Students' perspectives on entering a data science career after experiential learning with local community organizations

V.N. Vimal Rao, Chelsey Legacy, & Andrew Zieffler

Introduction

With a growing need for trained data scientists, it is important to understand the ways in which colleges and universities can prepare and encourage students for a career in data science (DS). The purpose of this study is to explore how experiential learning may affect students' propensity to enter a data science career.

Theoretical Framework

Social Cognitive Career Theory (SCCT) is a theoretical account for how cognitive and social mechanisms, complementary to skills and abilities, underlie students' educational and career choices (Lent et al., 1994; Lent & Brown, 2019).

The basic building blocks of SCCT are:
 self-efficacy beliefs, outcome expectations, and *personal goals.*

Each of these constructs support:
 interest development, choice actions, and *performance attainment.*

These in turn affect an individuals' processing of experiences which cyclically feed beliefs and expectations.

Participants and Setting

The NSF-funded DSC-WAV (HDF DSC-1923700) is a workforce development project that provides undergraduate students externship opportunities to gain authentic experiences with data and computing (see Horton et al., 2021, for more about the project).

It simultaneously supports community-based and non-profit organizations to harness the data science revolution at the local level. We interviewed 20 students (80%) from the first cohort of students completing the project in May and June 2020.

Data Collection and Analysis

20 student participants (80% of the Spring 2020 cohort) were interviewed via Zoom in May 2020. The recorded interviews and accompanying notes were analyzed via an iterative deductive coding process (Saldaña, 2015). Initial codes created based on the data were iteratively refined until a consistent definition per code was achieved. Each code was then assigned to one of the components of the SCCT model.

Conclusion and Future Work

Evidence from DSC-WAV participant interviews suggest that externships provide valuable learning experiences that support the primary drivers of career choice, complimentary to classroom experiences.

This is consistent with SCCT which posits that learning experiences shape students' self-efficacy beliefs and outcome expectations, which in turn support interest development and subsequently career choice goals.

Future analyses will explore variation in DS career choice goals and actions as a function of learning experience characteristics.
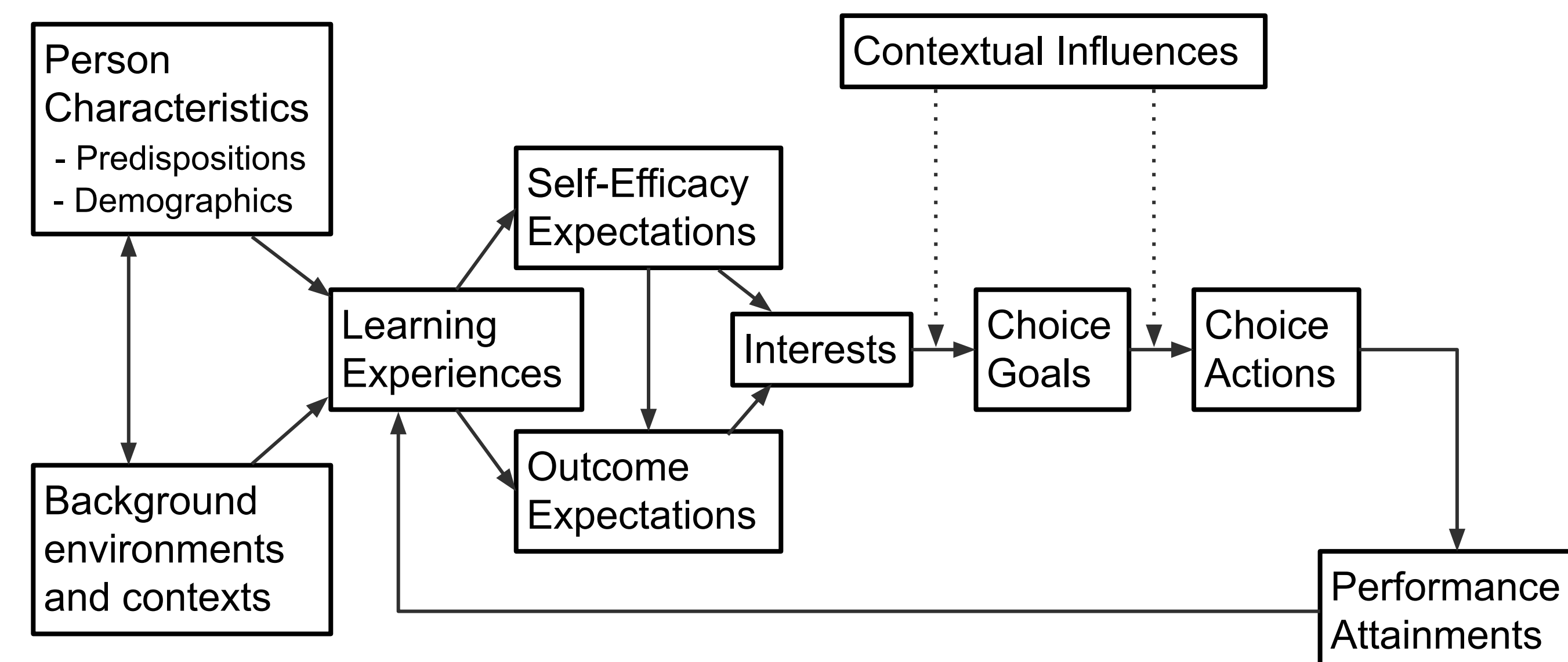

UNIVERSITY OF MINNESOTA
Driven to Discover®

Data Science (DS) externships can support the formation of DS career goals by shaping students' outcome expectations, their self-efficacy, and their interest in DS.

The Social Cognitive Career Theory Model

Theme 1: DSC-WAV experiences helped shape students' outcome expectations by providing a realistic view of what DS work entails

"It is hard to understand what a data scientist does outside of what a person learns in the classroom"

"[This] helped [me] have an example of the type of work I could be doing"

"[This project] gave me a more realistic view"

"Seeing the overlap between DS and environmental studies let me see there are these opportunities in the job field"

"[This project] opened me to ideas about different career options that involve DS"

"This experience was helpful in understanding how prevalent and useful DS is in the workplace"

"I wasn't sure if DS had a role in nonprofits. Now I realize there's this whole niche industry"

Theme 2: DSC-WAV experiences helped students identify which aspects of DS work they were good at and which aspects they liked (i.e., self-efficacy and interests)

Self-efficacy

"Apparently, I'm pretty decent at managing data"

"This experience was really affirming"

"I feel more confident in my skills because of this experience"

"I developed confidence in the tools I used"

Interests

"I liked doing this [project]"

"[This project] helped [me] hone [my] interests within DS"

"Environmental work peaked my interest in DS"

"I'm more interested in project management and client communication"

"This was what I was expecting and it was fun"

Theme 3: DSC-WAV experiences helped students specify career choice goals

"Before this, it was just a vague notion of 'maybe I'd like to do DS'"

"I want to pursue a Masters degree"

"I really want to continue working with communities"

"I will be declaring a DS major"

"I want to pursue becoming a Data Engineer"

"I want to work in data cleaning and processing"