

Grantsmanship 101

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Overview

- 1) Structure and common elements in research grant applications
- 2) What the Reviewer needs to know
- 3) How to start writing
- 4) Tips for grant writing

Grant

Definition: An exercise in persuasive writing that conveys your ideas to a funder to get money to do something.

The goal of a grant proposal for **RESEARCH**: Obtain financial sponsorship for your project

Research grants have certain elements in common

Element	Implications for You
Must be responsive to the mission of the funder	
Communication is organized according to specific rules	
Presentation must be logical	
Work must be feasible	
Reflect state-of-the-art and best practices in the field	
Must have an impact	

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Reflect state-of-the-art and best practices in the field	Methods up to date and cutting edge
Must have an impact	Must move the field forward or meet the need of the funder

In order to have your project selected for funding – Reviewers must ...

- **be able to tell what you're going to do**
- **think it's worth doing**
 - **Compelling reason to do the project**
 - **Moves field towards a goal/has an impact**
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How do they know this information?

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How do they know this information?

You tell them

Key Sections of Research Grants:

- **Research**
- **Personnel**
- **Budget and Time**
- **Resources – Environment**

Key Sections of Grants: Buchter

- **Research**
- **Personnel**
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Key Sections of Grants: Buchter

- **Research**
- **Personnel**
- **Budget and Time**
 - **Follow the directions**
 - **Make sure the project can be completed in the time allowed and the budget available**
- **Resources – Environment**

Key Sections of Grants: Buchter

- **Research**
- **Personnel**
 - **Biosketch**
- Budget and Time
 - Follow the directions
 - Make sure the project can be completed in the time allowed and the budget available
- Resources – Environment

Biosketch

The Biosketch represents you – take time with it

Aesthetics and layout matter

**Sell your personal role in the research in the
Personal Statement**

'....One can tell a significant amount about an investigator's attention to detail in composing a biosketch.' Comment on NIH Rock Talk – Now Open Mike.

Biosketch

The Biosketch represents you – take time with it

Aesthetics and layout matter

**Sell your personal role in the research in the
Personal Statement**

Forms and examples are
available

Instructions on all sections

Review through the GEMS
Core

'....One can tell a significant amount about an investigator's attention to detail in composing a biosketch.' Comment on NIH Rock Talk – Now Open Mike.

Research

- **Structure and key elements to include are fundamentally the same in all research grants**
- **Length will vary**
- **Documents will vary**
- **Content will be similar but with emphasis based on funder instructions**

Buchter Resident Research Award

- Abstract that includes the specific aims (max. 1 page - no references)
- Hypothesis/specific aims/research goals (max. 1 page)
- Methods/experimental design (max. 2 pages plus references)
- Impact and relevance to child health (2-4 sentences)

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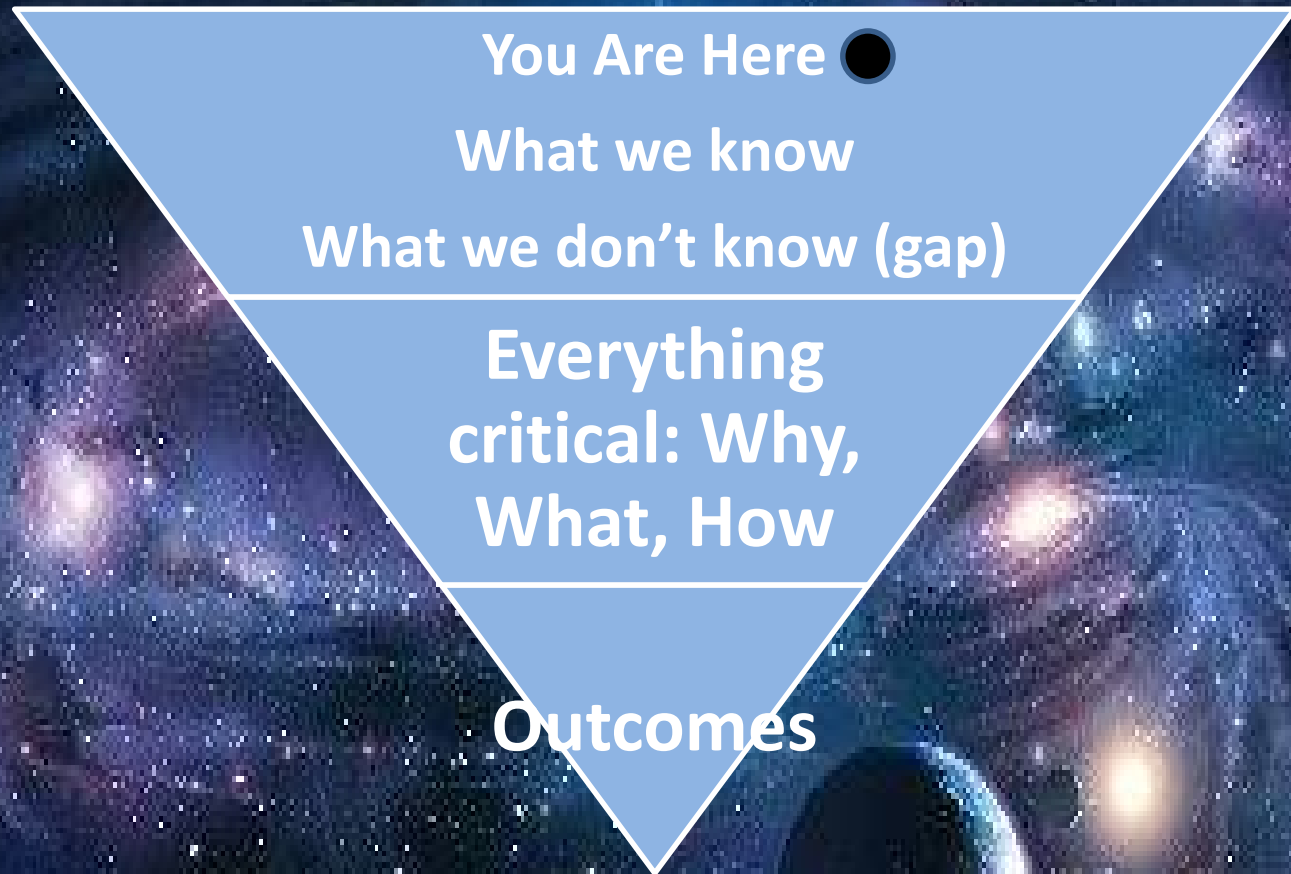
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The Universe (Pediatrics)



Impact and Relevance to Child Health

Broad Structure – 4 parts

Background

Long-term goal, Overall Objective, Hypothesis, Rationale

Aims

Payoff

Structure of the Background

Orient the Reviewer (You are Here)

Should get the reader's attention

Typical to address the mission of the funder (Department of Pediatrics = pediatric health issue)

Current Knowledge

State what is known about issue (*It is well known that...*)

Gap or unmet need

State what is unknown (*However, it is unknown/unclear/undetermined ...*)

Why it's important to address gap or unmet need

Addressing this issue will...

The lack of understanding of this issue prevents...

Structure - Rationale, Goals and Hypothesis

What, Why

Long-term Goal Should clearly encompass the gap (*Our long-term goal is to....*)

Overall objective This is the next step to achieve the long-term goal (*The overall object of this application is to ...*)

Central hypothesis

Rationale that underlies the proposed research, should convey what will be possible after completion of the proposal, and is not possible now

Structure

Aims

Methods (Briefly, mostly described in ‘Methods/experimental design’)

Payoff (*Upon completion of these aims, the expected outcomes are...*)

Structure

Gap (critical need)



Long-term goal (of your group)



Overall Objective (for this proposal)



Overall hypothesis (best guess)

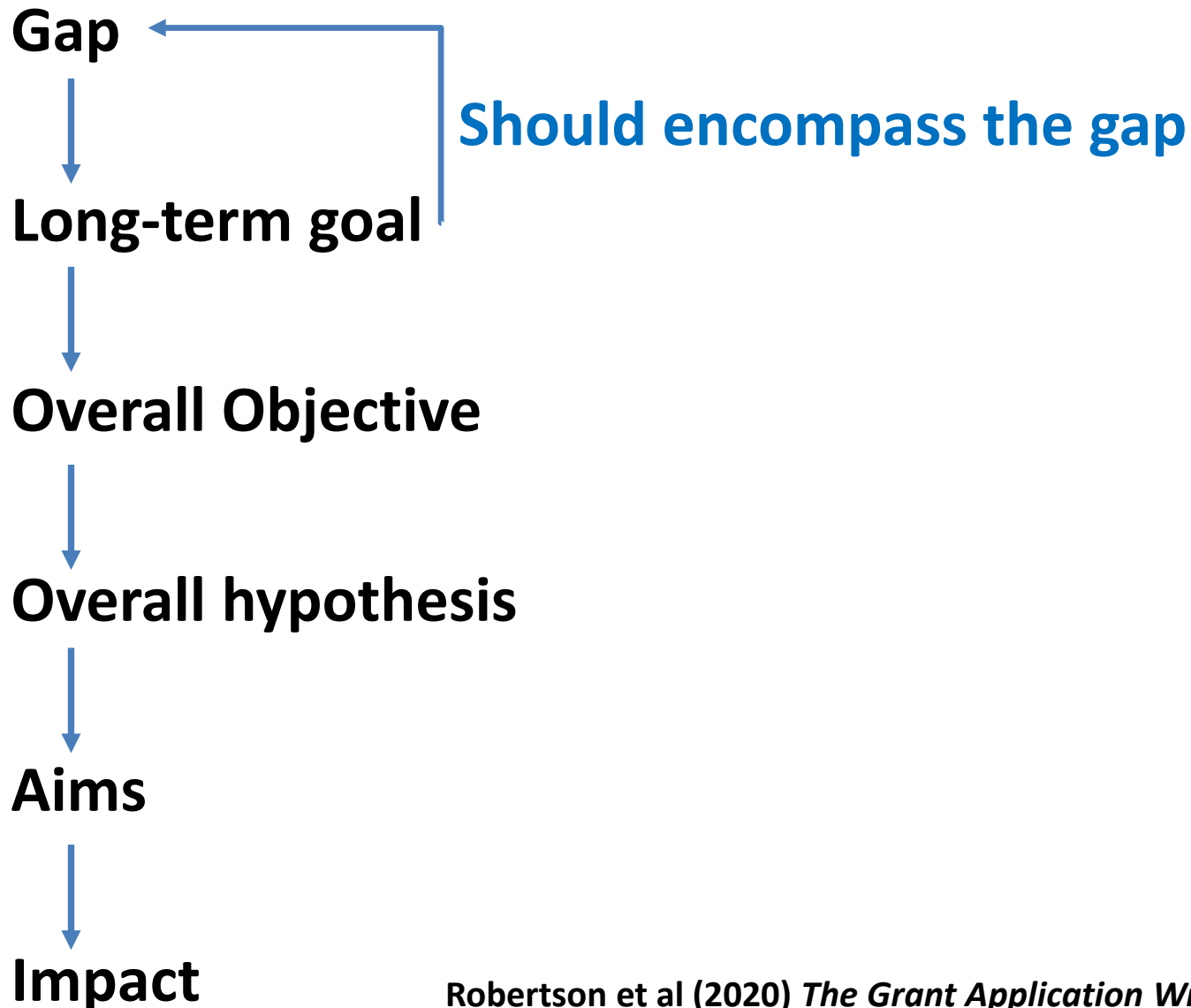


Aims (test the hypothesis)

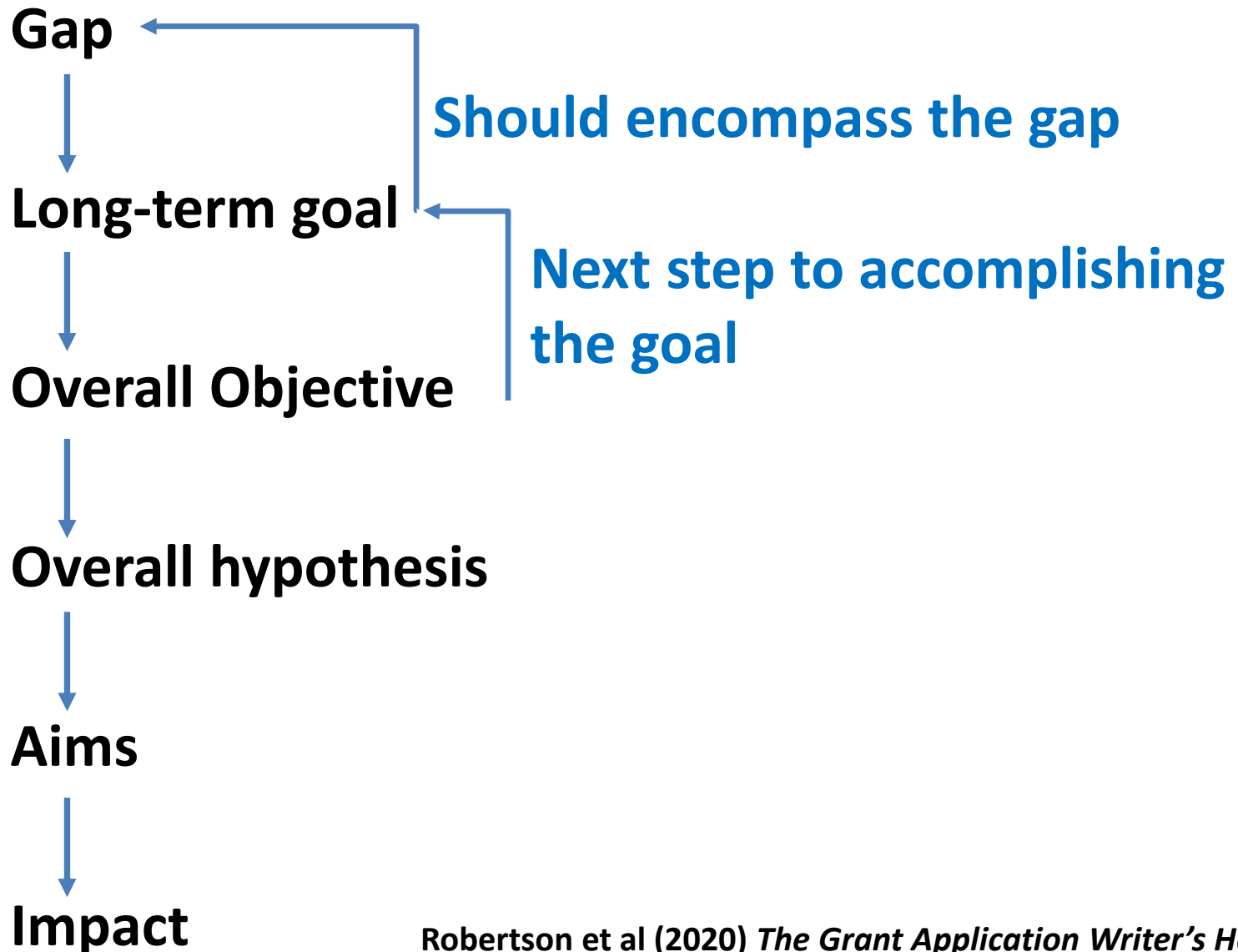


Impact

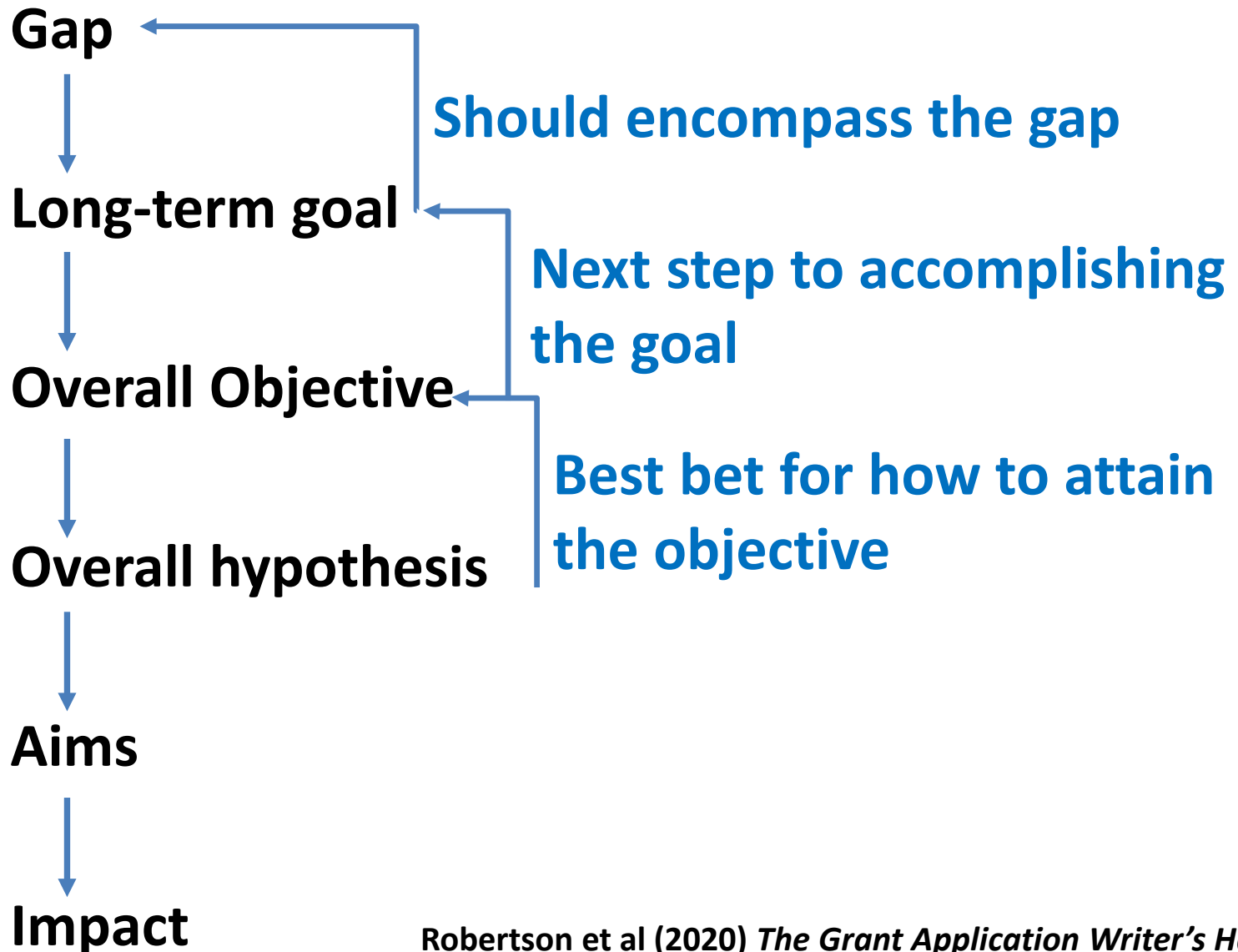
Structure



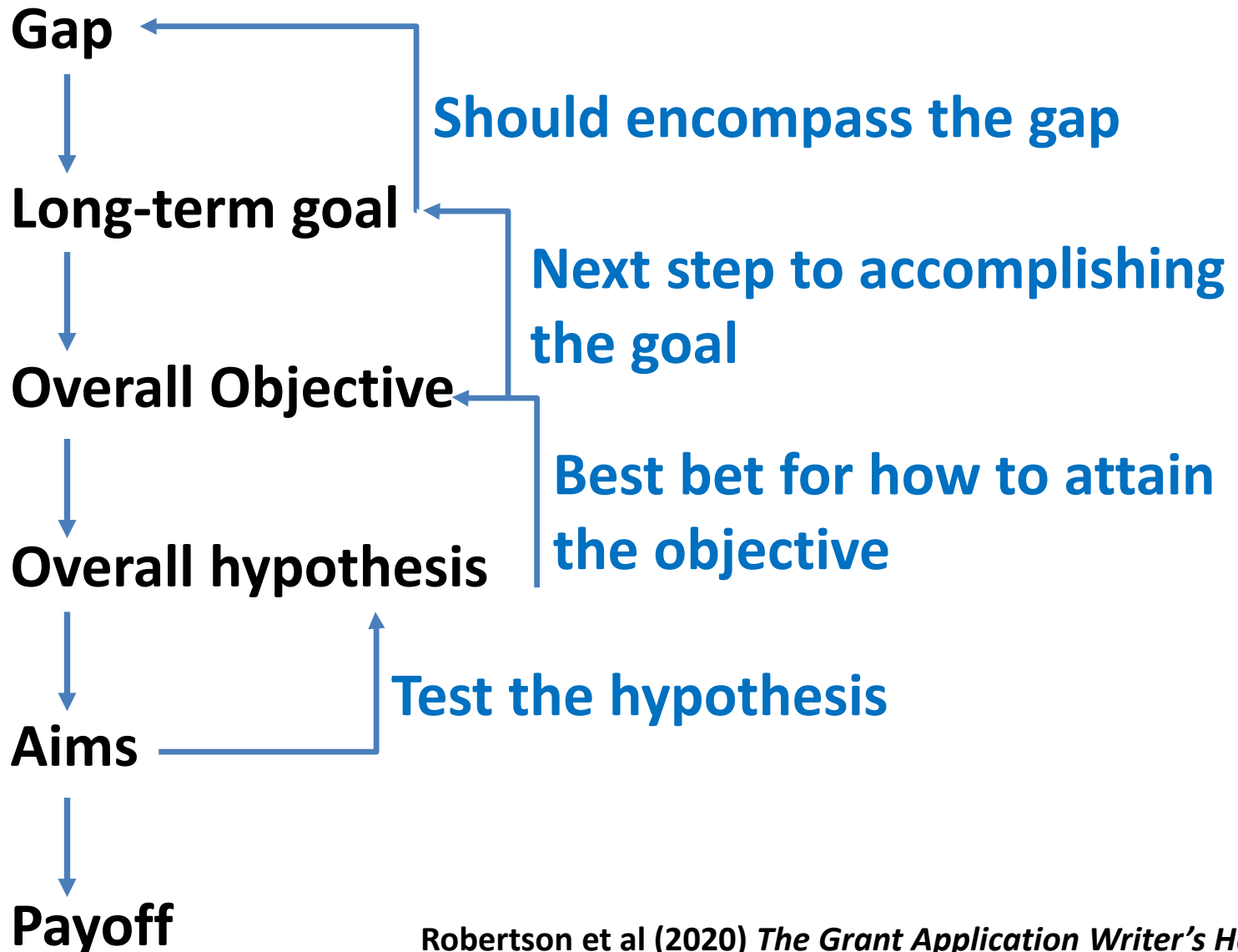
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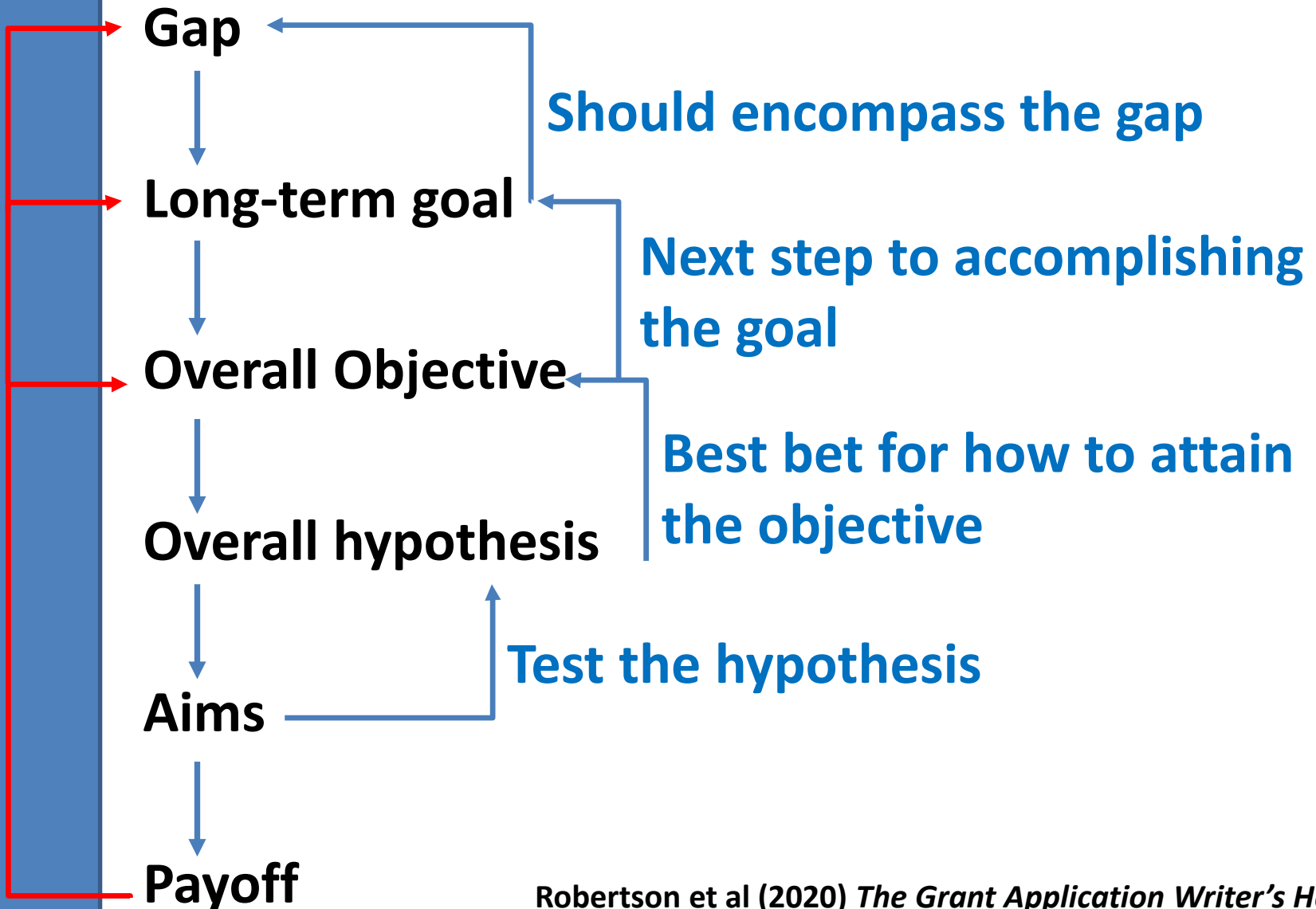
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Structure



Structure

Overall “Big Picture”

Known data

Gap

Reason to fill gap

Long-term goal

Rationale

Overall hypothesis

Aims

- Why
- Specific hypotheses
- How
- What
- Impact

Alternatives/Interpretation

Payoff

Future Directions



Outline this information

Abstract that includes the specific aims (max. 1 page - no references)

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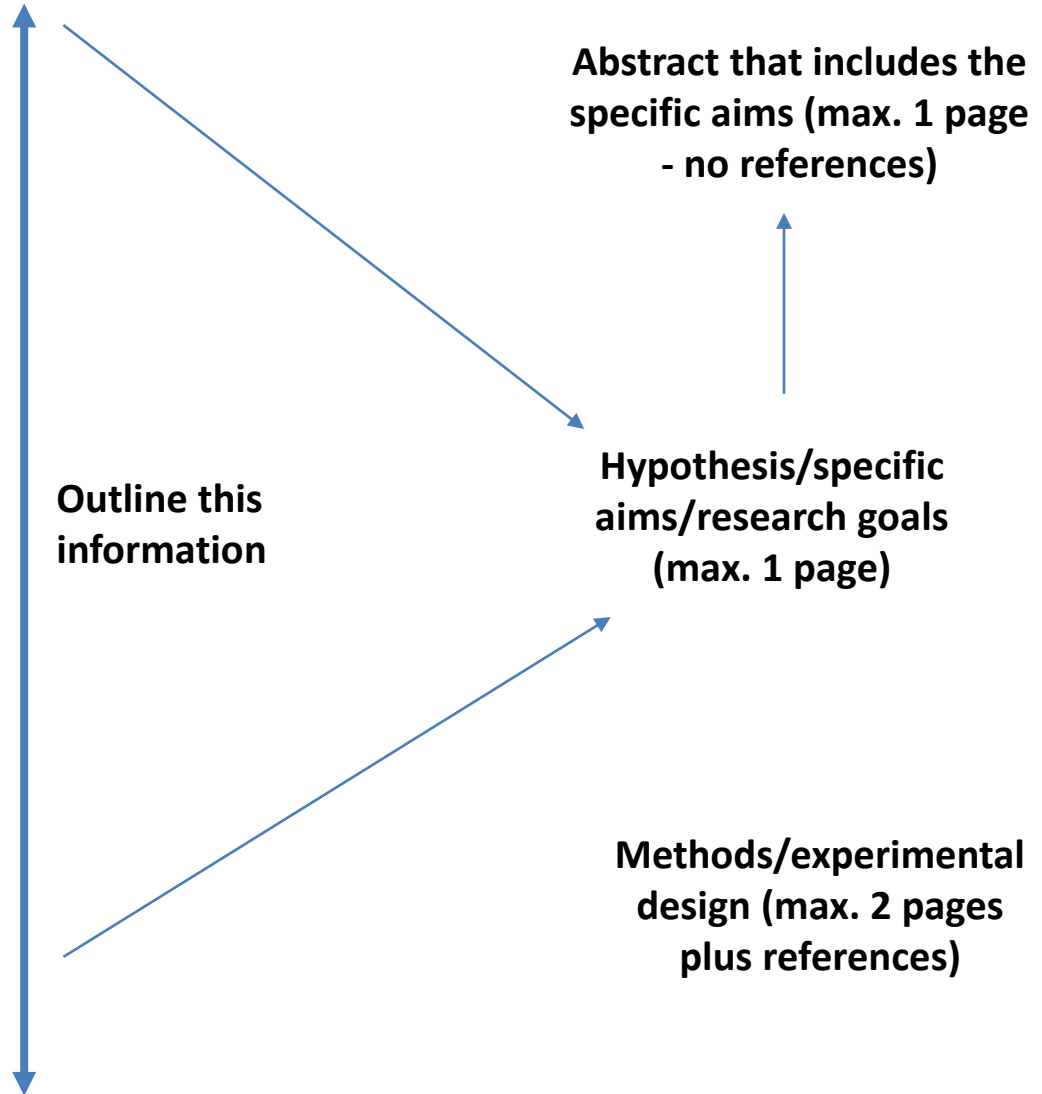
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Structure

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Overall hypothesis

Aims

- **Why**
- **Specific hypotheses**
- **How**
- **What**
- **Impact**

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Tips For Writing

Write

Start early

**Work on multiple things at one time –
Helps with self-editing**

**Don't wait for it to be good before you
get feedback**

Long Term - Work on your writing

- **Poorly written: A good idea is
necessary, but not sufficient**

Tips For Writing –

Tell the reviewer what you want them to know

If you want the funder to know something tell them

- **Fact vs. meaning of the fact**

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...between 31 and 44% of 12-18 year old foster youth are taking 1 or more psychotropic medications. State and federal governments spend \$4.5 billion per year on foster care; over \$12,000 per year per child is spent on physical and mental health treatment for every youth in foster care. Psychotropic medications account for almost \$1500 in Medicaid costs for each child with child welfare involvement.

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Why is a fact important? What is the take home message?

How is it related to the rest of your proposal?

Why should they care?

Tips For Writing –

Only tell the reviewer what they need to know

Not a comprehensive review

Everything you include is important

- **Stay focused and don't lead the reviewer astray**

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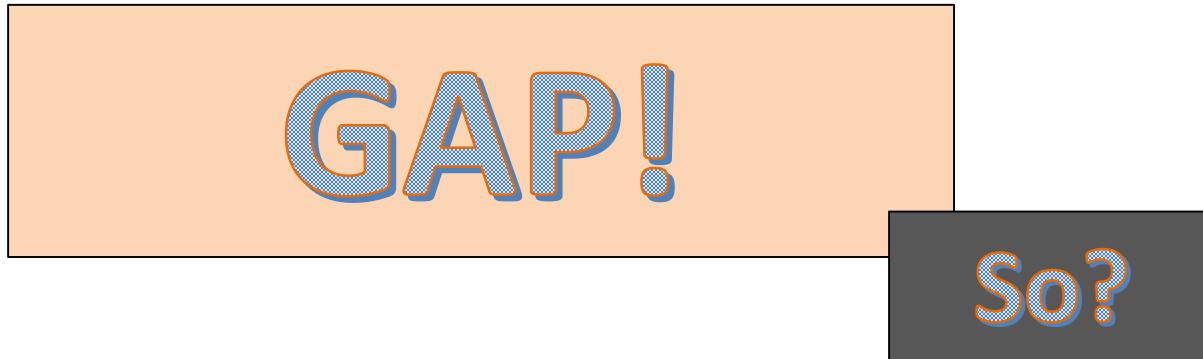
Why should they care?

Tips For Writing –

Tell the reviewer what you want them to know

If you want the funder to know something tell them

- Avoid the ‘So?’



Tell the reviewer:

- Why filling the gap is important
- What you will be able to do once the gap is filled
- How filling the gap will move the field forward (impact on child health)

Tips For Writing

Make it easy to find information:

- Don't be subtle
- Label, format, headers, spacing
- Use **Bold/Underline/Italics** (but sparingly)

Conservative estimates suggest that at least one third of all patients who receive treatment for major depressive disorder (MDD) do not attain remission even with as many as four treatment trials (1). As a group, these patients are not responsive to conventional pharmacotherapy, psychotherapy, or accepted somatic treatments. Recent publications suggest that a subset of patients with inadequate response to antidepressant therapy have increased signs of systemic inflammation, as reflected by increased levels of C-reactive protein (CRP) (2). Thus, there may be a role for systemic therapies that diminish peripheral inflammation as a treatment for resistant depression.

One integrative nutraceutical that has received a fair amount of attention is omega-3 fatty acids (n-3s), either as a monotherapy or in combination therapy for MDD. One of the n-3s, eicosapentaenoic acid (EPA) is the precursor of a variety of bioactive lipid molecules, many with anti-inflammatory effects at concentrations 100 to 1000 times lower than EPA. Although the existing literature is complex, with both positive and equivocal studies and meta-analyses, results in their entirety suggest that some patients with MDD may benefit from n-3s (3). The most compelling findings are from studies in which n-3s are used in combination with traditional antidepressant therapy. It has also been argued that n-3 use in depression should be guided by a precision medicine approach, with a focus on those TRD patients most likely to benefit from this treatment (4).

Our long-term goal is to evaluate the efficacy of n-3s for MDD, both as a monotherapy and a combination therapy. This work has allowed us to refine our knowledge about the type and dosage of n-3 supplementation and the patient population most likely to respond positively to n-3 therapy, and to identify a possible unique mechanism of action for n-3s' antidepressant activity. This R33 application builds directly from our previous collaborative R01 grant and our recently completed UG3 grant. These studies showed that a dosage of 4 g/day of EPA, given over 12 weeks demonstrated a significantly greater antidepressant response than either 1 or 2 g/day of EPA. Furthermore, our work suggests that overweight/obese individuals with MDD and hs-CRP levels ≥ 3 mg/L may be a highly responsive group to this treatment. While underlying mechanisms for this response are unclear, our preliminary data support the concept that resolution of inflammation, mediated, in part, by lipid molecules called specialized pro-resolving lipid mediators (SPMs) may be involved. SPMs are derived endogenously from EPA and docosahexaenoic acid (DHA) n-3s, and, in limited studies, by exogenous administration of these n-3s. In keeping with the hypothesized anti-inflammatory mechanism of action of n-3s in MDD, our data demonstrated that a sustained response on the Inventory of Depressive Symptomatology, Clinician-Rated version (IDS-C30) was correlated with increased levels of the EPA-derived SPM precursor 18-hydroxyeicosapentaenoic acid (18-HEPE).

Based on these results, we propose a 12-week, placebo-controlled, double-blind, randomized controlled trial of 4 g/day EPA-enriched n-3, identical to that used in our pilot UG3-funded trial, as adjunctive treatment in adults with treatment resistant MDD (TRD), BMI >25 kg/m² and hs-CRP ≥ 3 mg/L. We hypothesize that adding 4 g/day of EPA-enriched n-3 to overweight/obese MDD patients with inadequate response to ongoing antidepressant treatment and levels of hs-CRP ≥ 3 mg/L will:

- 1) Significantly increase plasma 18-HEPE concentrations compared to placebo (primary biological endpoint)
- 2) Have significantly more subjects with $\geq 50\%$ sustained (at both week 8 and 12) decrease in Montgomery-Asberg Depression Rating Scale (MADRS) scores than placebo
- 3) Demonstrate that sustained responders ($\geq 50\%$ MADRS score decrease at both week 8 and 12) to 4 g/day of EPA n-3 have significantly greater increases in 18-HEPE levels than unsustained/non-responders to EPA-enriched n-3 as well as placebo-supplemented sustained responders.

This study will meet the R33 mechanism objectives to 1) Replicate the impact of the natural product on a biological signature, 2) Assess whether there is an association between the degree of the impact on the biological signature and clinical outcomes in a patient population, and 3) Study the impact of the natural product in a target population that is more responsive. The study is hypothesis-based, milestone-driven, directly based on strong preliminary data and directly related to the research priorities and mission of NCCIH. The results of this study will determine if plasma 18-HEPE is a mediator of treatment response in overweight/obese MDD patients with inadequate response to ongoing antidepressant treatment and with peripheral markers of chronic inflammation. It will also guide the design and sample size of a future UH3 application.

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Our **long-term goal** is to elucidate how OT modulates the neural systems underlying social information processing and social reward to enhance social motivation. We focus here on oxytocin receptor (OXTR) rich regions at a key intersection between these systems: the basolateral amygdala (BLA), a site for multimodal integration of salient sensory cues, and the nucleus accumbens (NAcc), the limbic-motor interface that is critical for reward-seeking behavior. The **objective here** is to record from chronic electrode implants within these regions during behavioral paradigms that exploit the equivalent of social motivation in rodents, namely social approach. Our **central hypothesis** is that the motivation to interact socially is determined by a balance between positive and negative valence cues, and that OT acts to enhance how positive valence cues and/or suppress how negative valence cues modulate the functional neural connections between cue and reward processing areas, thus facilitating social motivation. The **rationale** for our proposal is that, once we know how OT affects functional connectivity between these areas in natural social contexts, our improved knowledge about OT's sites of action will enable better targeted OT-based therapies to ameliorate social deficits. Here, we pursue this with two complementary **specific aims** in two distinct rodent models that are each optimized to address the positive and negative valence aspects of our hypothesis.

Tips For Writing – Write for a scientist not in your field

- Very few reviewers will be experts in everything you do
- Don't write down, write clearly
- Reading → Pictures
 - Don't leave a black hole

'We will use *topologic simulation models* to evaluate the effect of stresses...'

Technical terms can make communication more efficient when a group understands the meaning, but they may create barriers when interacting with laypeople or researchers outside of your field. Using jargon can make your message unintelligible, or even worse, make you seem insincere.

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'We will use *topologic simulation models* to evaluate the effect of stresses...'

'We will use simulation models based on local topography and other watershed characteristics to evaluate the effect of stresses...'

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Tips For Writing –

Common Mistake = Insecure/Unsure/Don't believe

‘We hope to be able to potentially demonstrate that estrogen might modulate...’

VS

‘Completion of this project will demonstrate the role of estrogen in the modulation of...’

Tips For Writing – Formatting (how the grant looks) is important

- No errors (spelling/grammar/cutting/pasting)
- Spacing
- Margins
- Font



- You are trying to convince someone to give you money to do research – what message are they getting from the presentation of your grant?

Find someone to review your proposal

- Give them time to review
- Better to request review from only 1-2 people at a time
- Multiple levels of review
 - Peer
 - Mentor
 - Someone not in your field



Don't reinvent the wheel

Resources

- <https://grantrainingcenter.com/blog/10-common-elements-winning-proposals/>
- <http://grantproposals.com/article/elements-of-a-grant-proposal/>

Resources

Editing:

- <http://www.law.cuny.edu/legal-writing/students/grammar/editing/editing-self.html>
- **References: www.germannanna.edu/tutor/documents/PaperSelf-EditingJuly2012.pdf**
- <http://owl.english.purdue.edu/owl/resource/561/01/> Copyright ©1995-2013 by The Writing Lab & The OWL at Purdue and Purdue University.
- <http://www.oxbridgeediting.co.uk/blog/top-proofreading-tips-speed-proofreading-61/>
- <http://lifehacker.com/5968996/how-to-edit-your-own-writing>

Writing:

- <http://www.quickanddirtytips.com/education/grammar/grammar-girls-editing-checklist>
- <http://cybertext.com.au/10490.htm>
- <https://writingcenter.unc.edu/tips-and-tools/editing-and-proofreading/>