Connectedness in Isolation: A Qualitative Study of Belonging in STEM During the Onset of COVID-19

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Abstract

The COVID-19 outbreak spurred unplanned closures and transitions to online classes. Physical environments that once fostered social interaction and community were rendered inactive. We examined undergraduate STEM students' feelings of belonging and engagement while in physical isolation and identified online teaching modes associated with these feelings. Interviews with a racially diverse group of 21 undergraduate students suggest that students derived feelings of connectedness from their interactions with instructors, peers, and from their prior experiences. Findings suggest that personalized, often synchronous online interactions tend to support students' feelings of connectedness and belonging in STEM.

Competence
The experience of mastery and being effective in one's activity.

Autonomy
Personal causation. The feeling one has choice and is willingly endorsing one's behavior.

Relatedness
The need to feel connected and belongingness with others.

Motivation & Behavior

The fundamental psychological needs according to Self-Determination Theory (Ryan & Deci, 2000)

Background

The Need to Belong
- Feeling related and connected with others is a fundamental need.
  (Ryan & Deci, 2000, Baumeister & Leary, 1995)
- Relationships with students and instructors can support this need.

Prior Research
- Belonging, motivation, and engagement can be supported though teacher-student and student-student relationships
  (Froiland et al., 2019; Roorda et al., 2011; Ryan, 2000)
- Online instruction that emphasizes social interaction is expected to facilitate a sense of belonging, interest, and persistence
  (Kahu, 2011; Delahunty et al., 2014)

Research Questions

1. *What were undergraduate STEM students' perceptions of belonging in during the onset of the COVID-19 pandemic?*

2. *Which online social interactions do students experience as supporting or hindering their belonging and engagement?*

Methods

Participants
- Undergraduate students (N = 21)
  - 76% Physics 1, 24% Calc 2
  - 40% Latinx, 30% Asian, 28% White, 2% Black
  - 42% Female
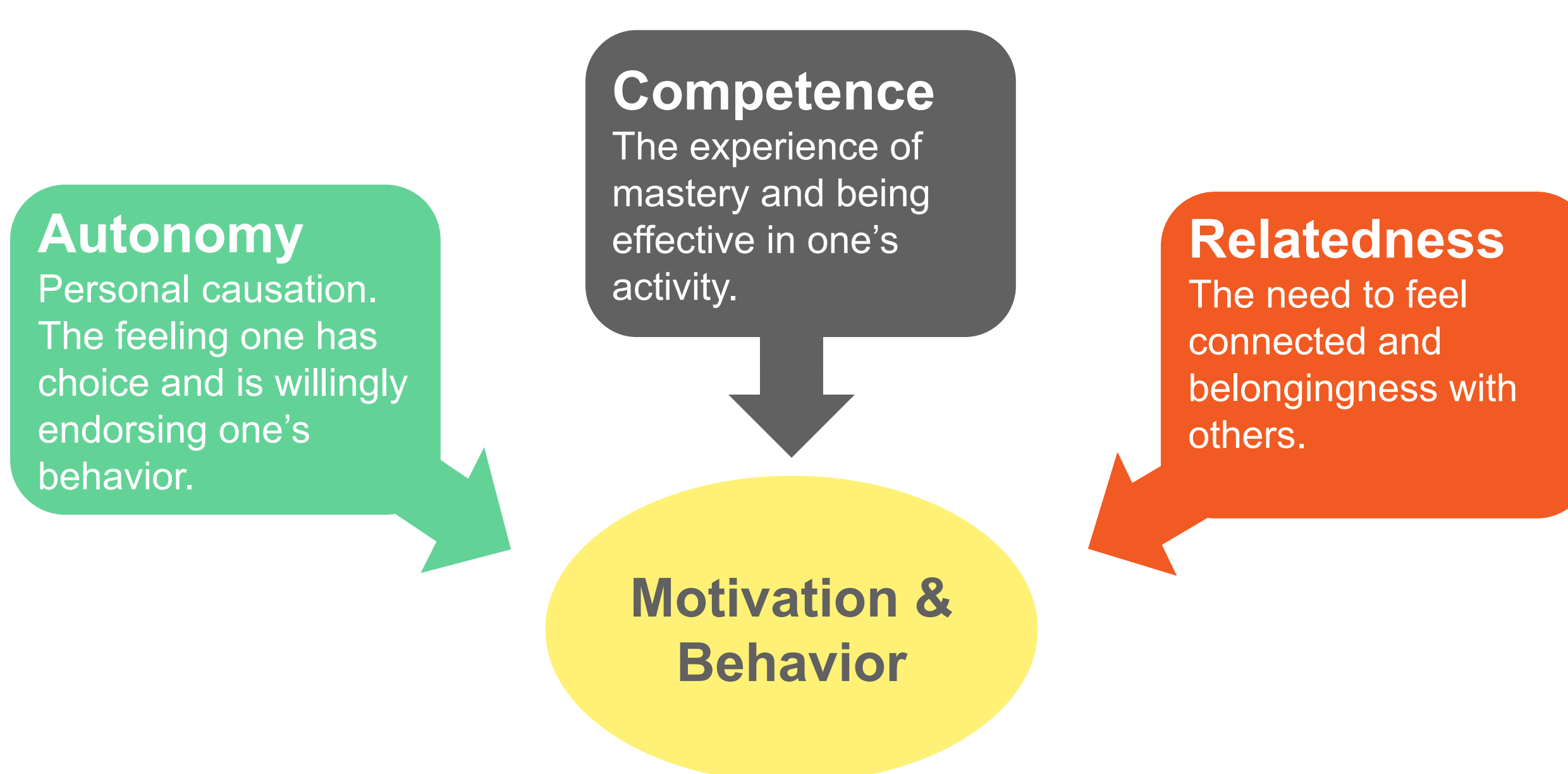 - M = 19.8 years old

Study Context
- Large Hispanic Serving Institution
- Interviews conducted during the onset of COVID-19 pandemic (April & May of 2020)

Procedures & Analysis
- Interviews with 1 to 3 students
- Questions about transition to online learning
- Constant comparative method (Glaser & Strauss, 1967)

Example Student Interview Questions
- To what extent do you feel that you belong in your physics / math class?
- What accommodations has your professor made to maintain community and support interpersonal connections (if any)?

Findings

Students' Reported Experiences of Belonging in STEM During the Onset of the COVID-19 Pandemic	
Sources of Belonging	
Positive peer-peer interaction (class-related)	46%
Positive peer-peer interaction (outside of class)	38%
Campus communities	8%
Faculty Caring	62%
Confidence from prior experiences	38%
Negative Experiences	
Isolation	46%
Patronized by faculty	15%
Positive Experiences	
Feeling cared for personally	15%
Feeling cared for academically	19%
Relatability to professor	23%

Note. Frequencies represent the proportion of interviews in which the interaction was mentioned.

"We still remind each other to do homework, to study for the test, and stuff *[via text message]*"

"I know [the instructor] cares about every single one of us. She even mentions it [*during synchronous instruction*]… it's almost like a second family"

"I feel like I'm still, I still belong in the class... in the sense that I know, I like [that] I have the background knowledge"

"I'm in a [*asynchronous*] class with 60 people... I feel like I don't belong. It's like there's nowhere to even belong to"

"It's like a condescending tone of like, if you paid attention, you would have seen the data already… We're not toddlers"

"It's really nice to hear just her voice in general because she's so good to us. She cares so much about her students and she's trying to make sure that we are OK in the end."

"He's made it really easy on us. He's made it…He's broken down the material really well."

Implications

Our findings highlight the breadth of students' feelings of belonging during times of mandated isolation. Generally, findings suggest that personalized, often synchronous, online interactions with faculty and students tended to support students' feelings of connectedness and belonging in STEM, and underscore the resilience of students and faculty in the face of hardship and crisis.

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