.F. (2001). Identification of children's and adults' vowels: Intrinsic fundamental frequency, fundamental frequency dynamics, and presence of voicing. *Journal of Phonetics*, 29: 23-51.

Stickney, G. & Assmann, P.F. (2001). Acoustic and linguistic factors in the perception of bandpass-filtered speech. *Journal of the Acoustical Society of America*, 109(3): 1157-1165.

James C. Bartlett

Research Interests: Nonverbal memory, aging and memory, emotions and memory

Publications: Searcy, J. H., Bartlett, J. C., & Memon, A. (1999). Age differences in accuracy and choosing in

eyewitness identification and face recognition. *Memory & Cognition*, 27: 538-552.
Searcy, J. H. & Bartlett, J. C. (1996). Inversion and processing of component and spatial-relational information in faces. *Journal of Experimental Psychology: Human Perception and Performance*, 22: 904-915.

Thomas G.R. Bower

Research Interests: Infant development, typical and atypical

Publications: Walton, G.E., Bower, N.J.A., & Bower, T.G.R. (1992). Recognition of familiar faces by newborns. *Infant Behavior and Development*, 15: 265-269.

Walton, G.E., & Bower, T.G.R. (1993). Amodal representation of speech in infants. *Infant Behavior and Development*.

Duane P. Buhrmester

Research Interests: Peer and family relationships; social competence

Publications: French, D.C., Rianasari, M., Pidada, S., Nelwan, P., & Buhrmester, D. (2001). Social support of Indonesian and U.S. children and adolescents by family members and friends. *Merrill-Palmer Quarterly*, 47: 377-394.

Jenkins, S. R., Goodness, K., & Buhrmester, D. (2002). Gender differences in early adolescents' relationship qualities, self-efficacy, and depression symptoms. *Journal of Early Adolescence*, 22: 277-309.

Lawrence J. Cauller

Research Interests: Functional architecture of reciprocal connections in sensory neocortex

Publications: Cauller, L.J. (2003). The NeuroInteractive Paradigm: Dynamical mechanics and the emergence of higher cortical function. *Computational Models for Neuroscience: Human Cortical Information Processing*. In: Robert Hecht-Nielsen and Tom McKenna, eds. Springer-Verlag.

Mitchel, B.D., & Cauller, L.J. (2001). Corticocortical and thalamocortical projections to layer I of the frontal neocortex in rats. *Brain Research*, 921 (1-2): 68-77.

Sandra Chapman

Research Interests: Discourse, cognition and brain function in brain injury, brain disease, and healthy aging

Publications: Chapman, S. B., & Sparks, G. (2003). Language and discourse. In: M. Aminoff & Daroff, eds. *Encyclopedia of Neurological Sciences*, San Diego, CA: Academic Press.

Cullum, C.M., Paulman, R.G., Koss, E., Chapman, S.B., Lacritz, L. (2002). Evaluation of cognitive functions in dementia. In: Myron Weiner, eds. *The Dementias*. Washington D.C.: American Psychiatric Press.

W. Jay Dowling

Research Interests: Complex auditory information processing and its development, music cognition

Publications: Dowling, W. J. (2001). Music perception. In: E. B. Goldstein, eds. *Handbook of Perception*. Oxford: Blackwell, 469-498.

Dowling, W. J., Tillmann, B., & Ayers, D. (2002). Memory and the experience of hearing music. *Music Perception*, 19: 249-276.

Richard M. Golden

Research Interests: Formal neural network models of perceptual and cognitive processes, text comprehension and recall

Publications: Golden, R. M. (2000). Statistical tests for comparing possibly misspecified and nonnested models. *Journal of Mathematical Psychology*, 44: 153-170.

Durbin, M. A., Earwood, J., & Golden, R. M. (2000). Hidden Markov models for coding story recall data. *Proceedings of the 22nd Annual Cognitive Science Society Conference*. Erlbaum: Mahwah, N.

James F. Jerger

Research Interests: Effects of aging on binaural auditory functioning, ERPs, brain mapping

Publications: Jerger, J. & Estes, I. (2002). Asymmetry in event-related potentials to simulated auditory motion in children, young adults and seniors. *Journal of the American Academy of Audiology*, 13: 1-13.

Tillman, G. & Jerger, J. (2002). Temporal compounds reveal interaural biases. *Journal of the American Academy of Audiology*, 13: 285-294.

Susan W. Jerger

Research Interests: Speech and auditory processing, auditory disorders

Publications: Spence, M., Rollins, P., & Jerger, S. (2002). Children's recognition of cartoon voices. *Journal of Speech, Hearing, and Language Research*, 45: 214-222.

Jerger, S., Martin, R., & Damian, M. (2002). Time course of semantic and phonological stages in picture naming for children and adults. *Journal of Memory and Language*, 47: 229-249.

William F. Katz

Research Interests: Neurolinguistics and aphasia, speech and language in normal and language-impaired children

Publications: Katz, W., & Assmann, P. Identification of children's and adult's vowels: Intrinsic fundamental frequency, fundamental frequency dynamics, and presence of voicing. *Journal of Phonetics*, 29: 23-51.

Katz, W. (2001). Coarticulation in aphasia: Implications for phonetic theories. *Journal of Phonetics*, 28: 313-334.

Michael P. Kilgard

Research Interests: Plasticity and Information Processing in the Auditory Cortex

Publications: Kilgard, M.P., Pandya, P.K., Engineer, N.D., & Moucha, R. (2002). Cortical network reorganization guided by sensory input features. *Biological Cybernetics*, 87: 333-43.

Kilgard, M.P., & Merzenich, M.M. (2002). Order sensitive plasticity in adult primary auditory cortex. *Proceedings of the National Academy of Sciences*, 99: 3205-3209.

Stephen G. Lomber

Research Interests: Visual and Auditory Processing in the Cerebral Cortex

Publications: Lomber, S.G. & Bullier, J. (2002). Shape discrimination deficits during reversible deactivation of area V4 of the macaque monkey. *Cerebral Cortex*, 12: 1145-1156.

Galuske, R.A.W., Schmidt, K.E., Goebel, R., Lomber, S.G., & Payne, B.R. (2002). The role of feedback in shaping neural representations in cat visual cortex. *Proceedings of the National Academy of Sciences*, 99: 17083-17088.

Aage R. Møller

Research Interests: Sensory physiology, neural plasticity

Publications: Møller, A.R. Pathophysiology of Tinnitus. In: Otolaryngologic Clinics of North America A. Sismanis (ed.): W.B. Saunders, 2003, Amsterdam pp 249-266

Møller, A.R. (2003). *Sensory Systems: Anatomy and Physiology*, Amsterdam: Academic Press.

Bert S. Moore

Research Interests: Affect and cognition, emotional development

Publications: Eisenberg, N. & Moore, B.S. (1997). Emotional regulation and development. *Motivation and Emotion*.

Moore, B.S. (1993). Empathy and its antecedents. *Motivation and Emotion*.

M. Teresa Nezworski

Research Interests: Personality and psychopathology across the life-span; special emphasis in sexual abuse

Publications: Wood, J. M., Nezworski, M. T., & Garb, H. N. (in press). The misperception of psychopathology: Problems with the norms of the Comprehensive System for the Rorschach. *Clinical Psychology: Science and Practice*.

Nezworski, M. T. & Wood, J. M. (1996). Narcissism in the Comprehensive System for the Rorschach. *Clinical Psychology: Science & Practice*, 2: 179-199.

Alice J. O'Toole

Research Interests: Face recognition, stereoscopic vision, and computational models

Publications: Leopold, D., O'Toole, A. J., Vetter, T. & Blanz, V. (2001). Prototype-referenced shape encoding revealed by high-level after effects. *Nature Neuroscience*, 4: 89-94.

O'Toole, A. J., Price, T., Vetter, T., Bartlett, J. C. & Blanz, V. (1999). Three-dimensional shape and two-dimensional surface textures of human faces: The role of "averages" in attractiveness and age. *Image and Vision Computing Journal*, 18: 9-19.

Margaret Owen

Research Interests: Family processes; early childcare

Publications: NICHD Early Child Care Research Network (2003). Early child care and mother-child interaction from 36 months through first grade. *Infant Behavior and Development*, 26: 345-370.

NICHD Early Child Care Research Network (2003). Does amount of time spent in child care predict socioemotional adjustment during the transition to kindergarten? *Child Development*, 74: 976-1005.

Karen Prager

Research Interests: Clinical and Counseling Psychology

Publications: Prager, K. J. (2000). Intimacy research in the 21st century: A new organizational framework. Poster presented at the Annual Meeting, International Society for the Study of Personal Relationships, Brisbane, Queensland, Australia.

Prager, K.J. (2000). Intimacy in personal relationships. In: S. Hendrick & C. Hendrick, eds. *Close Relationships*. Thousand Oaks, CA: Sage, 229-244.

Ross J. Roeser

Research Interests: Audiology

Publications: Roeser, Ross J. (1996). A guide to the practice of audiology. *Audiology Desk Reference*. Thieme, NY: Stuttgart.

Roeser, R. J., Hosford-Dunn, H., and Valente, M. (2000). *Audiology: Diagnosis*. New York: Thieme Medical Publishers, Inc.

Pamela R. Rollins

Research Interests: Child language development

Publications: McDonnell, S.A., FrielPatti, S., & Rollins R. P. (2003). Patterns of change in maternal-child discourse behaviors across repeated storybook readings. *Applied Psycholinguistics*, 24: 323-342.

Rollins, P. R. (2003). Caregiver contingent comments and subsequent vocabulary comprehension. *Applied Psycholinguistics*, 24: 221-234.

John W. Santrock

Research Interests: Family processes and adolescent development

Publications: Santrock, J.W. (2002). *Life-span Development*, (8th edition). New York: McGraw-Hill.

Santrock, J.W. (2001). *Adolescence*, (8th edition) New York: McGraw-Hill.

Anu Sharma

Research Interests: Neurophysiologic bases of speech perception; central auditory system development and plasticity; clinical populations

Publications: Sharma A., Dorman M., & Spahr A. (2002). A sensitive period for the development of the central auditory system in children with cochlear implants: Implications for age of implantation. *Ear and Hearing*, 23 (6): 532-539.

Sharma A., Dorman M., & Spahr A. (2002). Rapid development of cortical auditory evoked potentials after early cochlear implantation. *NeuroReport*, 13 (10): 1-4.

Melanie J. Spence

Research Interests: Infant perception, learning and memory

Publications: Spence, M.J. & Moore, D. (2003). Categorization of infant-directed speech: Development from 4 to 6 months. *Developmental Psychobiology*, 42: 97-109.

Thierry, K. L. & Spence, M. J. (2002). Source-monitoring training facilitates preschoolers' eyewitness memory performance. *Developmental Psychology*, 38: 428-437.

Robert D. Stillman

Research Interests: Preverbal and nonverbal communicative skills of children with severe communicative impairments

Publications: Aldridge, M.A., Stillman, R.D., & Bower, T.G.R. (2001). Newborn categorization of vowel-like sounds. *Developmental Science*, 4: 219-232.

Stillman, R., Snow, R., & Warren, K. (1999). "I used to be good with kids." Encounters between speech-language pathology students and children with PDD. In: D. Kovarsky, J. Duchan, & M. Maxwell, eds. *The Social Construction of Language Incompetence*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Linda K. Thibodeau

Research Interests: Speech perception in persons with hearing disorders; reduction of speech recognition difficulties

Publications: Thibodeau, L., DeLaRosa, N., & Champlin, C. (2001). Acoustic consequences of evaluating hearing aids via stethoscopes and listening tubes. *Volta Review*, 102: 25-33.

Friel-Patti, S., DesBarres, K., & Thibodeau, L. (2001). Case studies of children using Fast ForWord. *American Journal of Speech-Language Pathology*.

L. Tres Thompson

Research Interests: Neural mechanisms of learning and memory, effects of aging

Publications: Moyer, J.R., Jr., Power, J.M., Thompson, L.T. & Disterhoft, J.F. (2000). Increased excitability of aged rabbit CA1 neurons after trace eyeblink conditioning. *Journal of Neuroscience*, 20: 5476-5482.

Oh, M.M., Power, J.M., Thompson, L.T., & Disterhoft, J.F. (2000). Apamin increases the excitability of rabbit CA1 hippocampal pyramidal neurons. *Neuroscience Research Communications*, 27: 135-142.

Emily A. Tobey

Research Interests: Speech perception & production; hearing impairment

Publications: Roland, P., Tobey, E., & Devous, M. (2001). Pre-operative functional assessment of auditory cortex in adult cochlear implant candidates. *Laryngoscope*, 111(1): 7783. (Data selected for cover of Journal)

Geers, A., Nicholas, J., Tye-Murray, N., Uchanski, R., Brenner, C., Davidson, L., Toretta, G., & Tobey, E. (2000). Effects of communication mode on skills in long-term cochlear implant users. *Annals of, Otolology, Rhinology, and Laryngology*: Suppl. 185, 109(12): 89-92.

Hanna K. Ulatowska

Research Interests: Neurolinguistics, language changes in aphasia, dementia, and normal aging

Publications:

Ulatowska, H.K., & Olness, G.S. (2001). Dialectal variants of verbs in narratives of African Americans with aphasia: Some methodological considerations. In: M. Paradis, eds. *Manifestations of Aphasia Symptoms in Different Languages*, 9-26.

Ulatowska, H.K., Sadowska, M., Kadzielawa, D., Kordys, J., & Rymarczyk, K. (2000). Linguistic and cognitive aspects of proverb processing in aphasia. *Aphasiology*, 14 (3): 227-250.

Marion K. Underwood

Research Interests: Emotion regulation, anger and aggression, children's peer relations

Publications: Underwood, M.K. (2003). *Social Aggression Among Girls*. Guilford Press.

Hurley, J.C. & Underwood, M.K. (2002). Children's understanding of their research rights: informed assent, confidentiality and stopping participation. *Child Development*, 73: 132-143.

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Complete vita of the faculty (listed above) who will supervise dissertations may be found in the

Appendix.

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B. Library

1. List any library holding added in the past three years in anticipation of the program.

No library holdings have been added specifically in anticipation of the proposed degrees. Individual faculty may make recommendations for library purchases through the School's library representative. These ongoing requests have helped to build the needed library resources to support the current as well as the proposed Ph.D. programs.

2. Describe library holding specifically relevant to the proposed program, noting strengths and weaknesses. If there are guidelines for the discipline, do current holding meet or exceed standards? Describe planned actions that would maintain strengths and/or remedy weaknesses.

Library holdings are extensive and adequate to support the proposed programs which are emphases in the current Ph.D. in Human Development and Communication Sciences and the focus of much faculty research.

3. Describe cooperative library arrangements that would be available to students in this program.

The UTD library shares resources with numerous other academic and research libraries in the region. In addition, nationwide interlibrary loan is provided through membership in OCLC, a bibliographic utility shared by more than 6000 libraries. Thus, the current cooperative library arrangements will be sufficient.

4. Provide library director's assessment of library resources necessary for the proposed program.

Dr. Larry Sall, Director of Libraries, advises that because the three domains for the proposed degrees represent the existing emphases of the current Ph.D. in Human Development and Communication Sciences, the library has been developing resources to support research in all three proposed degrees. He further notes that the library maintains a satellite facility in the Callier Center for Communication Disorders with extensive holdings in Communication Sciences.

C. Equipment

1. List any equipment acquired in the past three years in anticipation of the program.

No equipment has been purchased in anticipation of the proposed program.

2. Itemize expenditures projected during each of the first five years for equipment and supplies specifically for the proposed program.

No net increase in expenditures for equipment and supplies specifically for the proposed programs are anticipated in the first 5 years compared to the current levels. Current annual expenditures for equipment and supplies for the School of Behavioral and Brain Sciences as a whole is \$360,000. Equipment and supplies are not allocated by degree program, but are shared across degree programs.

D. Facilities

1. Describe any facility added or modified in the past three years in anticipation of the program.

No facilities have been specifically added in anticipation of the proposed Ph.D. degree programs.

2. Describe the availability and adequacy of existing facilities that would be used for the proposed program.

The facilities of the School of Behavioral and Brain Sciences are more than adequate to implement and develop the proposed Ph.D. programs. Available facilities currently in use for the Ph.D. program in Human Development and Communication Sciences include the Callier Center for Communication Disorders Dallas campus, the Callier Center for Communication Disorders Richardson campus, the 4th level of Green Hall and the first level of the Multipurpose Building. Together, they provide laboratories and other research facilities, classrooms, faculty and administrative office space, doctoral student offices and study areas, and student computing labs. Although many of these facilities are shared with the School's other degree programs, their adequacy for the proposed programs is evident and availability to doctoral students and doctoral research is assured.

3. Describe planned alteration or renovation of existing facilities needed for the program; estimate date of availability and display estimated cost in Item VII.

No renovation or alteration is needed for implementation of the proposed Ph.D. programs.

4. Describe planned new facilities needed for the program; estimate date of availability and display estimated cost in Item VII.

No new facilities are planned or needed. The Callier Center for Communication Disorders-Richardson campus recently opened and will be utilized by the proposed doctoral program for teaching and research.

VII. COSTS

On the attached forms, provide estimates of new costs to the institution related to the proposed program(s) and provide information regarding sources of the funding that would defray those costs.

NOTE: Under Coordinating Board procedures, proposals for new programs and administrative units must be accompanied by (a) a statement certifying the adequacy of funding, or (b) a statement regarding the need for funds not yet available to the institution. The statement must be from the chief administrative officer of the requesting institution.

(Policy on Adequate Financing, Coordinating Board, January, 1992.)

VIII. ADDITIONAL COMMENTS THAT WOULD BE HELPFUL TO THE COORDINATING BOARD IN EVALUATING THIS PROGRAM REQUEST.

See Executive Summary.

Name of Degree(s): Cognition and Neuroscience, Ph.D.; Communication Sciences and Disorders, Ph.D.; Psychology, Ph.D.; Psychology, M.S.

COSTS TO THE INSTITUTION OF THE PROGRAM/ADMINISTRATIVE CHANGE

Note: Use this chart to indicate the dollar costs to the institution that are anticipated from the change requested.

| <u>Cost Category</u> | <u>Cost Sub-Category</u> | <u>Before Approval Year*</u> | <u>1st Year</u> | <u>2nd Year</u> | <u>3rd Year</u> | <u>4th Year</u> | <u>5th Year</u> | <u>TOTALS</u> |
|--------------------------|--------------------------|--------------------------------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|
| Faculty Salaries | (New) (a) | 0 | \$0 | \$0 | \$40,000 | \$41,200 | \$42,436 | \$123,636 |
| | (Reallocated) | 0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| Program Administration | (New) | 0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| | (Reassignments) | 0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| Graduate Assistants | (New) (b) | 0 | \$33,000 | \$67,980 | \$105,029 | \$144,240 | \$148,567 | \$498,816 |
| | (Reallocated) | 0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| Clerical/Staff | (New) (c) | 0 | \$25,000 | \$25,750 | \$26,523 | \$27,318 | \$28,138 | \$132,729 |
| | (Reallocated) | 0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| Supplies & Materials | (d) | 0 | \$2,000 | \$2,000 | \$1,000 | \$1,000 | \$1,000 | \$7,000 |
| Library & IT Resources** | | 0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| Equipment | | 0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| Facilities | | 0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| Other (Identify) | | 0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| <u>TOTALS</u> | | 0 | \$60,000 | \$95,730 | \$172,552 | \$213,758 | \$220,141 | \$762,181 |

* Include costs incurred for three years before the proposal is approved by the Board (e.g., new faculty, library resources, equipment, facilities remodeling, etc.).

** IT = Instructional Technology

Explanations:

(a) Estimated addition of new faculty into Ph.D. coursework and mentoring responsibility. Annual 3% merit increases included.

(b) Estimated at one new TA for each Ph.D. program per year. Three graduations assumed in year 5. Annual 3% salary increase included.

(c) Additional position to assist with clerical work associated with implementation and operation of the new programs. Annual 3% salary increase included.

(d) Cost of publicity materials, mailings, stationery, etc... associated with the implementation and operation of the new programs. Greater costs anticipated in the first two years for start-up.

No reallocation costs are included because all costs listed above are in addition to those which would have been incurred had the current Ph.D. program remained in effect and continued to recruit students.

Name of Degree(s): Cognition and Neuroscience, Ph.D.; Communication Sciences and Disorders, Ph.D.; Psychology, Ph.D.; Psychology, M.S.

ANTICIPATED SOURCES OF FUNDING

Note: Use this chart to indicate the dollar amounts anticipated from various sources. Use page 2 of this form to specify as completely as possible each non-formula funding source.

| <u>Funding Category</u> | <u>1st Year</u> | <u>2nd Year</u> | <u>3rd Year</u> | <u>4th Year</u> | <u>5th Year</u> | <u>TOTALS</u> |
|---|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|----------------------|
| I. Formula Income* | | | \$86,276 | \$106,879 | \$110,071 | \$303,226 |
| II. Other State Funding* | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| III. Reallocation of Existing Resources* | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| IV. Federal Funding* (In-hand only) | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| V. Other Funding* | \$60,000 | \$95,730 | \$86,276 | \$106,879 | \$110,071 | \$458,956 |
| <u>TOTALS</u> | \$60,000 | \$95,730 | \$172,552 | \$213,758 | \$220,142 | \$762,182 |

Name of Degree(s): Cognition and Neuroscience, Ph.D.; Communication Sciences and Disorders, Ph.D.; Psychology, Ph.D.; Psychology, M.S.

NON-FORMULA SOURCES OF FUNDING

Note: Use this form to specify as completely as possible each of the non-formula funding sources for the dollar amounts listed on page 1 of this form.

| <u>Funding Category</u> | <u>Non-Formula Funding Sources</u> | |
|---|------------------------------------|---|
| II. Other State Funding* | #1 | None |
| | | |
| | #2 | |
| | | |
| III. Reallocation of Existing Resources* | #1 | None |
| | | |
| | #2 | |
| | | |
| IV. Federal Funding* | #1 | |
| | | None |
| | #2 | |
| | | |
| V. Other Funding* | #1 | A combination of interest income, designated funds, and general, non-state institutional funds on hand. |
| | | |
| | #2 | |
| | | |