

# Proposal All Reviews: 1810526

Agency Name: National Science Foundation

Agency Tracking Number: **1810526**

Organization:

NSF Program: (SPRF-FR) SBE Postdoctoral Research Fellowship-Fundamental Research

PI/PD: Thomas, Ashley

Application Title: Finding one's social circle: How caregivers influence the social evaluations of infants.

## Review 1

### Rating:

**Multiple Rating: (Excellent/Very Good)**

### Review:

#### Summary

In the context of the five review elements, please evaluate the strengths and weaknesses of the proposal with respect to intellectual merit.

**Strengths:** The fellow intends to examine two mechanisms that are proposed to explain the development of infant social affiliations. The fellow will use behavioral and a more novel method of fNIRS (functional near-infrared spectroscopy) to examine how infants develop preferences for affiliation beyond those of their immediate caregivers. Although the fellow proposes to examine these issues in typically developing infants, she does a good job of describing how the findings from her work can be applied to interventions for children with developmental disabilities like autism and for children at risk for social isolation, which can be more common in children from low-income and/or racial and ethnic minority groups. The studies procedures and methods are described well in the proposal and are clearly mapped onto the research questions, and the expected outcomes and planned analyses are also appropriate and described well in the proposal.

**Weaknesses:** The novel approach that the fellow is using in fNIRS has limitations if it cannot be used with infants beyond 6 months of age because, as the fellow outlines, older infants will be non-compliant and take the cap off. Other physiological measures, notable EEG caps, have been used on infants, toddlers, and preschoolers for decades now, so there must be some testing procedures that can be developed so that fNIRS caps can be used with older infants.

In the context of the five review elements, please evaluate the strengths and weaknesses of the proposal with respect to broader impacts.

**Strengths:** The findings can be applicable to interventions for children with developmental disabilities, such as autism, and for children more at-risk for social isolation, which includes children from low-income or racial and ethnic minority groups. The findings can also be applied to understanding how infants form perceptions about in-group membership, which can have implications for understanding early precursors of discrimination. The fellow also has well-developed plans for mentoring underrepresented students and for disseminating the findings to the scientific community as well as community

outreach to parents through parenting groups, science festivals, and early Head Start programs.

**Weaknesses:** The idea that parents will be inherently interested in these findings may be overstated, especially when considering low-income parents associated with early Head Start. The plans for dissemination could have included more information on how the findings will be translated to parents from diverse backgrounds that might not be inherently interested in their findings.

Please evaluate the strengths and weaknesses of the proposal with respect to any additional solicitation-specific review criteria, if applicable

1. Match - Is the Sponsoring Scientist and host institution a good match to the Fellowship Candidate's proposed project, and does the Sponsoring Scientist's involvement in the project strike the right balance between supervisory guidance and the Fellow's independent growth?  
The fellow clearly describes how her co-sponsors will enhance her development in understanding social-cognitive development of infants, which is a new age group for her to study and experience that she did not get in her doctoral program. The opportunities afforded by the co-sponsors will provide guidance while also supporting the fellow's independent growth.

2. How well-developed is the Postdoctoral Mentoring Plan?  
The Postdoctoral Mentoring Plan is very well-developed with specific plans for enhancing the scholar's training. The co-sponsors were clear how the fellow's unique and novel plans fit into their research programs but do not overlap. They also explicitly state that the fellow's training plans will focus on developing the skills necessary for her to become an independent researcher. The only question I had was the value of having the fellow audit what appeared to be undergraduate courses.

3. Please comment on the quality of the Data Management Plan.  
The Data Management Plan was adequate.

4. Scientific Contribution - How significant is the potential contribution of this research on the SBE sciences, in general, and the specific discipline area(s) identified by this proposal?  
The findings will provide information on how infants form new social relationships, which could be of interest to developmental as well as clinical psychologists, anthropologists, and other social scientists.

#### Summary Statement

The proposal was very well-written with clear plans to examine a topic that has high potential for both scientific contributions as well as broader impacts.

## Review 2

### Rating:

**Very Good**

### Review:

### Summary

In the context of the five review elements, please evaluate the strengths and weaknesses of the proposal with respect to intellectual merit.

This is a unique proposal in which the fellow aims to study the social cognitive development of infants; specifically, the goal of this project is to understand whether and how infants tend to recognize affiliative behaviors and how caregiver presence/behavior can influence evaluations of others'. The fellow proposes 5 studies across 2 aims to investigate whether infants show a preference for agents that are affiliated with their own caregivers (Aim 1) and whether infants have a preference or desire to see others engaging in affiliative behavior (Aim 2). The fellow will study these questions in 4 month old infants, 12 month olds and 24 month olds. The main goals for the fellow in terms of her training involve gaining experience investigating pre-verbal infants, neuroimaging expertise and building theoretical expertise in social development.

**Strengths:** The studies proposed here are rigorous and well-motivated and I think could add to the scientific understanding of how infants begin to attach social value to others. The innovation of using puppets instead of other is an interesting design alternative, which is qualified well. The use of fNIRS to probe neural correlates of observing affiliative behaviors is a useful, non-invasive neuroimaging approach that the co-sponsor (Saxe) is beginning to employ in her research lab and one in which the fellow would receive training. The main sponsor (Spelke) has long been a leader in the

field of social development infants, and would provide requisite theoretical and experimental expertise for the fellow's training. The institutions (Harvard, MIT) are phenomenal environments for the fellow to build her skills.

**Weaknesses:** One weakness that the fellow notes that fNIRS will only be used in the youngest age group of infants being studied, and not the older ones because the older infants tend to take off the cap. While I appreciate the point, I do wonder if there might not be some way to ensure that older children wear the cap for the duration of the sessions, because acquiring fNIRS data only in one group limits the ability to track any possible observed differences in behavior across development with functional neural development across time. Another weakness also pertains to the possible interpretations of the neuroimaging data. The fellow suggests that if the infants demonstrate activation in the mPFC when viewing their caregivers affiliate with an agent, that this would mean the infants are experiencing social reward; I feel as though this is relying on reverse inference to some degree. Just because there are adult studies that consistently implicate this region in such processes doesn't necessarily mean that this region is doing the same thing in 4 month olds.

In the context of the five review elements, please evaluate the strengths and weaknesses of the proposal with respect to broader impacts.

**Strengths:** The broader impacts of the proposal are strong, as it has the potential to inform how children develop affiliative tendencies, how in-group/out-group biases may begin to develop and may have some kind of pre-diagnostic ability for conditions with social deficits (i.e., autism). The proposal also notes that the fellow will engage in mentoring of underrepresented student populations, outreach to the public via media outlets which the sponsors have extensive experience with, and education/outreach to nearby community organizations.

**Weaknesses:** none identified.

Please evaluate the strengths and weaknesses of the proposal with respect to any additional solicitation-specific review criteria, if applicable

**Sponsor-Fellow match:** The sponsor-fellow match is strong, as is the institution. Drs. Spelke and Saxe are leaders in the field of social development and social developmental neuroscience, and the fellow is seeking to gain formal training in these areas, though her previous graduate experience was in social development under a PI with expertise in cognitive development.

**Mentoring Plan/Data management plan:** The mentoring plan is sound and well developed with benchmarks for progress and attention paid to training in terms of grant writing, methodological coursework and additional seminars and presentation opportunities. Data management plan is adequate.

**Scientific Contribution:** I believe the potential to add to our understanding of social development here is strong and novel.

### Summary Statement

This proposal has a number of strengths in terms of novelty, innovation and the training for the fellow. There are a few weaknesses in terms of intellectual merit, but overall I think this proposal has a strong potential for success. I rate it as Very Good.

### Review 3

#### Rating:

**Very Good**

#### Review:

#### Summary

In the context of the five review elements, please evaluate the strengths and weaknesses of the proposal with respect to intellectual merit.

**Strengths:** This is a well-written proposal on an interesting and highly relevant topic. The methods include well-validated approaches but also applies newer methods in this field of research (fNIRS). The candidate presents a clear rationale for the research and the methods. The aims and hypotheses are supported by previous work from the research team. The proposed studies have high potential to advance knowledge. As the candidate describes,

understanding how infants use their caregivers as a 'reference' in evaluating novel people is of fundamental interest in areas such as social and moral development. The setting, team and environment are very strong.

Weaknesses: There doesn't appear to be any information about demographic characteristics of the infant-caregiver pair. It seems that factors such as age, sex, SES and cultural background of the caregiver might impact some of the behaviors. In addition, does it matter if the caregiver in the study is the primary caregiver? For example, in a divorced home one parent might have much less time with the infant, or there could be a nanny, grandmother, etc. who provides a significant portion of the caregiving. Some description of the data coding procedure is needed, including any checks on interrater reliability. Additionally, the candidate refers to a power analysis but does not present any descriptions of the studies on which it is based, or statistics from the analysis.

In the context of the five review elements, please evaluate the strengths and weaknesses of the proposal with respect to broader impacts.

Strengths: This work has very high broader impact. The research findings will inform multiple fields, including education, special education, social psychology, clinical psychology and psychiatry. The work has implications for a number of important societal issues such as child abuse and neglect, social exclusion, prejudice, bullying and autism spectrum disorders. The candidate specifies plans to continue mentoring first generation and underrepresented students, to communicate findings to the broader public through media outlets, and to provide education and outreach to relevant communities.

Weaknesses: No significant weaknesses were identified.

Please evaluate the strengths and weaknesses of the proposal with respect to any additional solicitation-specific review criteria, if applicable

1. Match - Is the Sponsoring Scientist and host institution a good match to the Fellowship Candidate's proposed project, and does the Sponsoring Scientist's involvement in the project strike the right balance between supervisory guidance and the Fellow's independent growth?

The combined expertise of the two mentors along with the excellent setting at MIT and Harvard are an ideal match for the proposed project. The training plan nicely lays out how the candidate will transition into increasing dependence throughout the project.

2. How well-developed is the Postdoctoral Mentoring Plan?

The mentoring plan is well-developed and very strong. It includes a good balance of research goals, career development activities, ethics training, and mentoring. The proposed work fits well within the mentors' current work. The plan does not address the question of limitations that might be placed on the candidate regarding the research following the fellowship.

3. Please comment on the quality of the Data Management Plan.

The data management plan is adequate.

4. Scientific Contribution - How significant is the potential contribution of this research on the SBE sciences, in general, and the specific discipline area(s) identified by this proposal?

This project will build fundamental knowledge about how infants form new social relationships with people beyond their caregivers and how they maintain existing ones. Moreover, this work will inform theories about infant's early representations of social relationships, and will build knowledge about the development of in-group biases that occur later in childhood.

#### Summary Statement

This is an exciting and interesting proposal that has high intellectual merit and the potential for very broad impact. The applicant and mentors are successful and make an excellent team. A few aspects of the research plan would benefit from additional detail, but overall this application is quite strong. For these reasons, I rate this application as Very Good (V).