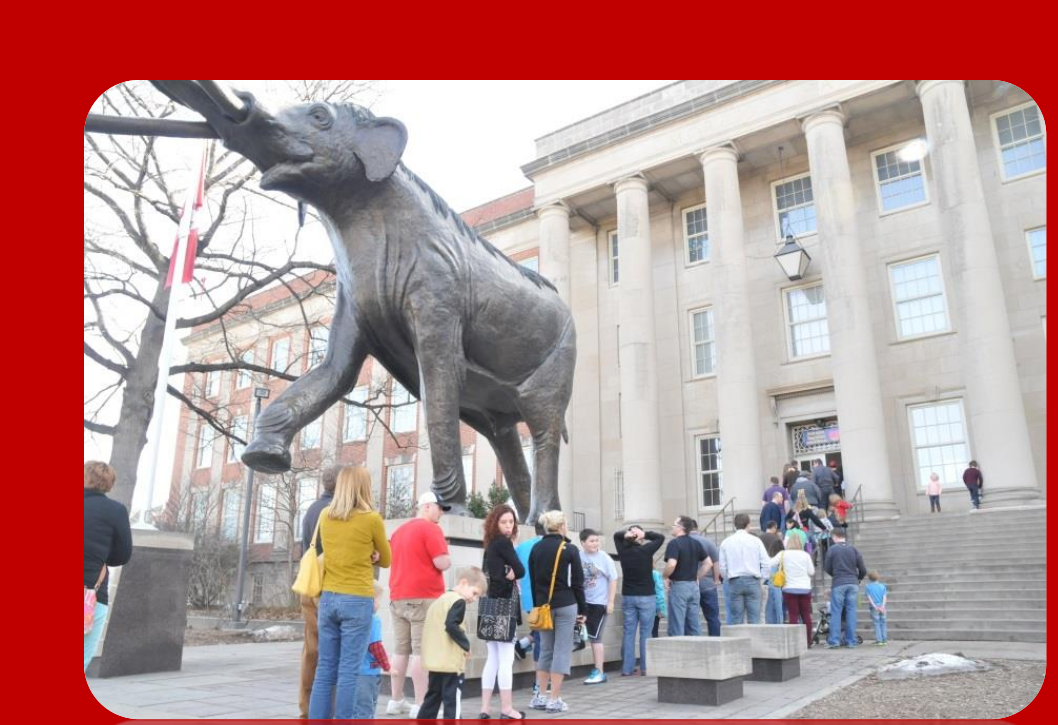




# INFORMAL EDUCATION WITH ARACHNIDS

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**PROJECT OVERVIEW.**  
We developed two main programs that utilize charismatic animals as hooks to draw in the public and increase their interest in, and enthusiasm for, science.

**Program I.** We developed an informal museum event focused solely on arachnids entitled **'Eight-Legged Encounters'**.

**Program II.** We developed an upper level university class (undergraduate/graduate level) - **'Communicating Science through Outreach'** - which teaches STEM students about science communication and engagement. Through this course, students develop and implement an after-school science club for local middle school youth at Community Learning Centers.

**TARGET AUDIENCES.**  
 > *Eight-Legged Encounters:* General public (toddler, K-12, parents, educators)  
 > *Communicating Science through Outreach:* Middle school students from Community Learning Center schools & STEM university undergraduate and graduate students.

**EVALUATION.**  
 > The Bureau of Sociological Research (BOSR) assessed the strengths and weaknesses of the current program structures to allow for improvement over the course of the grant and to examine the impact of the project.  
 > **Goals** were to measure: (1) the impact of the Eight-Legged Encounters event on the general public's interest in science, (2) the impact of an after school science club on the youths' interest in, knowledge of, and future career aspirations related to science, (3) the university students' knowledge of and interest in science outreach, and (4) the effectiveness of the university seminar class in preparing students to do science outreach.

**METHODS.** The data collection for the Eight-Legged Educators evaluation involved three audiences: (1) a post-event survey completed by participants at the Eight-Legged Encounters event, (2) a club experience survey completed by students in an after school club, and (3) focus groups, observations, and end-of-course evaluations conducted with students in the BIOS 497/897 "Communicating Science Through Outreach" seminar class at the University of Nebraska-Lincoln (UNL).

**DELIVERABLES.**  
 > Programs for after-school science clubs developed by UNL students  
 > More than 25 modular activity stations  
 > Taxonomy and systematics (*Create a Chelicerate, What is an Arthropod, Assemble an Arachnid*)  
 > Silk evolution and function (*Build a Burrow, Cribellate Vs. Ecribellate Silk, Weave a Web, Catch a Moth, Tissue Paper Flower*)  
 > Research and scientific inquiry (*Microscope Madness, Community Experiment*)  
 > *Path of Predators* activity booklet & associated stamps  
 > Original artwork trading cards  
 > Scientific write-ups of Community Experiments

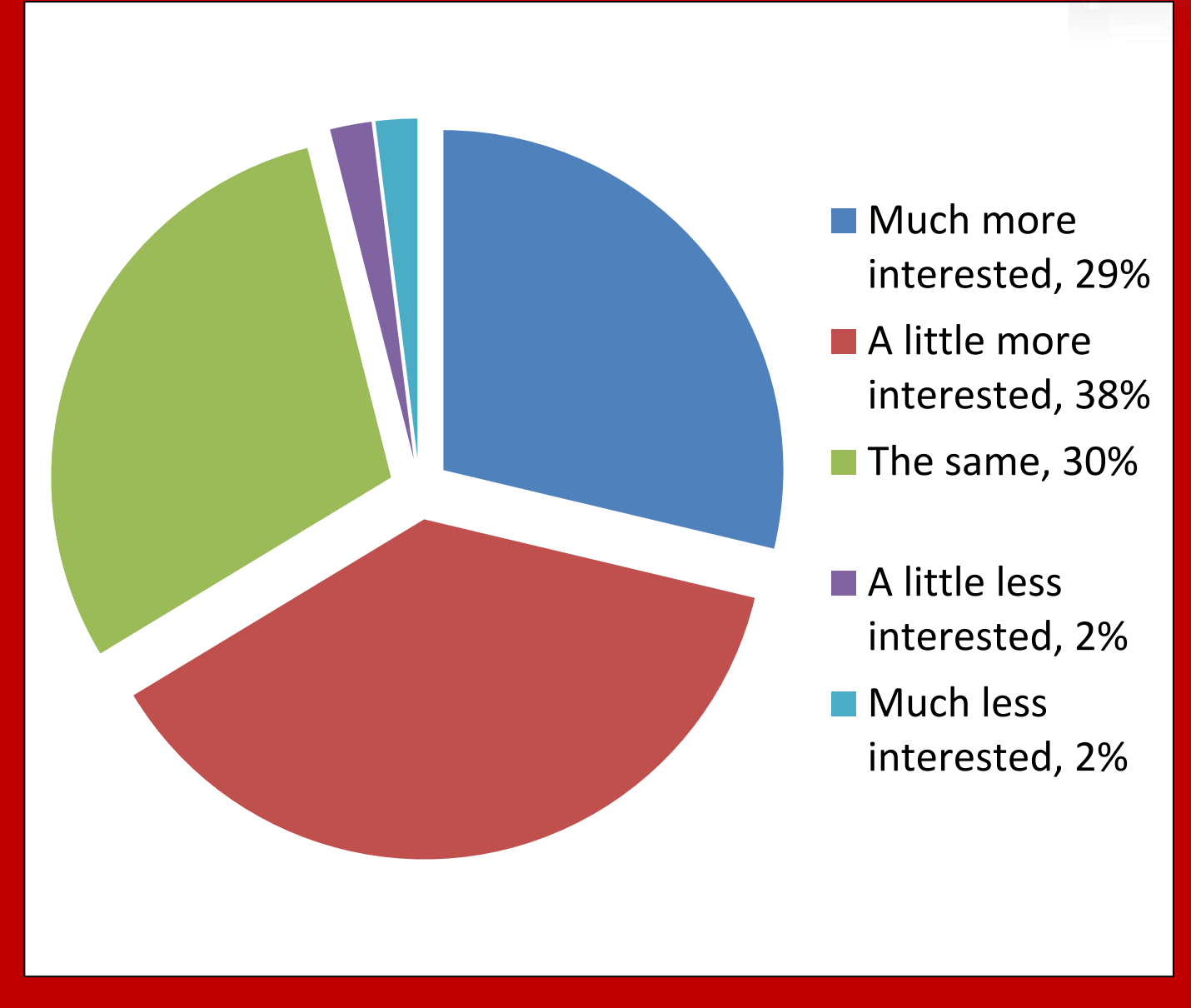


Figure 2. Change in interest in learning about scientific discoveries among adult respondents (n = 63).

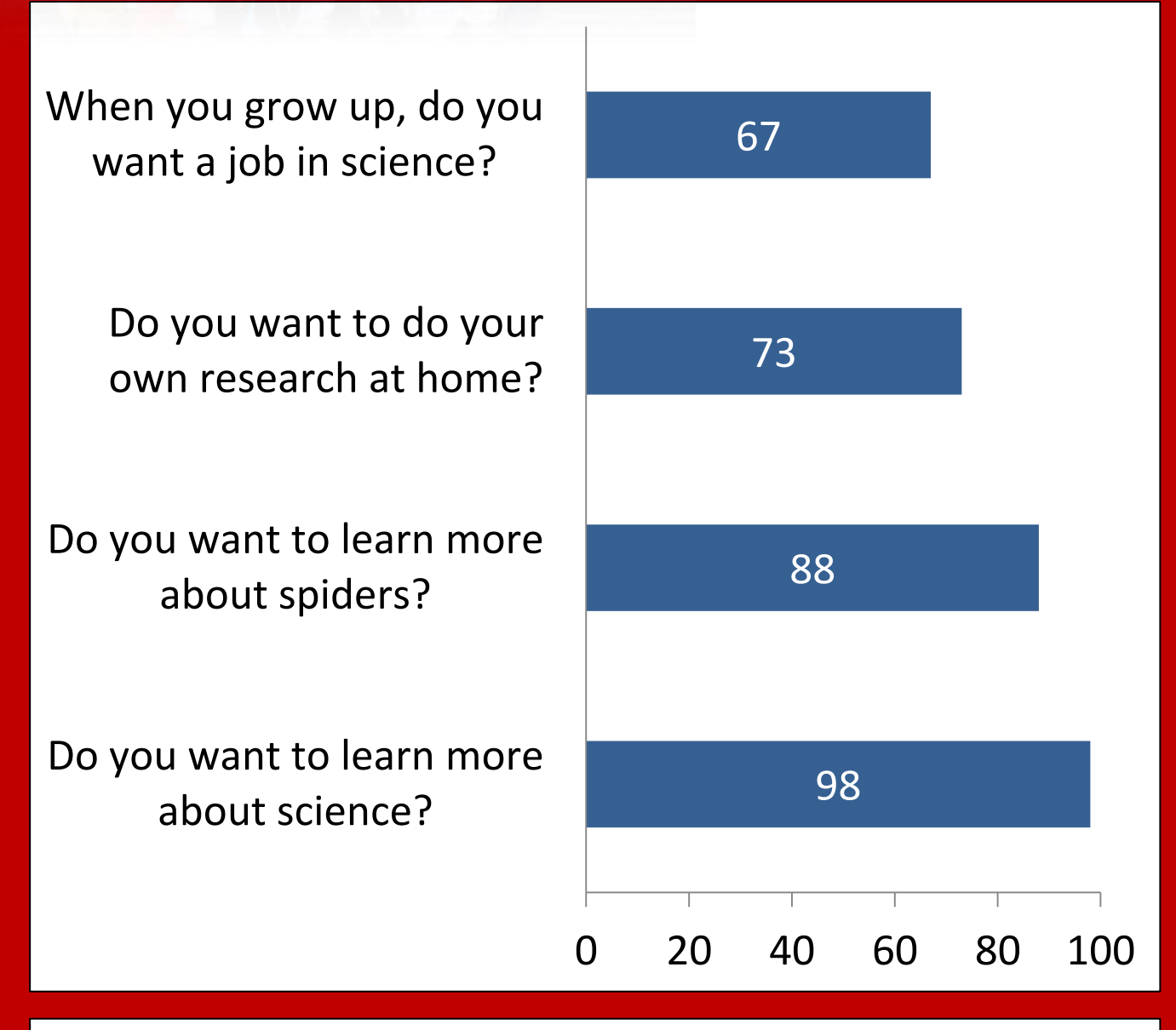


Figure 3. Youth's interest in science activities (n = 42). Respondents were 50% female, 50% male and ranged in age from 4 – 14 with a mean of 7.7.

**Eight-Legged Encounters**  
 Eight-Legged Encounters is a one-day family event with more than 25 activity stations including arts and crafts, hands-on experiments, and physically active games. We have activities for all ages, including a toddler area with story-time, wooden puzzles, and puppets. A community experiment allows participants to collect their own spider by eye-shine in a darkened room and then use it in an experiment to collect data. Experimental results are written up and the resulting manuscript is emailed to all participants.

The **'Path of Predators'** module includes an activity booklet and 11 stations highlighting the eleven living arachnid orders. Each station has original artwork backdrops, clay sculptures, original trading cards, and collectible stamps to be placed on a phylogenetic tree depicting the evolutionary relationships among the 11 orders. Most stations also have live animals.

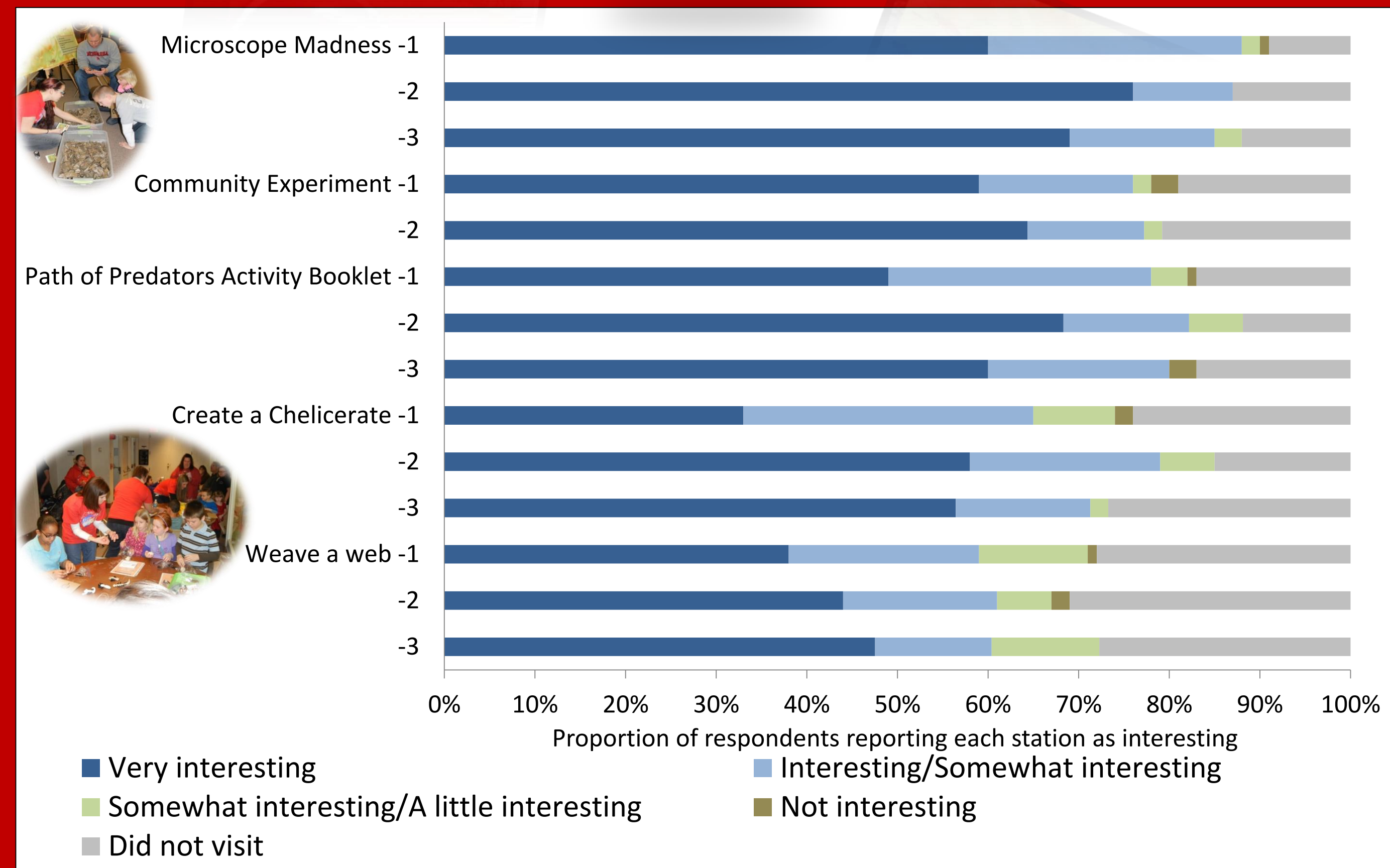
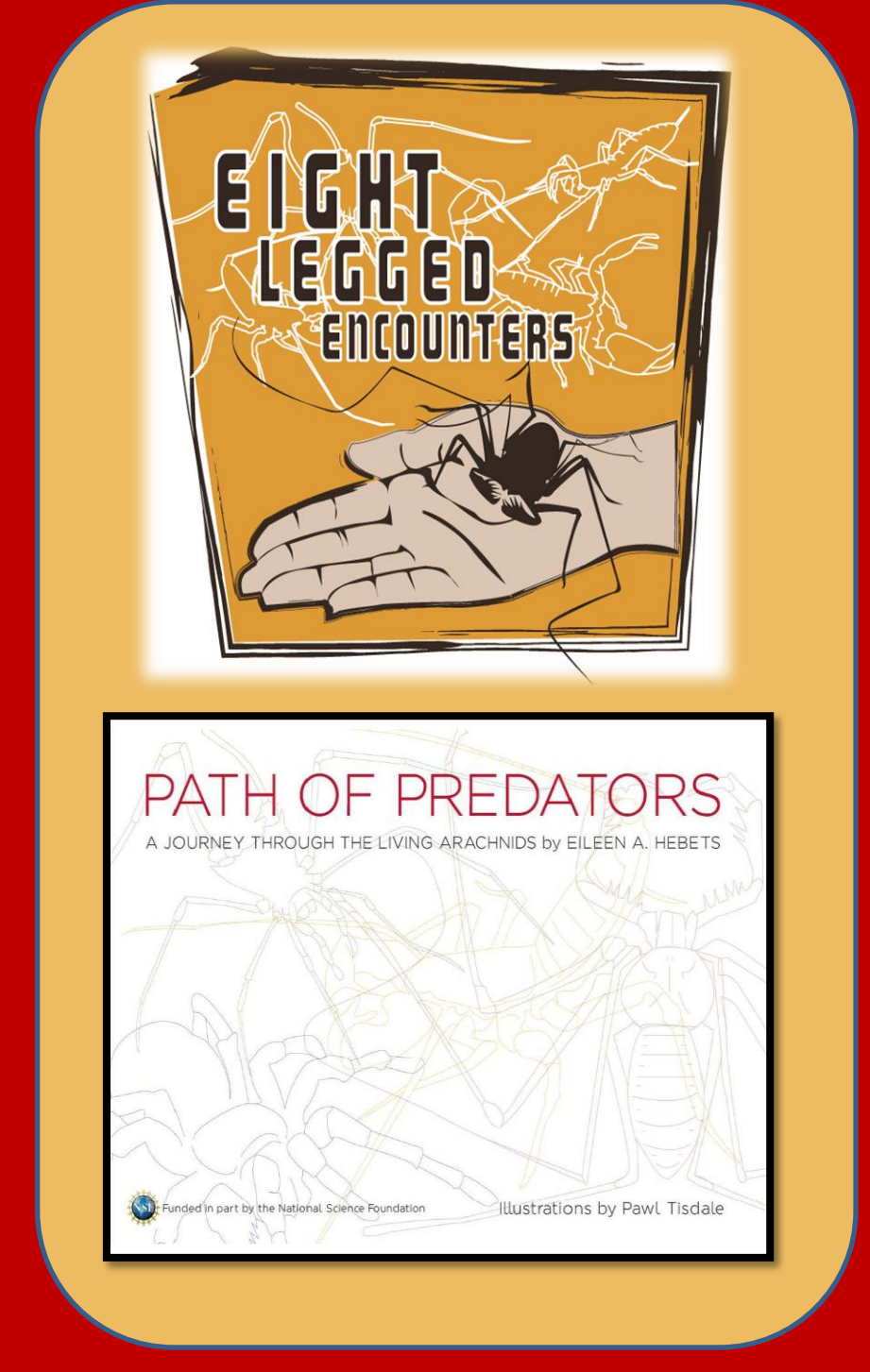


Figure 1. Proportion of exit survey adult respondents reporting each station as interesting after attending *Eight-Legged Encounters*. (1) Morrill Hall, NE Event spring 2013 (n = 101), (2) Butterfly Pavilion, CO fall 2013 (n = 48-53), (3) Morrill Hall, NE Event spring 2014 (n = 60-62).

**COMMUNICATING SCIENCE THROUGH OUTREACH (BIOS 497/897)**

**COURSE OBJECTIVES**  
 > Introduce university students to inquiry-based learning.  
 > Introduce university students to effective strategies for communicating science to general audiences.  
 > Aid university students in the development and implementation of an inquiry-based outreach program focused on evolution for middle school after-school programs.  
 > Introduce university students to assessment and evaluation strategies for measuring the impacts of their educational efforts.  
 > Increase university students enthusiasm for and interest in developing informal science curricula.

**OBJECTIVES FOR MIDDLE SCHOOL STUDENTS**  
 > Increase enthusiasm for, interest in, and knowledge of science.  
 > Provide role models to encourage students to attend college

**RESEARCH QUESTIONS**  
 1. Can we use a peer assisted learning paradigm to:  
 1. Teach STEM undergraduate & graduate students how to effectively communicate science in an informal setting?  
 2. Increase interest, awareness, and knowledge of STEM in underprivileged middle school students?

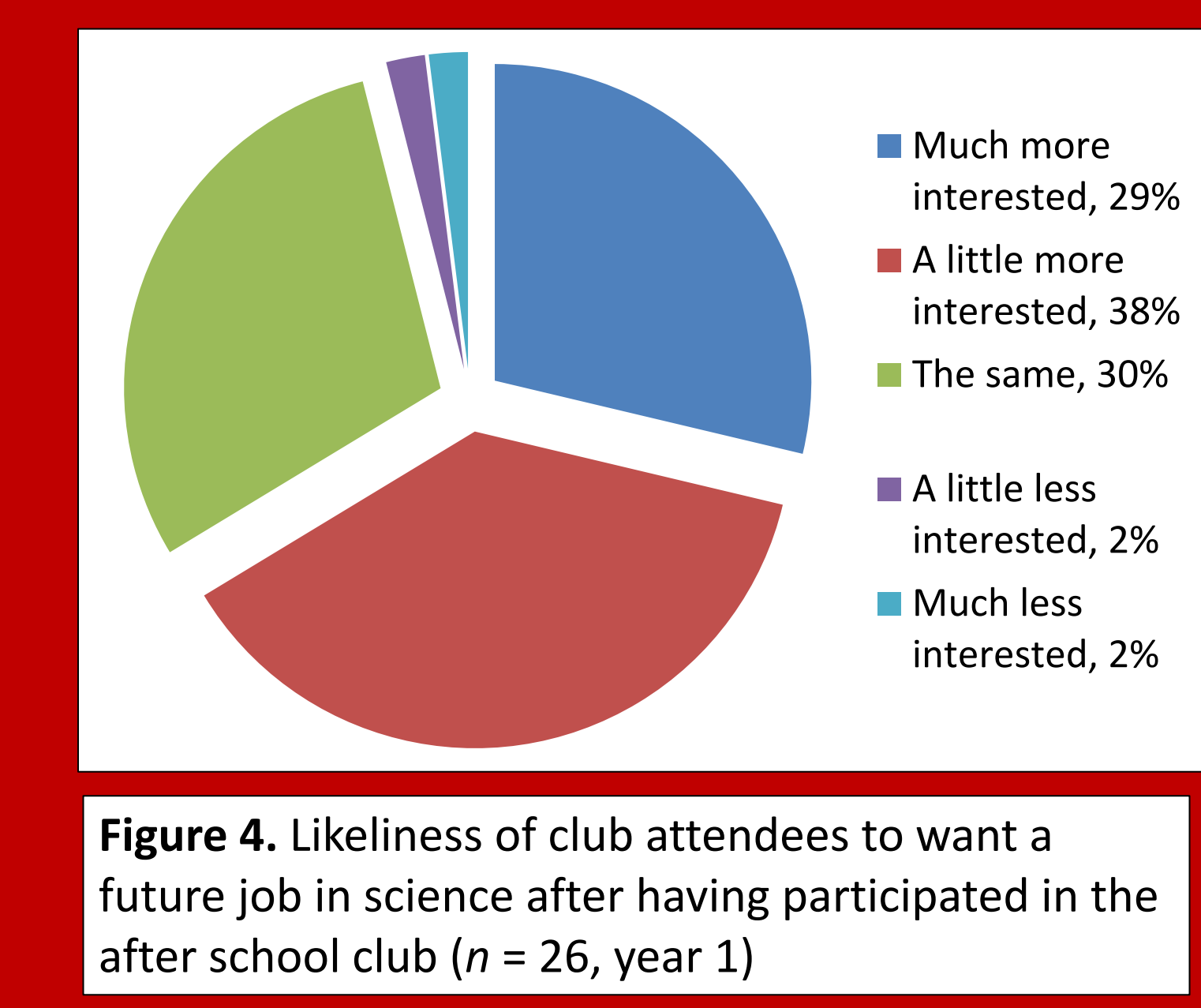
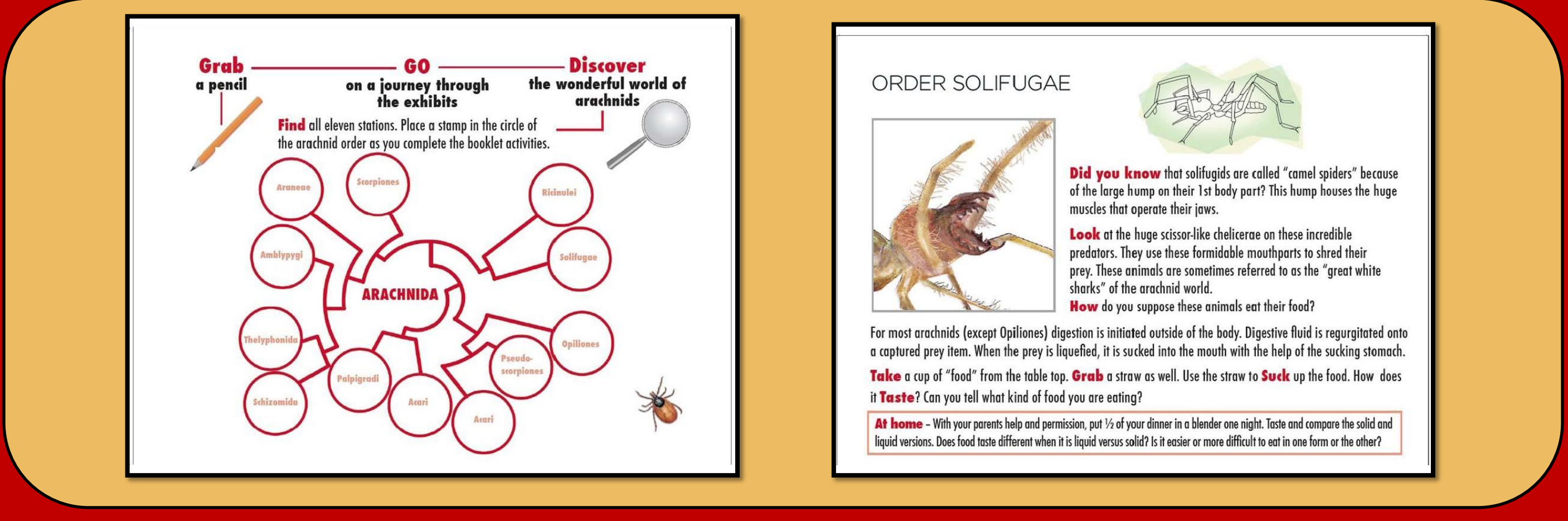


Figure 4. Likeliness of club attendees to want a future job in science after having participated in the after school club (n = 26, year 1)



**VENUES.** 'Eight-Legged Encounters' has been hosted at the Nebraska State Museum (Morrill Hall) twice, with record-breaking attendance (>800 people in <4 hours) and once at the Butterfly Pavilion near Denver, CO. It is scheduled to go to the Denver Museum of Science and Nature in the fall of 2014.

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