Faculty Development Seminar

Grant Writing: Nuts & Bolts

October 16, 2013
Dept of Psychiatry & Beh Sciences

Specific Aims

Specific Aims

- Roadmap to your grant application
- Very important part - your basic idea and hypotheses that guide the entire application
- Seasoned reviewers place much weight on this section - you need to spend much effort on writing, editing, and refining your Specific Aims

Specific Aims - Necessary Elements

- Clear statement of the problem or question you plan to investigate
- Background material, to provide context for your proposal
- Why your proposal is innovative and significant
- What you plan to do (i.e., basics of design, primary outcome(s), study conditions)
- Specific aims and hypotheses

Specific Aims - Tips

- Brief narrative/background information may mention exciting new Preliminary Data that underlies the Approach and long-term goals of the project
- Be as brief and specific as possible
- For clarity, each aim should consist of only one sentence
- Most successful applications have 2-3 specific aims

Specific Aims - Tips

- Section provides capsule of the project
- It should be apparent to the reader how the Aims relate to each other (but don't depend entirely on each other!)
- State hypothesis clearly - make sure it is understandable and testable
- Use bullets, numbers, and bolding to make the Aims easy to read
- Use language that emphasizes the Significance and Innovation of the project

Specific Aims - Tips

- Section forms the backbone to the grant and should be conceptually clear and well organized

- Use "power words" - delineate, describe, determine, develop, estimate, examine, specify, test, translate, utilize, contrast, conduct, define, explore, evaluate, measure, build, increase, etc.

- Spend a lot of time on this section—may be the only part that the reviewer reads!

Significance

Significance

- Point out public health impact, treatment, intervention, prevention impacts, as well as the importance in furthering our understanding of underlying pathophysiology / systems processing, etc, in future improvement / intervention
- Keep it short and sweet (short paragraph)
- Include relevant numbers, prevalence, etc.
- Separate significance from background; in general the more you can 'spoon feed' the reviewers the info for significance and innovation that they will be using for those sections of their review, the better.
- Can use bullet points or numbered statements within the paragraph pointing out the main components of significance

Significance paragraph--Example

A1. The public health impact of combat trauma and PTSD

PTSD is the fourth most common psychiatric diagnosis, affecting 10% of all men and 18% of women[13]. In the aftermath of September 11, 2001, almost 57.8% of the New York City population experienced at least one symptom of PTSD[14], while 11.2% developed full criteria for the disorder[15]. The conflicts in Iraq and Afghanistan, although markedly different in many respects compared to the Vietnam theater of conflict (e.g., improvised explosive devices (IEDs), suicide bombings, urban warfare), have produced a large number of new PTSD cases, with early reports documenting a rate of 12.9% soldiers meeting strict criteria for PTSD and 18% meeting more broadly defined criteria[1]. **There is no question that PTSD is a serious and urgent public health problem and that the biological mechanisms of vulnerability to developing psychopathology after trauma must be investigated very closely. A promising candidate neurobiological mechanism involves the neurocircuitry of fear, which, according to several lines of evidence, appears to be dysregulated in PTSD[8-12]. Discovering brain-based phenotypic biomarkers of the disorder will optimize diagnosis and treatment strategy resulting in better and faster treatment response. These new strategies will be invaluable as the number of patients increases.**

Significance-Background

- Background research on previous studies
- Provide rationale for hypotheses
- 25-30% of the Research Strategy (about 3 pages of a 12-page grant)
- Preliminary data can be included here or under approach

Innovation

Innovation

- List simply and explicitly what is innovative about the grant
- Innovation can take many forms, from the novel tools being used (at a biological or psychological level) to the novelty of bringing established tools to a novel question and novel interdisciplinary approaches
- If you can support sweeping statements about innovation (e.g. by stating something like 'there are currently no publications identified using the search terms x and y in pubmed…) as well as the need for this kind of innovative work (citation, etc), it will also help the arguments toward what could be an otherwise subjective, but important, aspect of the work.

Innovation--Example

This proposal is innovative at multiple levels. It is novel in that there are no current studies examining the role of polygenic risk underlying the neuroimaging and physiology intermediate phenotypes that are associated with PTSD. We feel that the team we have put together is uniquely qualified to combine PTSD GWAS data with physiology, imaging, molecular biology, and neurophysiology studies. The work is innovative in the use of inducible pluripotent stem cells from subjects with PTSD to understand molecular and cell biology pathways dysfunction associated with polygenic risk. We know of no other group currently actively using iPSC-derived neuron technology to address such questions in PTSD or anxiety disorders. Our proposal utilizes an innovative combination of extremely deep phenotyping of individuals with GWAS, physiology, neuroimaging, blood-based biomarkers and iPSC derived neuronal cells. ***Our experimental approaches outlined below collectively provide a valid translational approach to understanding the specific role of gene pathways in a disorder with immense impact on public health.***

Investigator

Investigator

- Show expertise (publications) for each Aim
- If PI hasn't published in an area covered in an Aim include co-investigators who have
- Investigative/Research team: show prior collaboration
- Based on Biosketch

Biosketch

- A. Personal Statement
  - Research interests and expertise
  - Qualifications to be PI or co-I
  - Highlight relevant awards/grants
  - Emphasize prior or planned collaboration with team
- B. Positions, Honors, etc
  - List in chronological order
  - Separate appointments and honors
- C. Publications (up to 15)
  - List 15 most relevant (out of total#)
  - Make sure include papers relevant to proposed grant
  - Include any papers with co-investigators
- D. Grants/Funding
  - As PI and co-I
  - Don’t need to show %effort or $$ amt

Personal Statement—Example 1 (Senior PI)

My expertise in translational neuroscience, specifically focused on molecular mechanisms of fear acquisition, consolidation, and extinction of fear supports the current R01 proposal to understand the role of development on neurobiological mechanism of fear inhibition in trauma-related disorders. My overall program is to understand in humans, and model in genetic animal systems, the risk for psychopathology that include genetic and environmental risk factors.

My qualifications to serve as a collaborator include: receiving prestigious national research awards for basic and translational research on fear in animals and humans including recently, being named an HHMI Investigator, the Freedman Award in Basic Science from NARSAD and the Clinical Scientist Award in Translational Research from the Burroughs Wellcome Fund; and previously, the Pfizer Fellowship in Biological Psychiatry, the Anxiety Disorders Association of America Junior Faculty Award, two NARSAD young investigator awards, a Rockefeller Brother's Fund Young Investigator Scholarship, and K01 from the National Institutes of Health. I am currently Principal Investigator (PI) on 2 R01 grants and an RC1 Challenge Grant to understand translational, genetic and psychological risk factors for PTSD. I am a standing member of the VA Merit Review study section for genetics of PTSD and mental health related grants, am on the SIMONs foundation grant review board for genetics of Autism, and am a member of the Scientific Advisory Board for the DOD funded InTrusT clinical and genetic research studies in PTSD and traumatic brain injury.

Together, these experiences and our labs' expertise provide for a powerful combination of sophisticated behavioral, physiological, molecular and genetic approaches in traumatized populations to understand the effects of trauma on neurobiological functioning.

Personal Statement—Example 2 (Junior PI)

My research focuses on the acquisition and extinction of conditioned fear in traumatized populations (both combat veteran and civilian) using psychophysiological methodologies including fear potentiated startle, galvanic skin response, and cognitive awareness. My qualifications as Principal Investigator for this R01 application is my significant experience in the neurobiology of fear extinction as it relates to the fear-related symptoms of posttraumatic stress disorder (PTSD). My work has been supported by funding from the Brain and Behavior Foundation (formerly NARSAD) and the Congressionally Directed Medical Research Program through the Department of Defense. My current research focus is on the interaction between genetic and environmental risk factors that mediate vulnerability to developing PTSD, PTSD symptom severity, and treatment outcome, with a focus on the identification of intermediate phenotypes. As a program analyst in the Trauma Recovery Program at the Atlanta Veterans Affairs Medical Center and an Assistant Professor in the Department of Psychiatry and Behavioral Sciences at Emory University, I lead a team of translational, clinical researchers at the Atlanta VAMC on a program of studies that examine the multi-dimensional aspects of PTSD symptomatology with an overarching goal of informing emerging clinical interventions for combat-related PTSD. I am currently director of the Human Psychophysiology of Emotion laboratory at Emory University, which includes experimental setups for fear-potentiated startle, psychophysiological assessment, emotional regulation, eye-tracking, and can be integrated with the Biomedical Imaging Technology Center at Emory.

Investigative Team

- Include a paragraph in the approach describing the expertise of each individual in the team and their respective contributions—highlight previous collaborations on grants or papers
- Key personnel roles and %effort described in the Budget justification

Investigative Team--Example

Table 1: History of Collaboration Investigations		
Grant	PI	**Investigators Involved**
R01 MH071537	Ressler	**Smith, Jovanovic**
R01 MH100122	Jovanovic	**Smith, Ressler, Norrholm**
P50 CA183641	O'Regan	**Smith, Miller**
R01 MH096764	Ressler	**Smith, Jovanovic**
R34 MH097790	Rothbaum	**Ressler, Jovanovic, Norrholm**
U19 MH069056	Mayberg	**Dunlop, Ressler, Jovanovic**
R01 MH099211	Gillespie	**Ressler, Jovanovic**
P50 MH077928	Stowe	**Smith, Owens, Kinkead**
Non-federal Grants		
Brain & Behavior Research Foundation	Smith	**Ressler**
Schering Plough Pharmaceuticals	Miller	**Smith**
Conquer Cancer Foundation	Torres	**Smith, Miller**
Brain & Behavior Research Foundation	Norrholm	**Ressler, Jovanovic**

Environment

Environment: Facilities & Resources

- General description of Emory and Dept of Psychiatry
- Clinical resources: clinics, inpatient/outpatient numbers, ACTSI, CIN
- Laboratory
  - Molecular
  - Neuroimaging
  - Genetics
  - Psychophysiology
- Office/Computers

Environment: Equipment

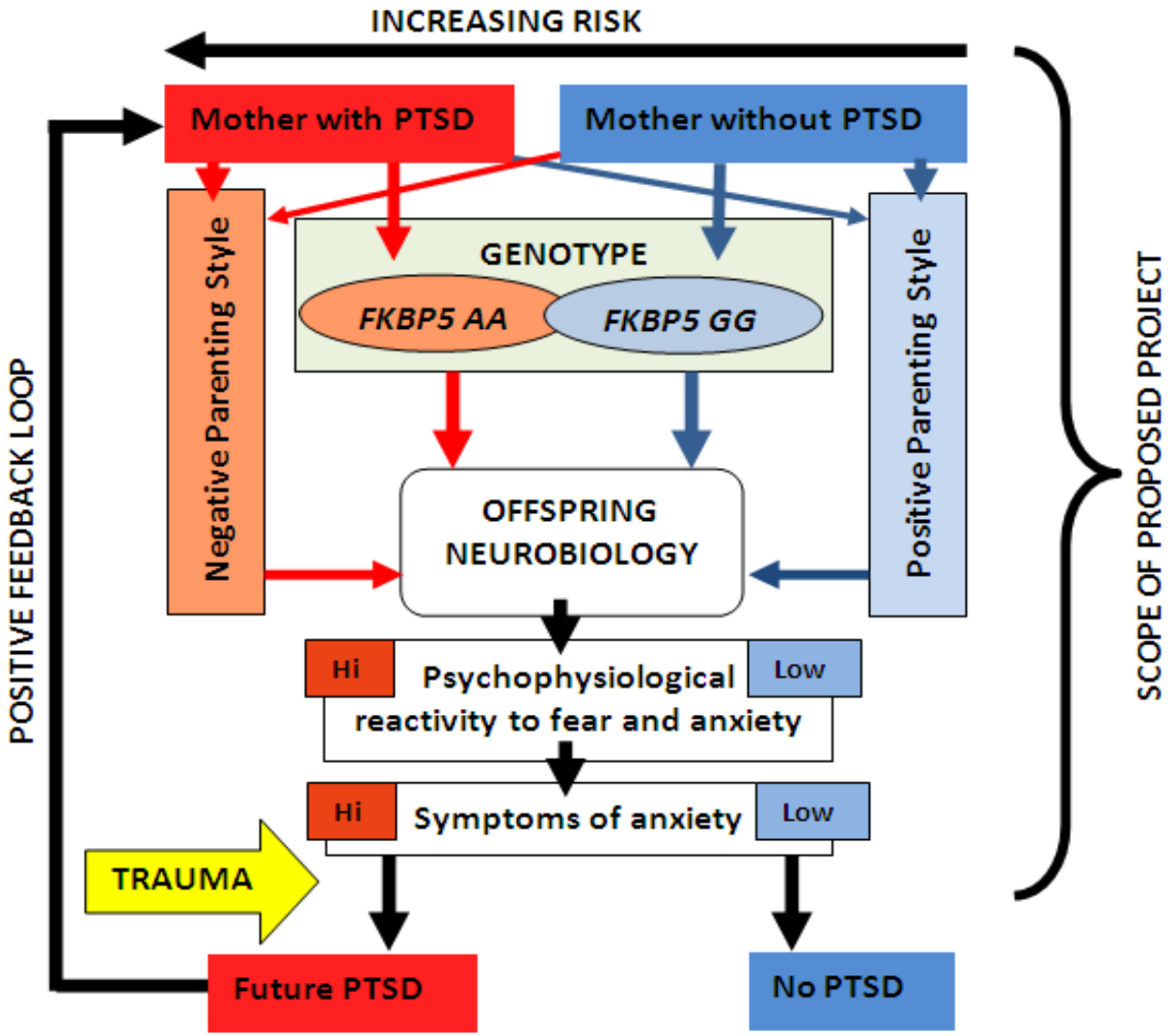
- Equipment
  - List state-of-art research equipment
  - Imaging
  - Psychophysiology
  - Genetics

Approach

Approach: Research Design and Methodology

- Overview of design
  - Can include diagram, etc
- Investigative team: show prior collaboration
- Feasibility of Recruitment
  - Access to targeted clinical population
  - Referrals from clinicians
  - Show prior success with recruitment
- Preliminary data for each Aim
  - Figures and preliminary statistics
  - Pilot data or previous background research with same methods

Study Overview Diagram--Example



Approach

- Statistical approach
- Power analyses (should have a statistician on team who can write up this part)
- Challenges and alternative approaches
- Timeline of project
  - Can be table

Study Timeline--Example

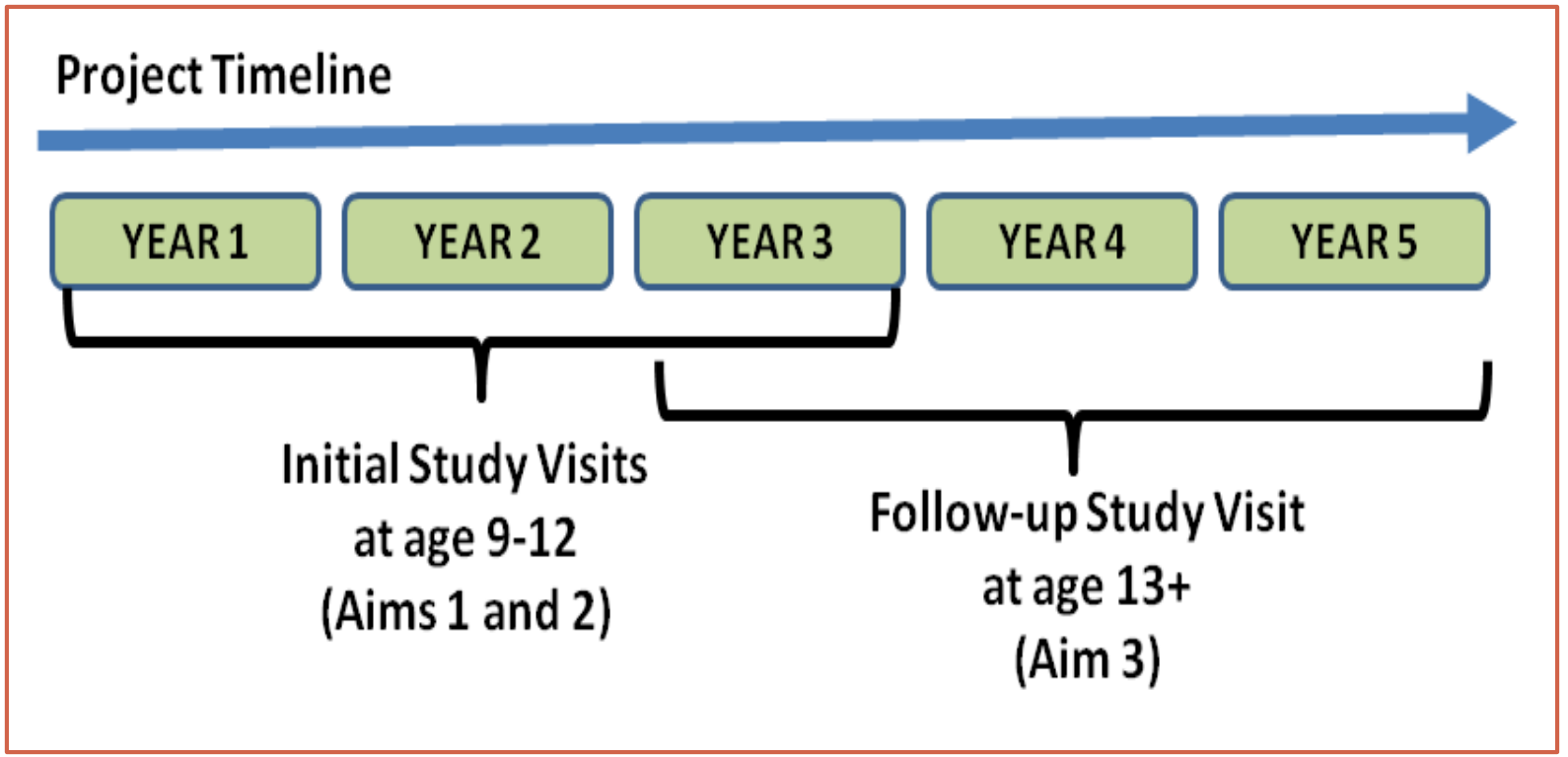


TABLE X.X	Visit 1	Baseline		9 months		18 months	
	Mom	Mom	Child	Mom	Child	Mom	Child
Maternal Childhood Maltreatment:	✓						
Child Trauma Exposure		✓	✓	✓	✓	✓	✓
Child Community Violence Exposure		✓	✓	✓	✓	✓	✓
Child Stressful Life Events			✓		✓		✓
Child Internalizing and Externalizing Behaviors		✓	✓	✓	✓	✓	✓
Parenting		✓	✓	✓	✓	✓	✓
Maternal Affect and Emotion Regulation	✓			✓		✓	
Demographics	✓			✓		✓	
Maternal Trauma Exposure	✓			✓		✓	
Maternal Psychiatric Diagnosis	✓			✓		✓	
Child Pubertal Status		✓		✓	✓		✓
Relationship with Fathers and residential co-parents		✓	✓	✓	✓	✓	✓

Approach

- Future directions
  - what other grants/research programs will build on this research?
  - “big question”
  - clinical applicability

Future Directions--Example

Future research directions: ***The results of the proposed research will form the basis of a research program integrating neuroanatomy and fear inhibition associated with symptoms of trauma-related disorders.*** The research program will build on fear-related neurobiological phenotypes that can be used in the assessment of treatment outcomes. This Exploratory Developmental Research Grant application is leveraged by the Grady Trauma Project parent grant (MH071537-07, PI Kerry Ressler, who is a co-investigator on this application), which is currently funded to collect in-depth characterization of trauma-related symptoms, as well as genetic data collected for genome-wide analyses. These genetic data can also be combined with the presently proposed neuroimaging data in future studies. In addition, the same fear conditioning methods are being used in a funded R21 (MH092576-01, PI Tanja Jovanovic) to examine neuroendocrine effects on dysregulated fear responses in PTSD. This project will provide pilot data for a future R01 to examine fear inhibition as a phenotypic marker of treatment outcome in clinical projects. At Emory we have both the resources and expertise through our collaborations with the Trauma and Anxiety Recovery Program headed by Dr. Rothbaum, and the Trauma Recovery Program for OIF/OEF veterans at the Atlanta VA Medical Center led by Dr. Bradley, to examine the fear inhibition pre- and post-treatment of PTSD symptoms. Thus this R21 project will generate future funding both for basic scientific discovery as well as treatment applications.

NIH Scoring Criteria

Overall Impact:
The likelihood for a project to exert a sustained, powerful influence on research field(s) involved

Overall Impact	High	Medium	Low
Score	1 2 3	4 5 6	7 8 9

Evaluating Overall Impact:
Consider the 5 criteria: significance, investigator, innovation, approach, environment (weighted based on reviewer's judgment) and other score influences (e.g. human subjects)

e.g. Applications are addressing a problem of high importance/interest in the field. May have some or no technical weaknesses.

e.g. Applications may be addressing a problem of high importance in the field, but weaknesses in the criteria bring down the overall impact to medium.

e.g. Applications may be addressing a problem of moderate importance in the field, with some or no technical weaknesses

e.g. Applications may be addressing a problem of moderate/high importance in the field, but weaknesses in the criteria bring down the overall impact to low.

e.g. Applications may be addressing a problem of low or no importance in the field, with some or no technical weaknesses.

5 is a good medium-impact application, and the entire scale (1-9) should always be considered.