



Is Science for Me?

Promoting Science Identity Following Climate Change Disasters in College Students

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Abstract

- ❖ **Aim:** To examine outcomes of an informal environmental education intervention for college students impacted by recent hurricanes.
- ❖ **Results:** Participants reported higher STEM identity following the informal learning experience. We also found increased resilience, but only for male students.

Introduction

- ❖ In recent years, natural disasters have increased at unprecedented rates (Hoeppe, 2016; Ibararán, Ruth, Ahmad, & London, 2009).
- ❖ Following natural disasters, students experience high rates of stress and academic difficulties (Richardson et al., 2015; Joseph, 2012).
- ❖ Little is known about how to foster resilience and academic identity for disaster-impacted students.
- ❖ However, informal learning experiences are critical in building students' career interest and in shaping their science trajectories (National Research Council, 2009).
- ❖ To address this need, we implemented an informal learning experience for hurricane impacted students. The students collected photographs and oral histories documenting damage to their home communities over a 2-week period in May of 2019.

Participants

- ❖ 50 students impacted by Hurricane Florence
 - 54% female
 - 59.1% STEM majors
 - 75% White/European-American, 0.04% Hispanic/Latino; 9.1% Black/African-American, 6.8% Asian/Asian-American; 9.06% Other
- ❖ All students selected were provided with a stipend of \$1000 for their participation in the informal learning experience.



Method

- ❖ Participants completed a one-day training in advance of participation.
- ❖ Participants were grouped into teams of two from the same geographic region.
- ❖ The teams worked collaboratively to collect data at 20 targeted locations per team and to record oral histories.
- ❖ Each team collected 360° images of the forest in both sites with known forestry damage and in control comparison sites.
- ❖ Teams also identified at least 2 community members whom they interviewed, gathering oral histories of forest damage following hurricanes.
- ❖ All data collection occurred over a 2 week period in late May of 2019.

Measures

- ❖ Measures were given before training (pre-test) and 2 months after the learning experience (post-test).
- ❖ Participants also completed daily measures of science interest and science enjoyment for one month (pre-training until after all data were collected).
- ❖ **STEM identity:** This measure presents 7 sets of circles which overlap in varying degrees. One circle represents STEM and the other the participant. Participants indicated which circle best represents their STEM identity (1 = No Overlap to 7 = Total Overlap) (London et al. 2011).
- ❖ **Resilience:** The Academic Resilience Scale (ARS-30) was used to measure processes of resilience, in particular cognitive-affective and behavioral ways in which students respond to adversity (1 = Likely to 5 = Unlikely) (Cassidy, 2016).
- ❖ **Science Interest and Enjoyment:** Single-item measures; “How interested are you in science right now?”; “How much do you enjoy science right now?” (1 = Extremely Interested/Really Enjoy to 7 = Extremely Uninterested/ Really Did Not Enjoy).

Results

- ❖ **STEM Identity.** Participants expressed higher STEM identity at post-test ($M = 5.50$, $SD = 1.78$) than at pre-test ($M = 5.15$, $SD = 1.95$).

Resilience				
	Pre-test		Post-test	
	Males	Females	Males	Females
Perseverance	22.87 (5.33)**	23.33 (7.99)	30.07 (9.95)**	25.05 (6.59)
Help-seeking	16.00 (4.05)**	17.20 (5.55)	23.20 (8.95)**	17.20 (5.33)

- ❖ **Interest and Enjoyment.** Participants reported higher Science Interest and Enjoyment on days when their data collection experiences were more positive.
 - ❖ Interest: $B = .3479$, $SE = .05$, $t = 6.764$, $p < .001$
 - ❖ Enjoyment: $B = .3066$, $SE = .04$, $t = 6.294$, $p < .001$.

Discussion

- ❖ We found that informal learning experiences can promote science identity in hurricane impacted students.
- ❖ Informal forestry learning can also foster resilience. However, resilience effects were only found for men, raising new questions:
 - ❖ Were team dynamics different for men and women?
 - ❖ Do stereotypes around STEM for females impact resilience?
- ❖ We also found that interest and enjoyment fluctuated daily and were related to how positive data collection experiences were that day.
- ❖ Overall, our results have important implications for intervention to promote STEM identity and resilience for disaster-impacted students.

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