What factors promote interest in geology? Results from surveys of GSA members

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RQ: What factors contribute to geoscientists' pursuit of geology?

Study 1: Interviews of 37 field geologists (LaDue & Pacheco, 2013)

Study 2A: Survey at 2011 GSA Annual Meeting in Minneapolis, MN

Study 2B: Revised Survey at 2013 GSA Annual Meeting in Denver, CO

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Study 1: Interviews of 37 field geologists (LaDue & Pacheco, 2013)

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Study 1: How did you get interested in Geology? (LaDue & Pacheco, 2013)

Study Population: 37 field geologists 17 female Mean Age: 37.6 years **Highest Education:** 10 PhD 11 MA/MS 8 BA/BS 8 undergrads



Figure 1. LaDue & Pacheco, 2013

Themes related to interest in Geology

Influences	Levine et al.,	Houlton,	Hoisch & Bowie,	LaDue & Pacheco,
	2007	2010	2010	2013
Academic Coursework	Х	Х	Х	Х
Awareness of Geosciences	Х			Х
Interest in Science			Х	
Geoscience Careers	Х			
Faculty		Х		Х
Field Trips	Х	Х		Х
Family		Х	Х	Х
Outdoor Experiences	Х	Х	Х	Х
Travel	Х	Х	Х	Х
Rocks, Fossils		Х	Х	Х
Local Geology		Х		Х

Study 2: GSA Survey

Open-ended Question:

• 2011 How did you get interested in geology?

"In your answer consider how childhood, family, school, non-school, outdoor experiences and/or people have influenced your academic or career path. Please include details like your age at the time, the people involved and the setting in your response."

2013 Three separate prompts

- "Did you have any notable childhood experiences that substantially contributed to your choice of the geological sciences for your academic or career path?"
- "Did you have any notable experiences in middle school, high school, or college..."
- "Did you have any notable experiences in or with nature or geological field experiences..."



Study 2: GSA Survey

Close-ended Questions: *People*

9. Did you have any teachers, professors, or academic mentors who **positively** influenced your academic or career path?

□No, not particularly

Yes

If yes, check all that apply:

Pre-college peer
 College peer
 Pre-college teacher
 Intro geology professor

Non-intro geology professor
 College academic advisor
 Other (please explain)



Study 2: GSA Survey

Close-ended Questions: *Earth*

11. Did you participate in any of the following activities growing up?

- Hiking
- Orienteering
- Science Museums
- Rock Climbing
- Rock/Fossil Collecting
- Reading about Science Topics
- ■Video Games
 - First Person Shooter
 Multi-player online games

Sports
Boy/Girl Scouts
Camping
Science TV Programs
Science Clubs (4-H,FFA, environmental science club, etc.)
Other: *please explain...*

Limitations

This is not a validated *scale* of interest in geosciences.

This is not *generalizable* to all geologists since the sample population was attendees at GSA.

Sample Population



- 2011 GSA Survey
- 81 participants
- 39 female
- 67 white
- Mean age: 31.8 years
- Highest Degree:
 - 16 PhD
 - 8 MA/MS
 - 56 N/A currently pursuing, or undergrad, or N/A



GSA Survey

2013

- 101 participants
- 46 female
- 83 white
- Mean age: 33.2 years
- Highest Degree
 - 30 PhD
 - 13 MA/MS
 - 30 BA/BS
 - 28 N/A currently pursuing or N/A

Method – Analysis

Open-ended Responses

- Two rounds of inter-rater coding with rubric generated in LaDue & Pacheco, 2013
- Total Counts
- Word Cloud

Close-ended Responses

- Total counts
- Spearman correlation
- Chi square

Method \rightarrow Results

Open-ended Responses	Theme	Close-ended Response
56	Middle/High School	126
26	College Professor	84
18	Hiking	152
55	Rocks & Fossils	100
55	Family	109

Open-ended Responses



Open-ended Responses Academic



Open-ended Responses Academic



"There was a really good science program at my high school. They took us on field trips to Michigan's Upper Peninsula and out west to national parks. It really sparked my interest." 61



Open-ended Responses People



Open-ended Responses People



Open-ended Responses People





Open-ended Responses Earth



Open-ended Responses Earth



Pre-College

125 took Earth Science in Middle or High School

High School Courses



College

- 47 entered college as a Geology Major / 133 did not...
- 39 switched from other STEM Major
- 151 influenced by someone in college environment



Hobbies



Do any family members have careers in STEM?

Do any family members have careers in art, music, creative writing?

	No	Yes	
STEM	87	95	X² n<
ARTS	130	52	$\boldsymbol{\rho}$

rent with EM Career	Νο	Yes	<i>X</i> ² (2 <i>, N</i> =172) = 8.456
Female	31	54	<i>p</i> <.01
Male	51	36	

Close-ended Survey

Interesting non-significant results

No significant gender differences (chi square):

- Hobbies (ex. camping, scouts, hiking, watching TV, etc.)
- Entering college as a geology major

No significant difference in taking middle/high school earth science:

- Entering college as a geology major
- Entering college as a STEM major

Conclusions

Academic, People, Earth themes emerge (van der Hoeven Kraft et al., 2011) Pre-College

• Students take High School Earth science (32%) (AGI Status of Geoscience Workforce, 2014)

College

- Advisors & Introductory Course Professors
- Only 26% came to college as a geology major

Family

- Significantly higher number of parents in STEM than in humanities/arts careers
- Significantly more for Female participants

Future work

1. Approach this question using existing *Interest* theoretical framework (Hedi & Renninger, 2006)

2. Scale Development

3. Data collection with other samples (ex. non-science, other science, other geoscientists)

4. Evaluate questions with diverse comparison groups (ex. culture/ethnicity, geography, etc.)

Open-ended Responses Emotion



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Close-ended Survey

Significant Correlations

	Variables	Correlation
ALAUEIIILC	Enter as Geology major * Enter as STEM	247**
	Enter as Geology major * PhD	.177*
	Enter as Geology major * Rock and Fossil Collection	.232**
	Enter as STEM major * Boy/Girl Scouts	.173*
	No Degree * Non-School Influence	.223**
	Family Influence * Parent with STEM career	.249**
	Family Influence * Museums	.213**
	Parent with STEM career * Parent with ARTs career	.191**
	Parent with STEM career * Male	207**
	Parent with STEM career * Female	.212**

Spearman Correlations * p<.05 **p<.01