UNIVERSITY OF CALIFORNIA

Santa Barbara

Exploring Latina and Hispanic Female Students' Sense of Belonging in STEM Majors Following a Belonging Intervention

A dissertation submitted in partial satisfaction of the

requirements for the degree Doctor of Philosophy

in Counseling, Clinical, and School Psychology

by

Beatriz Del Carmen Bello

Committee in charge:

Professor Collie Conoley, Chair

Professor Andrés Consoli

Professor Merith Cosden

September 2018

The dissertation of Beatriz Del Carmen Bello is approved.

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Professor Merith Cosden, Ph.D

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Professor Andrés Consoli, Ph. D.

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Professor Collie Conoley, Ph.D., Committee Chair

September 2018

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ACKNOWLEDGMENTS

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To my colleagues at UCSB, I am grateful to have shared this journey with you and to have formed quality relationships with amazing people. I would like to thank my lab sisters for your support, validation, and unending encouragement. You all have been a wonderful touchstone during this journey and I am grateful for your support. I know you too will accomplish great things. Dr. Kevin Delucio, thank you for being my mentor, sounding board, and friend. I could not have imagined going through this journey without you. Words cannot

communicate how happy I am that God put you in my path. To Lauren Koch and Lindsey Liles, thank you for normalizing the struggle and being an amazing support team. You are inspirational and intelligent women and I am so lucky to have you two in my life.

I would like to thank the Center for Multicultural Training in Psychology internship program at Boston Medical Center for being my home away from home. The support, mentorship, teachings, and connections I have received during my internship year have truly nourished my mind, body and soul. I am particularly grateful to both Dr. Borba and Dr. Fuchs for the guidance and support you provided me during the completion of my dissertation. Faculty at CMTP, you have all uplifted my spirit and prepared me for the journey ahead. I would also like to thank my clinical supervisor Carola Mallol, LMHC for being an amazing Latina role model. I will hold your wisdom close to my heart. Finally, I would like to thank my research assistant, Alexandra Wong, for her hard work and dedication. It was a pleasure working with you. I am so grateful to have had you on the team. Thank you for insights and hard work.

DEDICATION

I dedicate this work to my family whose love, support, and sacrifices made this accomplishment possible. In particular, I want to thank Elena Bello, Domingo Bello, Blanca Gonzalez, Carlos Bello and Helen Bello. You fill my heart.

You are true role models from which I have learned about dedication and hard work. Your embodiment of hard work, intelligence and perseverance is a daily demonstration of your strength and your love. You mean the world to me. In particular, I have to thank my parents and my aunt for all of the sacrifices they have undergone in order to provide me with the opportunities they were not given. I hope to one day have the ability to give back even half as much as what you all have given to me. Thank you to my siblings for your unconditional support and for rooting for me all along the way. This work is not proof of my efforts alone, but it is made possible due to the support and love I receive from my family.

I also dedicate this work to my partner, Omari Straker, who has been patient, supportive, and encouraging throughout my journey. I am blessed to have you in my life. I admire your intelligence, heart, and humbleness. Thank you for always being there when I needed you the most and for putting everything down to be emotionally supportive to me through this stressful and long journey.

Finally, I dedicate this work to the Latina participants of this study who made this project possible. Thank you for allowing me to learn from you and for allowing me a glimpse into your life and experience. I hope the lessons I have learned from my participants, communicated through this work, can help support other Latina students in their chosen journeys.

CURRICULUM VITA OF BEATRIZ D.C. BELLO
August 2018

EDUCATION

Ph.D., Clinical, Counseling and School Psychology **June 2018**
University of California, Santa Barbara
Emphasis in Counseling Psychology

Masters of Arts, Counseling Psychology **June 2014**
University of California, Santa Barbara

B.A., Psychology and Social Behavior, *Cum Laude* **June 2010**
University of California, Irvine
Campuswide Honors Program

RESEARCH EXPERIENCE

Independent Researcher, Dissertation **Oct. 2016-Aug 2018**
Committee Chair: Collie Conoley
Dissertation Title: Sense of Belonging in STEM Majors: Exploring Latina College Students' Experiences (Defended August 2018)
University of California, Santa Barbara

- Recruited Latina college student participants in STEM majors who had undergone an incremental belonging intervention to promote sense of belonging.
- Study examined the lived experience of Latina students' in STEM majors and their sense of belonging.
- Explored strategies utilized by participants when facing challenges.

Graduate Research Practicum **Sep. 2012-2017**
University of California, Santa Barbara
PI: Collie Conoley, Ph. D.

- Served as a research team judge evaluating client therapy experiences of Goal Focused Positive Psychotherapy orientation using Consensual Qualitative Research (CQR) methodology.
- Transcribed psychotherapy sessions and coded transcripts for a research project examining the therapeutic effects of positive empathy in forming approach goals.
- Developed independent research project examining the construct of grit as a potential protective factor against experiences of discrimination and stereotype threat among minority college students.
- Participated in research evaluating client responses to clinical assessments used within department's training clinic. Managed participant recruitment and collection of assessment data, and conducted semi-structured interviews.

Graduate Student Researcher **Sep. 2015-March 2017**
Veterans Treatment Court, Fresh Start Residential Treatment, Substance Abuse Treatment Court, Re-Entry Drug Court, and Juvenile Drug Court
University of California, Santa Barbara

PI: Merith Cosden, Ph.D.

- Conducted structured clinical interviews with veterans using depression, symptom inventories, and trauma history screens used in part to evaluate outcomes of drug treatment court for veterans in San Luis Obispo, Santa Barbara, and Ventura counties.
- Conducted interviews evaluating youth's experiences as part of participation in juvenile drug court program.
- Coded open-ended responses from veterans in response to their evaluation of the drug treatment court program.
- Co-authored quarterly and yearly program evaluation reports for a number of treatment programs, which included data on participant demographics, treatment adherence, outcome data using scores on the Addiction Severity Index, and participants' evaluation of programs.
- Managed and updated program databases, worked with treatment providers to obtain needed data, and ran statistical analyses for program evaluation reports.
- Attended quarterly meetings with program administrators and probation officers to discuss data collection progress and areas of improvement.
- Conducted trainings for treatment providers on how to administer the Addiction Severity Index to treatment participants.

Research Assistant **Nov. 2012-2013**
Dissertation Title: *Resilience in the aftermath of a technological disaster: A community-based mixed methods research study*
PI: Jasmin Llamas, M.A.
Faculty Advisor: Morgan Consoli, Ph. D.

- Trained in using Consensual Qualitative Research (CQR) methodology to analyze qualitative research data for an advanced doctoral student completing dissertation research.
- Coded semi-structured interview transcripts examining posttraumatic growth of individuals surviving a gas explosion in San Francisco.

TEACHING EXPERIENCE

Teaching Associate **Summer 2016**
CNCSP 101: Helping Relationships
University of California, Santa Barbara
Instructor

- Taught a required course for the applied psychology minor for undergraduate students.
- Instructed students on introductory material covering fundamental helping skills and empirical support for effective helping interactions.
- Facilitated group discussion and led self-exploration exercises on topics including privilege, multicultural considerations, ethics, and motivations for helping.
- Completed course planning tasks including preparing course readings and creating a course syllabus, assignments, lecture materials, and quizzes, midterm and final exams.

- Additional responsibilities included grading course assignments, proctoring and grading exams, and leading in-class role play interactions to practice basic helping skills.

Teaching Assistant **Fall 2014; Winter 2014**
CNCSP 110: Introduction to Educational and Vocational Guidance
University of California, Santa Barbara
Instructors: Michael Brown, Ph.D.; Lily Maestas

- Held weekly discussion sections leading experiential activities to uncover professional values and interests, discuss results of Strong Interest Inventory and Myers-Briggs Type Inventory assessments, graduate programs, and financial planning.
- Met with other teaching assistants to discuss and plan weekly section material.
- Coordinated out of class participation in career and graduate program fairs led by university's career services department.
- Proctored and graded midterm and final exams and graded written assignments for my sections.

Teaching Assistant **Summer 2014**
CNCSP115: Peer Helping
University of California, Santa Barbara
Instructor: Tania Isreal, Ph.D.

- Led weekly discussion section for undergraduate students serving as student housing resident assistants (RAs).
- Met weekly with instructor and fellow teaching assistants to discuss student responses to section activities and coordinate future meetings.
- Trained students on scenarios that may be encountered in their role as RAs and reviewed decision-making models.

Teaching Assistant **Fall 2013**
Psychology 01: Introduction to Psychology
University of California, Santa Barbara
Instructor: Alan Fridlund, Ph. D.

- Held four weekly discussion section sections for a total of 120 students, approximately 30 students per section, for a required introductory course for the psychology major.
- Proctored and graded midterm and final exams and created exam review materials.
- Met regularly with instructor and other teaching assistants to monitor course progress and students' responses to course materials in sections.

CLINICAL EXPERIENCE

Pre-Doctoral Intern **Sep 2017-Aug 2018**
Boston Medical Center/Boston University
Center for Multicultural Training in Psychology
Primary Supervisor: Sandra Mattar, Ph.D.

- APA accredited internship providing high quality generalist training in Clinical Psychology utilizing a practitioner-scientist model.
- Interns provide services to a culturally diverse client population with social, economical and political disadvantages.
- Interns develop expertise in multiculturalism and employ a multicultural lens to gain a holistic understanding of the populations they serve in order to deliver competent psychological services and improve treatment outcomes.
- Interns participate in weekly mentoring meetings focused on professional development, individual supervision, core didactic seminars, and attend grand rounds.
- Interns split their week attending two placement sites for 12 months to gain an array of experiences and competencies.

Massachusetts Mental Health Center
Latino Mental Health Team
Individual Clinical Supervisor: Carola Mallol, M.S., LMHC
Group Clinical Supervisor: Shavonne Moore, Ph.D.

- Collaborated within an interdisciplinary team comprised of psychologists, psychiatrists, social workers, and nurses in a state outpatient mental health center.
- Provided individual psychotherapy and case management services to monolingual Spanish speaking adult and geriatric patients with severe and persistent mental illness.
- Provided behavioral health interventions for management of comorbid medical conditions (e.g. diabetes).
- Served a diverse population with regard to ethnicity, gender, sociocultural/demographic factors, physical and psychological abilities, religion, and socioeconomic status.
- Employed evidence-based practices including CBT and ACT for psychosis. Utilizing Humanistic/Person-Centered and Psychodynamic frameworks and conceptualizations.
- Provided psychological assessments as part of an assessment clinic (e.g. WAIS, MMPI, PAI, BDI, BAI).
- Received weekly one hour individual and group supervision, as well as participating in didactic seminars focused on treating populations with severe mental illness.
- Participated in weekly interdisciplinary team meetings that include case presentations, case management, crisis/hospitalization updates, and treatment plan reviews.

The SPARK Center
Ryan White Title A & D Mental Health Provider
Primary Supervisor: Martha Vibbert, Ph.D.

- Provided culturally sensitive psychotherapy and behavioral health interventions to adolescents and young adults in individual, family, and group modalities through onsite and in-home treatment.
- Served as part of the pediatric HIV/AIDS mental health program in affiliation with the Infectious Disease Clinic at Boston Medical Center with patients who have been either prenatally infected or have acquired HIV later in life.

- Closely collaborated with primary care providers, social workers, and nurses to coordinate treatment, connect patients with needed medical and psychiatric services, and improve treatment outcomes.
- Provided HIV/AIDS focused psychotherapy treatment including managing disclosures, medication adherence, dealing stigma and social isolation, and providing developmentally appropriate psychoeducation.
- Provided psychological treatment for Major Depressive Disorder, anxiety disorders, adjustment disorders, harm/risk reduction, substance use disorders, and case management relating to issues of homelessness.
- Other duties included but were not limited to program development targeting healthy development and nutrition of adolescents and young adults living with HIV and wellbeing promotion services.

Cultural Broker Quality Improvement Project
Boston Medical Center

- Conducted clinical interviews in both English and Spanish as part of a quality improvement project within the Neurology and Gastrointestinal Pediatric Clinics.
- Project was aimed at improving treatment outcomes and providing tailored treatment planning by identifying and bridging cultural gaps that may widen health disparities.
- Interviewed families of children and young adults with a new chronic illness diagnosis to understand cultural beliefs, worldviews, medication adherence, and culturally appropriate medical treatment.
- Worked collaboratively with medical providers after interviewing patients and their families to assist in developing tailored treatment plans and improving doctor-client collaboration.
- Assisted in project development and project piloting for the goal of preparing project for hospital-based research study. IRB approval pending.

External Practicum Student **Sep 2015-June 2017**
New Beginnings Counseling Center
Clinical Supervisor: Paul Guido, Ph.D.

- Provided long-term psychotherapy for concerns ranging from prolonged grief, major depression, anxiety disorders, and issues relating to trauma.
- Conducted individual and family therapy in both English and Spanish to Santa Barbara community members of varying physical abilities, ethical/racial identities, language, and mental health concerns, utilizing a psychodynamic orientation.
- Served as a Housing Authority clinician providing therapy for individuals receiving low income housing, using short-term counseling and crisis management.
- Attended monthly clinical trainings focused on mental health related topics including trauma treatment, suicidality, rape crisis issues, psychotherapeutic medication.
- Participated in didactic 10-week intensive specialty track on personality disorders.
- Additional activities included conducting phone intakes in Spanish and translating clinical documents into Spanish.

External Practicum Student **June 2014-Sept. 2015**
Family Service Agency
Clinical Supervisor: Nancy Rank, LMFT

- Provided long-term psychotherapy to adults, children, couples, and families in both English and Spanish at a community mental health center.
- Treated issues concerning family functioning, depression, anxiety, and trauma.
- Utilized a multicultural lens to conceptualize and tailor therapy to client's needs and goals, trained primarily using a Humanistic orientation.

External Practicum Student **Fall 2014-2015**
Family Strengths Center
Harding University Partnership School
Clinical Supervisor: Collie Conoley, Ph.D.

- Worked within an elementary school setting providing family therapy in English and Spanish for low performing students and their families.
- Utilized a Goal Focused Positive Psychology orientation focused on building on strengths to support students in meeting their full potential within the educational context.
- Collaborated with the principal, teachers, and other school staff to develop mutual goals and a supportive partnership between the school and Latino parents.
- Provided referrals and case management services using a social justice framework.
- Completed in-class observational assessments of students before and after treatment to monitor progress.

Advanced Practicum Student **Fall 2013-2014**
Hosford Counseling and Psychological Services Clinic
University of California, Santa Barbara
Clinical Supervisor: Collie Conoley, Ph.D.

- Trained in Goal Focused Positive Psychology orientation focused on increasing positive emotions, identifying strengths, and obtaining goals that promote well-being, within a university-based community mental health center.
- Trained to identifying goals and hidden desires through an action oriented and strengths based approach.
- Conducted therapy with individuals, couples, children and adolescents, and families in both English and Spanish.
- Conducted intake interviews, semi-structured assessments, and completed clinical case presentations.
- Administered and scored weekly client assessments to monitor progress.

Assessment Practicum Student **2013-2014**
Psychological Assessment Center (PAC)
University of California, Santa Barbara
Clinical Supervisors: Erik Lande, Ph.D. & Jordan Witt, Ph.D.

- Administered comprehensive battery of psychological tests including cognitive, personality, and neurological assessments to community members as part of a university-based psychological assessment center.
- Conducted intake client interviews, psychological testing, and feedback sessions.

- Completed in-depth assessment cases and technical assessment reports delineating assessment outcomes, recommendations, and accommodations.

Basic Practicum Student **2012- 2013**
Hosford Counseling and Psychological Services Clinic
University of California, Santa Barbara
Clinical Supervisor: Heidi Zetzer, Ph.D.

- Trained using a client centered orientation with goal of developing a strong clinical foundation.
- Conducted therapy with college students serving as pseudo clients presenting with mild to moderate concerns such as anxiety and adjustment concerns.
- Participated in weekly group supervision sessions led by advanced graduate students under the supervision of a licensed clinical psychologist.

SUPERVISION EXPERIENCE

Clinic Coordinator and Organizational Climate Supervisor **June 2016-June 2017**
Hosford Counseling and Psychological Services Clinic
University of California, Santa Barbara

- Responsible for managing clinic operations of clinical training, research, and clinical services provided and weekly meetings with the Clinic Director to discuss clinic operations.
- Conducted phone intakes with prospective clients in English and Spanish.
- Provided on-site supervision to advanced practicum students seeing individual clients, couples and families, which involved aiding in skill development, case conceptualization, and crisis management. Monitored live video feed of student clinician therapy sessions.
- Established a positive environmental climate by organizing events such as the multicultural potluck, ensuring adherence of clinic policies, and launching a self-care initiative for clinicians.
- Lead case assignment meetings with faculty and student supervisors to assign intake cases and monitor high risk clients.
- Responsible for clinic administration duties including managing client transfers, terminations, and case audits, developed and lead trainings for incoming clinicians, oversaw and managed the other student supervisors in charge of assessment and research, technology, and outreach.
- Revised the clinic procedures and policy manual and supervisors manual delineating daily operations for clinicians and student supervisors, and translated clinical documents and intake assessments into Spanish.

Assessment and Research Supervisor **Spring, 2016**
Hosford Counseling and Psychological Services Clinic
University of California, Santa Barbara

- Provided weekly on-site supervision to advanced practicum students conducting therapy, helping students in their development of clinical skills and case conceptualization.

- Updated assessment and research databases, tracking weekly client assessments to monitor therapeutic progress.
- Attended weekly case assignment meetings to assess intakes and assign clinical cases to clinicians.
- Conducted phone intakes with prospective clients in English and Spanish.

Student Supervisor, CNCSP 260B Basic Practicum I **Winter 2016**
Hosford Counseling and Psychological Services Clinic
Clinical Supervisor: Andres Consoli, Ph.D.

- Supervised two first year graduate students through live video feed, providing feedback on clinical skills and assisting in case conceptualization.
- Evaluated clinical performance of these students and attended supervisor meetings to discuss supervision issues.

CLINICAL CERTIFICATION

Gottman Couples Therapy Level 1 **Winter, 2016**
Gottman Couples Therapy Level 2 **Winter, 2016**

PROFESSIONAL ACTIVITIES

Student Representative **2015-2017**
American Psychological Association, Division 17

- Created outreach and presentation materials for Positive Psychology division representatives.
- Conducted Positive Psychology presentations on topics such as mindfulness, self-compassion, and forgiveness with graduate and undergraduate university students to increase awareness of division and recruit of new members.

Graduate Mentor **2016-2017**
Graduate Scholars Program

- Served as an advanced graduate student mentor to first year graduate students. Program was developed to aid graduate students of diverse backgrounds that are underrepresented in academia.
- Meet on a monthly basis with first year graduate student to provide support and resources to promote academic success and professional development.

Student Member **2013-2014, 2016-2017**
Clinic Policy Committee

- Served as the Hosford Clinic Coordinator representative for the 2016-2017 school year and as a counseling emphasis student representative from 2013-2014.
- Involvement included reviewing Hosford Clinic's policies, upcoming clinic program changes, updating clinic's mission statement, and funding projects.
- Approved research proposals for research conducted in the clinic and research addressing clinic related concerns.

Member and Presenter **Fall 2015**
Santa Barbara Wellness Program

- Trained to provide trainings in English and Spanish for the Latino community in Santa Barbara, providing psycho-education on issues of stress management, effective conflict resolution and decision making to promote mental, and physical and social well-being.

Assessment Specialist **2014-2015**
Child Abuse and Listening Mediation (CALM)
- Involved in scoring clinical assessments for clients served by a community mental health center specialized in treating children, adolescents, and families affected by domestic violence and sexual abuse.
- Compiled literature reviews and create treatment recommendation reports for treatment providers delineating empirically supported treatment guidelines for specific clinical issues.

Student Member **2014-2015**
Admissions Committee
- Involved in revising the Counseling, Clinical, and School Psychology program admission policies.
- Attended quarterly meetings with graduate student and faculty committee members, meet with interested applicants and provided information throughout the year, organized applicant accommodations during interview process, and organized the program's interview day.

Presenter **2012- 2014**
Everybody Does Outreach
- Created and presented on mindfulness in everyday life centering on principles, practice, and benefits of mindfulness through interactive activities and discussions with children and adults in the Santa Barbara community.
- Created and presented on bullying to parents and students of various ages focused on psycho-educating about bullying types, the power of bystanders, and negative consequences of bullying to promote prosocial behaviors.

Peer Mentor **Fall 2013 –2014**
- Served as peer mentor for a first year student from our doctoral program, providing individualized support and resources to provide a smooth transition into the graduate program.

Group Leader **March-June 2014**
Positive Psychology Psycho-education Group
Supervisor: Collie Conoley, Ph.D.
- Led weekly positive psychology psycho-educational groups for undergraduate students.
- Introduced and demonstrated relevant Positive Psychology constructs and practical applications.

ADDITIONAL TRAINING EXPERIENCES

Transgender Youth Training **Fall 2016**

- Attended a comprehensive two-day educational symposium sponsored by the Los Angeles Gender Center, training professionals in providing sensitive and competent mental health and medical care for gender non-conforming children, transgender youth, and transgender young adults.

Diagnosis Seminar **Summer 2016**

- Participated in a supplemental 10-week clinical seminar providing diagnostic training in a thorough mental status exams, cultural considerations in diagnosis and assessment, and attending to interpersonal markers implicated in diagnosis.

Spanish Skills for Culturally Minded Academics **2013-2014**

- Participated in group focused on developing specific clinical skills related to providing therapy in Spanish and with Latinx clients.

PUBLICATIONS

JOURNAL ARTICLES

Consoli, A. J., Fernández Oromendia, M., Olson, A., **Bello, B**., Navab Holden, A., & Santacrose, D. (2017).The use of coaching and peers in the acquisition of foundational skills in psychotherapy. In G. Rich, *Teaching psychology around the world* (Vol. 4). Newcastle, England: Cambridge Scholars.

Winter Plumb, E., Hawley, K.J., **Bello, B. D.C.,** Boyer, M.P., Damiani, T., Conoley, C.W.. (2017) *A Consensual Qualitative Study of Goal Focused Positive Psychotherapy.* Manuscript submitted for publication.

Conoley, C. W., Pontrelli, M. E., Oromendia, M. F., **Bello, C., Del, B**., & Nagata, C. M. (2015). Positive empathy: A therapeutic skill inspired by positive psychology. *Journal of clinical psychology, 71*(6), 575-583.

Conoley, C. W., Vasquez, E., **Bello, B. D. C**., Oromendia, M. F., & Jeske, D. R. (2015). Celebrating the Accomplishments of Others Mutual Benefits of Capitalization. *The Counseling Psychologist, 43*(5), 734-751.

TECHNICAL REPORTS

Cosden, M., Koch, L., & **Bello, B.** (2016). *Evaluation of Fresh Start: A residential treatment program for pregnant and perinatal women and their children.* Final Evaluation Report to Substance Abuse and Mental Health Services Administration (SAMHSA). Santa Barbara, CA.

BOOK CHAPTERS

Conoley, C. W., **Bello, B.,** Oromendia, M., Vasquez, E., & Conoley, J. C. (2015). The Promise of Well-Being for the Net Generation. In *Motivation, Leadership and Curriculum design* (pp. 75-92). Springer Singapore.

NEWSLETTER PUBLICATIONS

Bello, B. & Conoley, C. W. (2015). Positive characteristics promoting academic success among minority students in higher education. *Society of Counseling Psychology*

Section on Positive Psychology of the American Psychology Association Newsletter, 12(1).

Bello, B., Oromendia, M., Vasquez, E., Conoley, C. W., & Conoley, J. C. (2013). Well-being and Electronic Games: Perfect Context for Positive Psychologists. *Society of Counseling Psychology Section on Positive Psychology of the American Psychology Association Newsletter, 10(1).*

PROFFESSIONAL PRESENTATIONS

Beasley, C., **Bello, B.,** Emery L., Ock, S., Vance, T., & Valcin, V. (November 2017). Integrative Behavioral Health Services with LGBTQ+ Patients. Presented at Psychiatric Grand Rounds at Boston Medical Center, Boston, MA.

Bello, B. & Conoley, C.W. (September 2016). Fortalezas de la familia: A center promoting equal access for school involvement among Latino/a Parents. Poster presented at the Biannual National Latino/a Psychology Association Conference, Orlando, FL.

Bello, B. & Conoley, C.W. (August 2015). Family Strengths Center and Academic Success: Positive Psychology Informed Intervention. Symposium presentation at the Annual American Psychological Association Conference, Toronto, Canada.

Bello, B. & Conoley, C.W. (August 2014). Positive characteristics promoting academic success among minority students in higher education. Poster presented for Division 17 at the Annual American Psychological Association Conference, Washington D.C.

TRAININGS PROVIDED

Koch, L., **Bello, B.**, Liles, L., & Vasquez, E. (October 2015). *Addiction Severity Index: administration & scoring.* Presentation provided to treatment providers working on Santa Barbara County grants, Santa Maria, CA.

Koch, L., **Bello, B.**, Liles, L., & Vasquez, E. (November 2015). *Addiction Severity Index: administration & scoring.* Presentation provided to treatment providers working on Santa Barbara County grants, Santa Barbara, CA.

FELLOWSHIPS AND AWARDS

Family Strengths Center Fellowship	2017
Atkinson Diversity Enhancement Award	2017
Hosford Memorial Awards	2017
Block Grant, UCSB	2013-2017
Travel Award (to present at APA, Toronto)	2015
Bailis Family Foundation Grant	2014
Ray E. Hosford Award for Excellence in Clinical Dedication	2014
Hosford Hero Award	2013
Graduate Opportunity Fellowship, UCSB	2012-2013

PROFESSIONAL AND HONORS MEMBERSHIPS

American Psychological Association
- Member of Division 17
- Member of Division 35-Section for Hispanic Women
- Member of Division 45

American Psychological Association of Graduate Students (APAGS)

National Latino/a Psychological Association (NLPA)
California Psychological Association of Graduate Students
Santa Barbara County Psychological Association
Psi Chi, National Honor Society in Psychology
Phi Beta Kappa Honor Society

ABSTRACT

Exploring Latina and Hispanic Female Students' Sense of Belonging in STEM Majors Following a Belonging Intervention

by

Beatriz Del Carmen Bello

Significant imbalances in the representation of ethnic/racial and gender minorities in STEM fields continue to contribute to current and future socioeconomic inequities that threaten the U.S.'s future. The National Academy of Sciences (2006, 2007) suggests that without equal participation of women and diverse ethnic/racial individuals within STEM, the increasing demand for workers in these fields will threaten the U.S.'s position as a global innovator and leader. Specifically, those who identify as Hispanic[1] are among the most underrepresented in STEM fields, even while Hispanics represent the largest growing minority group in the U.S. (U.S. Department of Education [U.S. DOE], 2014). Research exploring the low representation of Latinx[2] and female students in STEM majors at the

[1] Hispanic. Refers to a person living in the United States who is of Latin American and Caribbean culture, origin, or ancestry, regardless of legal status or generational standing (Chapa, 2000). The term Hispanic will be used interchangeably with the term Latinx to maintain the integrity of authors cited, especially as many governmental documents use Hispanic to refer to the Latinx population.

[2] Latinx. In this document the term Latinx is used to denote gender inclusive language. The terms Latina/o are used when referring to the specific gender demarcations of female or male.

postsecondary education level, reveal experiences of an unwelcoming "chilly climate" among the factors explaining the low rates of degree attainment among these groups (Bonous-Hammarth, 2000; Flam, 1991). Experiences of low social connectedness encountered by Latinx and female students in STEM environments can have disproportionately large effects on sense of belonging, academic success, and retention (Walton & Cohen, 2007).

While the literature provides a good understanding of the factors that underrepresented minority students face that lead to lower retention rates in STEM fields (i.e. belonging), it has disproportionately ignored the added threats experienced by individuals with intersecting minority identities, as in the case of Latina students (Riegle-Crumb & King, 2010). More recently, researchers began attending to developing ways to remediate the psychological and social (psychosocial) issues that threaten belonging and persistence, through short interventions using implicit theories. This line of research seeks to promote protective factors which have shown initially promising results (Walton, Logel, Peach, Spencer, & Zanna, 2014), yet this literature also lacks an in-depth examination of the experiences of Latina students who have undergone these interventions. Gaining a greater understanding of the threats and protective factors at play for Latina students in STEM is an important avenue of exploration in light of the increasing rates of U.S. college graduation among Latinas (National Center for Education Statistics [NCES], 2005).

The current study aimed to explore Latina participants' experiences of belonging within STEM, after an intervention targeting their sense of belonging. Due to the significant lack of research exploring Latina students in STEM, the current study employed qualitative methodology to gain an in-depth understanding of Latina participants' lived experiences.

Four incoming first year students in STEM majors who self-identified as Latina/Hispanic female were recruited and interviewed about their experiences of belonging within their major, after completing a belonging intervention. A multiple case study design using Thematic Analysis was employed to provide an in-depth within and between case analysis of Latina participants' experiences. The Latina students in this study described benefiting from positive messages regarding their abilities and capacity for growth needed to succeed in STEM. Participants described that receiving these messages through multiple avenues helped foster their own belief in their capacity for growth. Latina students' description of how they dealt with challenges faced during their first year demonstrated use of sustained and proactive effort (incremental mindset). Each participant described some degree of commitment to improving and overcoming challenges through extended effort and proactive engagement when faced with challenges. Implications for future research interventions using incremental mindset with Latina students in STEM are discussed.

Keywords: Latina, STEM majors, sense of belonging, incremental orientation/growth mindset, entity orientation/fixed mindset, implicit self-theories

TABLE OF CONTENTS

Chapter 1

Introduction

Careers in science, technology, engineering, and mathematic (STEM) have been closely linked to national prosperity and innovation. The U.S. Department of Commerce (2011) claimed that STEM careers are the future, as more and more careers require knowledge in these areas. The current employment landscape reflects this global change, with an exponential increase in the job market for careers within STEM. The U.S. Department of Commerce (2013) predicted that employment opportunities in STEM will triple the rate of other fields by 2020. Yet, even in the face of increasing occupational opportunities, there exists only a small pool of students in STEM to meet the U.S.' occupational needs. The high demand and low supply of STEM workers has called national attention to the goal of increasing the number of students seeking STEM careers (National Science Foundation [NSF], 2006; U.S. Department of Commerce, 2011).

STEM fields having traditionally been dominated by White males in the U.S. (Riegle-Crumb & King, 2010). There exists a substantial gap in terms of the number of women and people of ethnic/racial minority groups obtaining degrees in STEM fields (NSF, 2006). The lack of representation in STEM is even greater among those who identify as Hispanic (U.S. DOE, 2014). The National Science Foundation (2006) provided data showing that of the bachelor's degrees awarded in science and engineering to U.S. citizens and permanent residents, Latinx students earned only 7.3% of degrees, whereas White, non-Hispanic students were awarded 65.1% of degrees in these fields. These imbalances warrant significant efforts to amend disparities, particularly as Hispanics represent the largest

growing minority group, accounting for 16 % of the U.S. population in 2010 (U.S. DOE, 2014).

The National Academy of Sciences (2006, 2007) suggests that without equal participation of women and diverse ethnic/racial individuals within STEM, the U.S.'s position as a global innovator and leader face significant threat in the very near future. For this reason, it is not surprising that these inequities have rightfully garnered attention and mobilized efforts that seek to amend these disparities. Yet, academic achievement and occupational attainment continue to vary along ethnic/racial and gender lines (Riegle-Crumb & King, 2010). There continue to be significant rates of underrepresentation of women (Walton et al., 2015) and Latinx students (Crisp, Nora & Taggart, 2009) in STEM majors and in attainment of STEM degrees (Crisp et al., 2009). Further, the intersection of gender and ethnic/racial minority identities has been associated with greater likelihood of pursuing degrees outside of STEM fields among Latina and African American female students (Crisp et al., 2009). These findings highlight the importance of attending to the experiences of individuals with intersecting minority identities in order to improve their participation in STEM. The imbalances in representation contribute to current and future socioeconomic inequities, which impedes gender and ethnic minority individuals' access towards upward economic mobility, which in turn can negatively impact society as a whole.

The literature that explores the imbalances observed among ethnic/racial and gender minority students, separately, has noted the detrimental effects that social factors (i.e. discrimination and systemic barriers) can have on psychological processes. The social and psychological research highlighted the threats to sense of belonging in undermining motivation and academic success of ethnic/racial and gender minorities. Questioning one's

sense of belonging occurs with greater likelihood among individuals who are continually exposed to the underrepresentation of their ethnic/racial and gender group in colleges and workplaces (Grodsky & Pager, 2001; Steele, 1997). When an individual does not see their salient identities represented in an environment, they may experience doubts about their place in that environment (Grodsky & Pager, 2001; Steele, 1997). Additionally, continual exposure to members of one's ethnic/racial and gender group receiving lower grades and salaries within STEM also increases threats to belonging (Walton & Cohen, 2007). Underrepresentation of minorities in academic and professional settings perpetuates a cycle of underrepresentation by creating an atmosphere where minority individuals tend to suspect that they would not "fit in", increasing stress and dissatisfaction that lead to attrition (Lovelace & Rosen, 1996; Walton & Cohen, 2007).

Apart from the threats of underrepresentation, minority students who identify with a group that is negatively stereotyped face an additional barrier to their sense of belonging due to social stigma. In the U.S. students who identify as Latinx or African American, and women in STEM are considered to be part of a socially stigmatized group due to negative social stereotypes of inferior intellectual ability. In light of experiences of discrimination and knowledge of negative stereotypes, students facing negative stereotypes are more likely to feel that they do not belong in higher education or within STEM majors. Stigmatized students' hypothesis of not belonging can create an insidious form of mistrust of the intentions of others, which can erode their academic performance and retention. For instance, individuals who hypothesize that they do not belong due to identifying with a socially stigmatized group, also referred to as belonging uncertainty, may lead to mistrust the intentions of others' actions (Cohen, Steele & Ross, 1999; Crocker, Voelkl, Testa & Major,

1991). Belonging uncertainty can guide perceptions and interpretations during ambiguous situations in which not belonging becomes highlighted while inconsistent evidence is viewed with skepticism (Walton & Cohen, 2007). Belonging uncertainty can also lead stigmatized individuals to notice threatening cues that might have otherwise gone unnoticed by someone of a non-stigmatized group (Kleck & Strenta, 1980; Mendoza-Denton et al., 2002; Walton & Cohen, 2007). This phenomenon, in which subtle events can serve to confirm a lack of social connectedness, can have disproportionately large effects on sense of fit, academic success, and retention (Walton & Cohen, 2007). Even in cases where underrepresented students demonstrate high academic achievement, if they feel they do not belong, they often drop out of a discipline for a discipline in which they experience a better sense of belonging (Good, Rattan, & Dweck, 2012).

Recent literature has shown that brief interventions targeting individuals' sense of belonging can mediate the effects of social marginalization that impact student retention. Well-being and academic performance have been found to decrease when underrepresented and stigmatized students believe that difficulties faced in a domain are evidence that they do not belong (Walton & Cohen, 2011). In response to these findings, a study by Walton and Cohen (2011) provided African American and White students with an intervention that framed concerns of belonging as commonplace, temporary, and part of the college transition faced by all students. The authors posited that encouraging a non-threatening interpretation of adversity faced by stigmatized minority students would protect them from the negative effects of interpreting threats experienced as due to their stigmatized identities. They further expected that the intervention would be particularly helpful for African American students, who represent a stereotyped and socially marginalized group in education. Results from the

study confirmed the authors' hypotheses of a statistically significant increase in the grade point average (G.P.A.) of African American students after undergoing the belonging intervention. The authors posited that the belonging intervention preventing the students from interpreting the adversities they faced on campus as indicative of their non-belonging. Additionally, at follow up three years later, the participants had limited recollection of the brief intervention, which led authors to conclude that the efficacy of the intervention did not rely on conscious awareness (Walton & Cohen, 2011). The authors concluded that social belonging can influence academic outcomes, while also noting that additional research among students of different stigmatized identities were still needed.

In addition to attributions stigmatized students can make in ambiguous circumstances, Good, Rattan, and Dweck (2012) highlight the importance of attending to minority individuals' implicit theories of themselves and the world. Fundamental assumptions of the self and social world have been found to alter cognitive processing of one's traits or abilities, influencing self-regulatory responses to setbacks and threat (Molden & Dweck, 2006). Implicit self-theories have been found to create meaning systems that impact self-regulation and behavior by shaping the way that information is processed (Molden & Dweck, 2006). In times of difficulty one's implicit theory can lead to distinctly different ways of coping and use of resilience-based behaviors (Blackwell, Trzesniewski, & Dweck, 2007; Mueller & Dweck, 1998; Yeager & Dweck, 2012).

Gaps in the Literature

Additional research that explores and addresses threats to degree attainment among students of intersecting minority identities is still needed. Specifically, the dearth in literature examining the experiences of Latina students in STEM requires additional attention (Riegle-

Crumb & King, 2010). As noted above, the Latinx population in the U.S. is quickly growing and expected to continue to grow. It is imperative for social justice efforts seeking to amend inequalities to attend not only to the systemic barriers impeding degree attainment, but also to explore factors that promote resilience and persistence in the face of adversity. Recent literature has shown that brief interventions targeting individuals' sense of belonging, information processing and coping can reduce the effects of social marginalization that harms student retention. Although interventions have shown promising results, a gap still exists in understanding sense of belonging among students that have undergone these psychosocial interventions. Latina students have been shown to outnumber their male counterparts in enrollment and graduation at the postsecondary level (Saenz & Ponjuan, 2009) thus making them a target group that can significantly change the distribution of degrees allocated in STEM. Exploring ways in which to promote Latina students' retention in STEM is of growing importance. Specifically, an in-depth understanding of Latina students' sense of belonging, who represent intersecting ethnic/racial and gender stigmatized identities in STEM, is needed. The long-term goal is that deeper understanding can be used to increase the Latina population in STEM occupations through academic success and persistence.

Current Study

The current study's purpose was to explore Latina participants' lived experience of belonging in their STEM major after undergoing a brief psychosocial belonging intervention. This study will address the main qualitative research questions of (a) what are the experience of Latina participants' sense of belonging in STEM majors after having undergone a belonging intervention, (b) how do these Latina participants cope with challenges of

belonging in their STEM major, and (c) what are their suggestions for tailoring future interventions using incremental mindsets for other Latina students in STEM?

Chapter 2

Literature Review

The following section provides a review of the literature on ethnic/racial minorities and female students' experiences in STEM with a focus on the social and psychological factors that impact their sense of belonging, followed by a review of literature on psychosocial interventions targeting belonging. The following literature review sections are (a) sense of belonging as an alternative to Tinto's college attrition model, (b) sense of belonging (c) a "chilly climate" and belonging, (d) sense of belonging's influence, (e) stigmatization and underrepresented students, (f) intersection of ethnic/racial and gender minorities in STEM, and (g) implicit theories of change and belonging interventions. The chapter ends by highlighting the purpose of the current study, which is described in further detail in chapter three of this document.

Sense of Belonging as an Alternative to Tinto's College Attrition Model

Literature on college attrition has focused on the importance of the first year of college, particularly the first academic semester or quarter. The first year of college has been identified as a critical time of transition into the college environment (Tinto, 1993). Tinto's (1975, 1993) integration theory is a commonly cited general student attrition model explaining freshman attrition levels in undergraduate education. This theory suggests that students enter higher education institutions with a range of different attributes, such as family and community backgrounds, educational experiences and achievements, skills and value orientations, which create students' educational expectations and commitments brought with them into the university (Tinto, 1975, 1993; Mannan, 2007). The theory posits that students' integration into social and academic systems within the educational setting determines

persistence or dropout (Tinto, 1975, 1993). Academic integration is defined as the successful integration of the student into the academic environment. Successful integration is determined by the degree to which students' prior experiences prepare them to meet the academic or intellectual expectations, and the social demands (i.e. interactions with faculty and fellow students) of their academic environment (Tinto 1987, 1993). Therefore, the mismatch between student and institution, as well as the student's lack of integration within the institution, create a low commitment to the institution that leads to attrition (Mannan, 2007).

Rendón, Jalomo & Nora (2000) challenged the applicability of Tinto's integration theory for a student who identifies with a nondominant social identity (i.e., non-White, non-male, non-heterosexual, non-Christian). Rendón et al. (2000) took issue with Tinto's (1993) model because it placed the onus of successful college integration solely on the student. Using Tinto's logic, if a student withdraws from college it is due to their failure to integrate successfully, rather than institutional shortcomings. These authors pointed to the potential harm that Tinto's conceptualization of attrition can have for underrepresented students. Tierney (1992) also argued that Tinto's model's highlighted that integration theory which demands racial minorities acculturate to institutions of higher education, institutions that have grown out of systems of oppression. The acculturation to higher education institutions require minority students acculturate by abandoning their home culture or maintain their cultural affiliations and risk academic and social disintegration. The argument rejects the conceptualization of integration in fostering college success because integration inappropriately assumes the culture of higher education institutions to be universal and identical among students of all backgrounds. Empirical challenges to examining student

persistence outcomes focused on the varied experiences of students of different cultural backgrounds. They also highlighted the need for an alternative construct that could better elucidate the interplay of responsibility for persistence between the student and the institution (Johnson et al., 2007).

In response to the criticism of Tinto's theory**,** Hurtado and Carter (1997) offered a conceptual alternative with their sense of belonging framework as a way to better explain attrition among stigmatized students of color, particularly considering experiences of Latinx student populations. In addition, Hurtado & Carter (1997) contended that integration as conceptualized by Tinto (1993) does not value culturally supportive alternatives to college participation that Latinx students employ and instead emphasizes dominant mainstream activities that may not foster Latinx student success. In its place, they offered the concept of sense of belonging, which "captures the individual's view of whether he or she feels included in the college community" (Hurtado & Carter, 1997, p. 327). Sense of belonging added the perspective that students' success is in part predicated upon the extent to which they feel welcomed by institutional environments and climates, which was not the case for many Latinx students (Hurtado & Carter, 1997). Rather than expecting students to bear sole responsibility for success through their integration into existing institutional structures, sense of belonging illustrates the interplay between the individual and the institution.

Sense of Belonging

Sense of belonging has a vital position in the academic success literature. A positive sense of belonging describes the experience of feeling like a valued member whose contributions are important (Osterman, 2000). As a theoretical construct, sense of belonging has been inconsistently defined (Hoffman, Richmond, Morrow, & Salomone, 2002; Hurtado

& Carter, 1997; Hurtado & Ponjuan, 2005; Johnson et al., 2007) making it difficult to synthesize how sense of belonging is conceptualized in the literature. Sense of belonging has been defined as the extent to which students feel connected to and accepted by their peers within an educational context. It has also been associated with creating positive relationships with faculty (Astin, 1993; Johnson, et al., 2007; Pascarella & Trenezini, 2005). As a research construct, sense of belonging has been described as a complex construct that relies heavily on students' perceptions of the educational environment, especially their relationships with other students (Juvonen, 2006; Murphy & Zirkel, 2015; Read, Archer & Leathwood, 2003). Most broadly, sense of belonging is a socially constructed experience, informed by a student's experiences of a particular educational context (Murphy & Zirkel, 2015).

The research literature on sense of belonging in college has focused generally on a number of specific factors. Some studies have focused on retention of Latinx student populations as related to peer and faculty support, and school involvement (Gloria, Castellanos, Lopez, & Rosales, 2005; Hernandez, 2000; Hernandez & Lopez, 2004). Hurtado and Carter's (1997) study used a composite measure of sense of belonging; assessing the extent to which students a) perceived themselves as part of the campus community, b) felt they were members of the campus community, and c) felt they belonged to the campus community. Hurtado and Ponjuan (2005) conceptualized sense of belonging in a similar manner but included the degree to which students were enthusiastic about their institution and whether they would recommend their university to others. Conceptualizations have also included extracurricular involvement and on-campus living (Johnson et al., 2007). Hoffman et al. (2002) developed several measures of sense of belonging which included students'

perceptions of academic and social support from peers, academic and social interactions with faculty, isolation from peers, and comfort in classroom environments.

Various factors used to conceptualize sense of belonging have demonstrated significant influence. For example, fostering relationships with faculty members outside of the classroom has increased levels of college satisfaction and persistence towards graduation (Hernandez & Lopez, 2004). The availability of role models to Latinx students, with a focus on the ethnic/racial make-up of faculty in STEM fields, has also been connected to greater sense of belonging. Having Latinx professor representation can facilitate successful trajectories for Latinx students in STEM fields (Cole & Espinoza, 2008). Grandy (1998) found that supportive educational environments were related to persistence in college for stigmatized minority students, including support from advanced students. Additionally, Hurtado and Ponjuan (2005) reported that Latinx students who lived on campus had a greater sense of belonging than students who lived off campus.

Although there is no consensus on the number of factors that make up the sense of belonging construct, there is significant overlap in the factors that have been explored among research focused on students' experiences in higher education institutions. For the purpose of this study, a modification of the factors described in Hoffman et al., (2002) were utilized in exploring sense of belonging among Latinx students in STEM. These factors include (a) interactions with peers and faculty (i.e. peer/faculty perceptions of them), (b) involvement on campus, (c) experience of academic and social support, and (e) experience of STEM classroom environment (i.e. ethnic/racial and gender climate).

A "Chilly Climate" and Belonging

There is a large discrepancy between the number of Latinx students who enroll in a STEM major and the number of students who earn a STEM degree (Walton et al., 2015). Statistics show greater enrollment of Latinx students in STEM majors compared to Caucasian students during the first year of college (U.S. DOE, 2003). Yet, the attrition rates for Latinx students from STEM majors are greater than that of their Caucasian counterparts, and Latinx students continue to be underrepresented in STEM majors. The same underrepresentation is true for women in STEM, while women of all ethnic/racial backgrounds are more likely to obtain a college degree (U.S. DOE, 2003). In particular, Latina students have a greater rate of college completion compared to Latino students (NCES, 2005). Even in light of growing numbers of females completing higher education, women are less likely to major in STEM (NCES, 2005)

The literature among ethnic/racial and gender minority students in STEM has noted the detrimental effects of social and psychological factors that threaten students' sense of belonging which undermines motivation and academic success of ethnic/racial and gender minorities. A bi-directional relationship among underrepresented students in STEM has been used to explain why certain groups poorly represented in STEM, even with higher enrollment into STEM at the freshman level. One direction of influence occurs from an unwelcoming social environment in STEM that these students' experience as psychologically threatening. These students perceive explicit and implicit messages that they do not belong. From another direction, underrepresented ethnic/racial and gender groups question their belonging in STEM because of their rarity in the population (Grodsky & Pager, 2001; Steele, 1997). Experiences of threat can lead to perceiving messages of not belonging, even when an

alternative explanation is plausible. Minority students' perceptions of not belonging have been found to harm their academic performance and persistence (Rankin & Reason, 2005). Thus, the underrepresentation of minorities in academic and professional settings creates an atmosphere where minority individuals tend to suspect that they would not "fit in," increasing stress and dissatisfaction that lead to attrition (Lovelace & Rosen, 1996; Walton & Cohen, 2007).

Social environments, such as institutions of higher education, often expose people to the risk of negative evaluation and rejection, which poses a threat to the self (Cook, Purdie-Vaughns, Garcia & Cohen, 2012). Once an environment feels unsafe, people tend to be vigilant and chronically alert to cues that could signal threat (Chen, Cohen, & Miller, 2010; Kaiser, Vick, & Major, 2006; Murphy, Steele, & Gross; 2007; Purdie-Vaughns, Steele, Davies, Ditlmann, & Crosby, 2008). This has been noted to be the case for Latinx students in higher education generally, and among women in STEM. The low representation among Latinx students and women in STEM adds to the threats mentioned above. Furthermore, student experiences of their institutions' campus climate have been used to gauge how students view the college environment, how they behave within this environment, and how their college experiences relate to their academic success (Cole & Espinoza, 2008).

The literature on Latinx students identifies a "chilly academic climate" or experiences of exclusion as a strong predictor of leaving a STEM major (Bonous-Hammarth, 2000). This experience is exacerbated and perpetuated by the continued underrepresentation of Latinx students in higher education compared to the rate of Latinx population growth (Census Bureau, 2003). The perception of the social environment or climate is also influenced by the observation of Latinx individuals earning lower grades and salaries (Grodsky & Pager, 2001;

Steele, 1997) and facing various forms of discrimination (Dovidio & Gaertner, 2000; Greenwald & Banaji, 1995; Harber, 1998; Walton & Cohen, 2007). Rankin and Reason (2005) reported that White students are more likely than ethnic/racial minority students to rate their university's racial climate as favorable, friendly, respectful and nonracist. Meanwhile, larger numbers of ethnic/racial minority students rated the campus climate as hostile, disrespectful, and racist, along with reporting experiences of being stereotyped and experiencing racial prejudice from university staff, faculty, and other students particularly in predominately White institutions (Ancis, Sedlacek, & Mohr, 2000; Cole & Espinoza, 2008). Latinx students experiencing a hostile campus climate have greater difficulty forming a sense of attachment to college and have greater difficulty adjusting academically and socially (Cole & Espinoza, 2008; Hurtado, Carter, & Spuler, 1996). Research among ethnic/racial students in higher education demonstrates that certain ethnic/racial minority students experience an unwelcoming academic environment in institutions of higher education generally, and within STEM specifically.

Research on women in STEM has also documented the experience of a "chilly climate" as females enter male-dominated fields, which make them feel unwelcome (Flam, 1991). This experience has been linked to both implicit and explicit messages that females are not welcome in STEM majors. For instance, research has shown that women typically experience social exclusion, disrespectful behavior, or biased decision making in STEM majors (Moss-Racusin, Dovidio, Brescoll, Graham, & Handelsman, 2012; Walton et al., 2015). Women's awareness of sexism and negative attitudes towards women in STEM has been shown to significantly decrease women's self-efficacy in STEM majors, particularly in

those with higher rates of underrepresentation such as engineering majors (Cadaret, Hartung, Subich, Weigold, 2017).

Sense of Belonging's Influence

Latinx and female students' experiences of threat to belonging in STEM create barriers to their completing their STEM degrees. Feeling that one belongs has been shown to relate to students' social adjustment to college element involved in the persistence, success and learning outcomes of all college students, but has been found to be particularly salient among marginalized groups (Strayhorn, 2012). Sense of belonging is thought to contribute to students' feelings of self-worth and feelings of kinship with their academic community (Osterman, 2000). Having a positive relationship with others and feeling accepted as a member of one's academic community is considered to be a fundamental psychological need (Deci, 1992; Good, Rattan, &Dweck, 2012; Walton & Cohen, 2011).

Having a positive sense of belonging can promote a variety of positive and prosocial educational outcomes such as engagement, achievement, well-being, happiness, and overall optimal functioning (Strayhorn, 2012). The negative effects resulting from feeling like one does not belong has been documented extensively in the literature. Studies have found that feelings of social isolation, loneliness, and low social status can be detrimental to well-being (Lyubomisrsky, Sheldon, & Schkade, 2005), intellectual achievement (Walton & Cohen, 2007) and physical health (Berkman & Syme, 1979; Cohen & Janicki-Deverts, 2009; Miller, Rohleder, & Cole, 2009; Uchino, 2006; Walton & Cohen, 2011). Additionally, situations that question one's sense of belonging have been found to impair intellectual performance, while contexts that foster belonging can nurture it (Baumeister, Twenge, & Nuss, 2002; Good, Aronson, & Inzlicht, 2002; Walton & Cohen, 2007; Walton, Cohen, Cwir, & Spencer, 2012).

Stigmatization and Underrepresented Students

As the previous section delineated, the underrepresentation of Latinx students in higher education and females in STEM majors is influenced both by the awareness of their limited representation and the negative social climate they encounter in these domains. These factors interact with one another and are explained largely by negative social stereotypes that target such student subpopulations. Students who identify with a group that is negatively stereotyped are said to face social stigma, which can create an additional barrier to their sense of belonging. In the United States, Latinx and African American students are stereotyped as having inferior intellectual ability compared to students of other ethnic/racial groups, and women are stereotyped to be intellectually inferior to males in the areas of math and science (Steele, 1997; Spitzer & Aronson, 2015).

The burden of threat from stereotypes has been referred to as stereotype threat. Stereotype threat has been defined as the fear of confirming a negative belief about a group with which one identifies (Steele, 1997). In this case, stereotype threat encapsulates underrepresented students' uncomfortable suspicion that their social identity characterizes them as unsuited for academic success, whether true or not (Aronson, & McGlone, 2009; Steele & Aronson, 1995). Historically, stereotype threat has been characterized as a situational factor contributing to underperformance on particular tests (Steele, Spencer, & Aronson, 2002). Contemporary scholarship has expanded this definition to encompass the heightened identity threat experienced by stigmatized students which can be intense, pervasive, and many times chronic (Cook et al., 2012). For stigmatized students, the pervasive social threats to their identity can undermine not only academic performance (Steele & Aronson, 1995; Walton & Spencer, 2009), but also create interpersonal anxiety

(Goff, Steele, & Davies, 2008) as well as social disconnection and alienation (Cook et al.,2012; Walton & Cohen, 2007).

The chronic experience of concern about stereotypes may overtime lead stigmatized students to contend with belongingness uncertainty, which is the hypothesis that "people like me do not belong here" or in any setting where academic ability is prized (Cohen & Garcia, 2008; Walton & Cohen, 2007). This heightened vigilance can become self-reinforcing and can significantly weaken students' sense of belonging and self-efficacy (Aronson & Inzlicht, 2004). Sense of belonging then may become contingent on social and situational cues (Cook et al., 2012). Research on stigmatized groups, such as Latinx students and women in STEM, has noted that uncertainty about belonging is more pronounced among these students, with particular distrust of the quality of their social bonds (Walton & Cohen, 2007). The experience of belongingness uncertainty created by an unwelcoming social environment has psychological consequences on stigmatized students that increase their threat of belonging and decrease their persistence. Together, stereotype threat and belongingness uncertainty create a vastly different experience for students through negatively affecting their performance, despite having similar capacity to succeed academically compared to non-stigmatized groups (Spitzer & Aronson, 2015).

Literature reveals the additional harm of social threats particularly as it pertains to ambiguous situations. In the face of chronic social threats, marginalized students may automatically question their inclusion into social relationships in mainstream institutions and their questioning can lead to evaluating ambiguous situations as threatening (Walton & Cohen, 2011). The tendency to interpret ambiguous situations as threatening occurs because of the overt messages of discrimination that are also occurring. Both the ambiguous and overt

messages intensify the sense that they should not inhabit these educational arenas. Attributional bias is the psychological construct that has been linked to minority students' negative sense of belonging in ambiguous situations (Yeager et al., 2014). Attributional ambiguity is characterized as a mistrust of the motives behind other's treatment leading to attributing ambiguous interactions as negative or attributed to their stigmatized identities (Cohen, Steele, & Ross, 1999; Crocker, Voelkl, Testa, & Major, 1991). Thus, apart from real experiences of discrimination and bias, ambiguous interactions can be perceived as threatening and create added psychological barriers that hinder minority students' sense of belonging, motivation, health and academic performance (Cohen & Garcia, 2008).

Intersection of Ethnic/racial and Gender Minorities in STEM

One venue that remains relatively unexplored is the intersection of ethnicity/race and gender in regard to degree attainment within STEM fields (Hanson, 2006; Riegle-Crumb & King, 2010). Research examining gender inequalities in STEM has largely described the female experience as the same across all women in STEM, while providing research findings from research conducted largely with White female student samples. Research exploring gender experiences in STEM usually do so using a broad lens that assumes the homogeneity of females in STEM regardless of race/ethnicity, and present one set of patterns, obstacles, and experiences that are applied generally to all females in describing the experiences women face in STEM (Muller, Stage, & Kinzie, 2001). Until recently it may have been that the significantly low numbers of women of minority ethnic/racial identities led to the lack of examination of their experiences in STEM, particularly among studies using quantitative research methods. Quantitative research methods pose significant limitation because they provide a limited understanding and simplified reflection of diverse experiences of women in

STEM. The experiences and difficulties faced by women in male dominated fields of STEM cannot be assumed to be a homogeneous experience shared by all women.

The importance of better understanding women of color's experiences in STEM first gained research attention in 1975, when the American Association for the Advancement of Science and the National Science Foundation held a meeting in which 30 women of color in the sciences met to call attention to the unique experiences and obstacles faced by women of color in STEM (Malcom, Hall, & Brown, 1976). The unique experience of women of color then became characterized as the "double bind," to describe the experience of having an identity targeted both by racism and sexism in academic and career fields dominated by White people and men (Malcom et al., 1976). Following the publication of this important report, researchers have given more attention to the intersection of stigmatized identities, which brought the intersectionality concept to the forefront. Intersectionality theory acknowledges that racism intersects with other oppressed identities in the lived experience of people of color (Wei, 1996; Ong, Smith, & Ko, 2018). Wei (1996) states that intersectionality theory highlights that women of color, with intersecting oppressed identities of ethnicity/race and gender in society, have an experience that is "greater than the sum of racism and sexism" (Wei, 1996, p.771).

Following the publishing of the report, the literature on the intersectionality of gender and ethnic/racial minorities has grown, but at a relatively slow pace. More contemporary research is needed to develop an understanding of Latinas' experiences in STEM fields as enrollment into college institutions continues to grow (Harvey & Anderson, 2005), while degree attainment in STEM fields remains unchanged (Harvey & Anderson, 2005; NSF, 2004). A recent national study examining the intersection of gender and ethnicity/race was

conducted by Riegle-Crumb & King (2010). In their analysis of data from the Educational Longitudinal Study of 2002 designed by the National Center for Education Statistics (2005), they noted that Latina students remained far less likely to declare a physical science or engineering major, regardless of attitudes or preparation (Reigle-Crumb & King, 2010). These results demonstrated the importance of exploring factors other than level of preparation and interest in STEM that contribute to the significant underrepresentation of Latina students in STEM majors.

Cole and Espinoza (2008) also noted a disproportionately low rate of Latina students' degree attainment and persistence in STEM fields compared to that of their Latino counterparts. These results are extremely troubling, particularly in light of the higher rates of Latinas enrolling and completing college degrees compared to their male counterparts (NCES, 2005). Latina students have also been shown to obtain higher grades compared to Latinos within institutions of higher education. Latinas are less likely to enter science and engineering majors in particular, but the Latinas who do enter these fields are usually academically well prepared but still high attrition among Latinas persists (Huang, Taddase, & Walter, 2000). The research results suggest that psychosocial and cultural dimensions rather than academic ability and preparation better explain the majority of difficulties in access, retention, and graduation of Latinas in STEM (Cole & Espinoza, 2008; Huang et al., 2000). Of the few qualitative studies conducted with undergraduate women of color (Johnson, 2001; Ong, 2005; Sosnowski, 2002) problematic experiences of women of color have been linked to their sense of belonging in STEM. Negative interactions with male peers and faculty, feelings of isolation from peers, negative perceptions of racial climate, negative racial and

gender stereotypes, and loss of confidence have been highlighted as important factors reducing persistence (Johnson, 2001; Ong, 2005; Sosnowski, 2002).

Implicit Theories of Change and Belonging Interventions

Apart from the literature on sense of belonging, and its influence upon stigmatized student populations, a focus in the intervention literature targets academic achievement among general student populations through applying the implicit theory of change (Dweck, 1986). The following section provides a summary of the literature on implicit theories of change that have garnered recent attention in their promise of promoting student persistence and academic achievement.

The construct of implicit theories of change, often times referred to as fixed versus growth mindsets, and alternately entity versus incremental theories, refer to the belief of one's personal attributes to be stable and rigid, or malleable and flexible (Chiu, Hong, & Dweck, 1997; Ryan & Mercer, 2012). Research manipulating individuals' implicit self-theory toward a growth or incremental mindset indicates enhanced positive outcomes in the realm of emotion regulation, cognitive reappraisal, goal-orientation, and coping strategies (Schroder, Dawood, Yalch, Donnellan & Moser, 2015). Implicit theories have been shown to be particularly influential in the areas implicated in academic performance; attributional style, self-schemas, and emotion regulation strategies (Joormann & Vanderlind, 2014; Kneeland, Dovidio, Joormann & Clark, 2016).

A large research base links individuals' implicit belief about personal attributes including character, willpower, and intelligence, among others, with academic outcomes (Chiu, Hong, & Dweck, 1997; Ryan & Mercer, 2012). Having an incremental orientation or growth mindset refers to the belief that with persistence and effort change can gradually

occur and one's characteristics can improve (Dweck, 1999). Incremental mindset has been associated with a higher likelihood of pursuing mastery-oriented goals focused on the acquisition of new skills and experiences (Burnette et al., 2013). In a meta-analysis by Burnette and colleagues (2013) incremental thinking was associated with active coping and lower negative emotions when evaluating goal accomplishments. Also, an incremental mindset improved self-regulation and led to more achievement of goals. In addition, Yeager, Trzesniewski & Dweck (2013) found that teaching incremental theory to adolescents led to lower levels of negative reactions to social adversity, as well as overall lower overall stress levels and physical illness eight months later.

In contrast, an entity theory or fixed mindset refers to an individual's belief that their personal characteristics are a set quality that cannot be altered (Dweck, 1999). Those with entity mindsets are more likely to employ performance-oriented and avoidant goals in order to evade threats to identity connected with negative evaluation. For example, college students with entity mindsets facing difficulty in adjusting to the academic demands of college courses, may decide that they are "not college material" and subsequently not prepare for exams and avoid seeking additional help from professors. Entity theory beliefs elicit behaviors that further decrease students' chances for academic success and serve as a self-fulfilling prophecy (Dweck. 1999). Belief in fixed characteristics has been found to magnify anxiety of evaluation and increase negative responses to stereotype threat (Dweck, 2007; Spitzer & Aronson, 2015).

Having an entity mindset has also been associated with more negative reactions to social adversities such as exclusion (Yeager & Dweck, 2012) and has been found to contribute to feelings of self-culpability when perceiving social slights (Yeager & Walton,

2011), believing that one deserves exclusion (Erdley, Cain, Loomis, Dumas-Hines, & Dweck, 1997). For this reason, interventions focused on changing students' entity theories to incremental theories have been explored to help buffer against detrimental narratives and help students redefine threats as challenges that through persistent work they can work to overcome.

Research by Rheinschmidt and Mendoza-Denton (2014) has demonstrated the importance of attending to stigmatizing social and interpersonal markers in combination with students' beliefs about peoples' capacity for growth. They argue that beliefs about the capacity for growth and change have been shown to be strong predictors of resilience and success in college, particularly among those facing academic challenges (Dweck, Chiu, & Hong, 1995; Grant & Dweck, 2003; Martinez & Mendoza-Denton, 2011). In their 2014 study, Rheinschmidt and Mendoza-Denton examined the effect of rejection sensitivity among stigmatized groups facing social class discrimination, while considering students' ideas about the malleability of their personal characteristics (i.e. math ability). Study results indicated that students fared worse academically and socially if they demonstrated high sensitivity to threat based on their stigmatized identity and held a static or fixed view of their personal characteristics (i.e. entity theory). Additionally, their results indicated a positive relationship between sensitivity to threat and fixed views of one's personal characteristics. Such that, students with more sensitivity to social threat (i.e. stereotypes of lower intellectual ability of females in STEM), and a fixed view of their abilities did worse in both social and academic domains.

Due to the pervasive evaluative character of the college experience, research has underscored that negatively stereotyped groups may benefit from psychosocial strategies

focused on reducing the threat of negative evaluative experiences (Cook et al., 2012). Additionally, attributing adversity to common and transient parts of the college-adjustment process can help prevent attributing adversity to fixed personal deficits or deficits unique to their ethnic/racial or gender group (Walton & Cohen, 2011). Results from Rheinschmidt and Mendoza-Denton (2014) support the notion that psychological interventions that promote a malleable rather than a static view of growth among students with stigmatized identities, can promote positive social and academic outcomes.

Contemporary interventions. Addressing social concerns related to belonging and identity threat can make a significant difference in learning and performance (Wilson, 2011; Yeager & Walton, 2011). Contemporary interventions that deal with threat to one's social identity (Steele, Spencer, & Aronson, 2002) or one's sense of belonging (Good, Rattan, & Dweck, 2012; Walton & Cohen, 2007) have indicated significant improvements in motivation and achievement. Simple interventions, including growth mindset (i.e. ability to grow for the better) and belonging interventions, have been found to successfully ameliorate threats to identity and raise students' achievement (Spitzer & Aronson, 2015). Even though these psychological interventions have been found to be powerful tools, they address psychological barriers in surprisingly simple ways. The simplicity and power of these interventions has created excitement among researchers in the fields of psychology and education. Yet, these interventions have also met their share of disbelief due to their claim of being cost-effective and simple one-time interventions with the ability to produce profound impacts. For that reason, studies providing greater understanding are needed to further examine the issues (Spitzer & Aronson, 2015).

Growth mindset interventions. Interventions focused on changing entity thinking to incremental thinking, also referred to as growth mindset interventions, focus on reducing performance anxiety and maladaptive responses to failure by employing a "normality of struggle" message that emphasizes the importance of effort (Spitzer & Aronson, 2015). In growth mindset interventions, students are taught about the malleability of characteristics, such as personality or intelligence. In a recent study by Yeager et al. (2014) students taught an incremental theory of personality, highlighting the belief that people can change. The results indicated that students had fewer negative reactions to social adversity, lower stress, and better academic performance over the year. Research results support the importance that students' mindsets play in their motivation and resilience. Having incremental mindsets can help students understand that their abilities can grow, and their circumstances improve with effort, which allows them to persist through setbacks (Spitzer & Aronson, 2015).

Literature on implicit theories in education has focused extensively on the domain of stereotypes of intelligence and ability. Research suggests that fixed mindsets of ability (entity theory) in STEM related fields undermines achievement in the face of difficulty (Blackwell, Trzesniewski & Dweck, 2007). In contrast those who hold a mindset that ability is malleable (incremental mindset) are less focused on proving their ability and more focused on learning and improving their abilities (Blackwell et al., 2007; Dweck & Legget, 1988; Mangels et al., 2006; Robins & Pals, 2002). Studies on implicit theories show that having an incremental mindset can lead to academic persistence and achievement in the face of ability-threatening academic challenges (Good et al., 2012).

The literature lacks studies that have developed interventions utilizing growth mindset in combination with belonging interventions, as a means to improve belongingness,

which could significantly increase not only academic performance, but social-connectedness. Apart from focusing on academic ability, stigmatized students such as gender and racial minorities may benefit from belonging interventions that employ an incremental mindset component to buffer against identity threats that lead many students to drop out of higher education in general and STEM fields specifically.

Belonging interventions. Social belonging interventions focus on changing how students think about negative interpersonal experiences and adversity. Belonging interventions have been found to protect students against negative events and enable them to work through their challenges (Spitzer & Aronson, 2015). Minority students who experience uncertainty about belonging in school can benefit more from social belonging interventions (Walton & Cohen, 2011), making this a valuable avenue to explore.

Walton & Cohen (2011) developed a one-hour belonging intervention focused on providing results from other student's experiences during the college transition. In this intervention incoming college students were presented with survey data from advanced-level students of all ethnicities, explaining that they faced concerns of belonging when they entered college. The intervention focuses on having freshmen learn that in time the worries of upperclassmen dissipated and eventually gained confidence, establishing friendships, and adapted to the academic domain (Walton & Cohen, 2011). After receiving this information, incoming students were asked to write a short essay about their own college experiences, incorporating personal examples similar to the ones they read from the upperclassmen. Finally, students were asked to make a video recording of their essay to be presented to future incoming students. Results of this study showed a reduction in the African American/White performance gap in students' 3-year G.P.A by 52% (Walton & Cohen,

2011; Spitzer & Aronson, 2015). The results support not only the impact of sense of belonging on academic outcomes, but they also provide an example of the utility of interventions that seek to increase sense of belonging and diminish the negative effects of stigma related threats in educational domains.

Growth mindset and belonging interventions may both be especially important during students' transition into college (Spitzer & Aronson, 2015). Research indicates that an individual's implicit theory of personal characteristics as fixed or malleable, is significantly predictive of self-regulation and behavior only when there is a threat or perception of difficulty (Blackwell et al., 2007). Benefits or negative outcomes associated with implicit theories are most pronounced during times of stress and transition (Blackwell et al., 2007; Yeager et al., 2014). The transition into the first year of college has been regarded as a significantly stressful transition for students, which makes it an opportune time for psychological interventions. Likewise, belongingness is especially important when students begin their college careers (Spitzer & Aronson, 2015). The transition into college has been associated with academic difficulties, loneliness and feeling out of place. Additionally, belonging interventions are more effective if delivered before any drop in performance or psychological toll can take place (Cook et al., 2012). Belonging interventions during the critical period of transitioning into college can strengthen students' motivation, persistence, and academic achievement (Spitzer & Aronson, 2015).

Purpose of Current Study

Psychological reactions to threatening settings can change the trajectory of peoples' experience over time (Walton et al., 2015). Specifically, the research on growth mindset and belonging interventions as reviewed in the previous sections, shows the benefits to students'

academic trajectory when protecting students from the negative psychological consequences of threats. However, there is a significant gap in the literature examining the lived experiences of stigmatized students exposed to growth mindset interventions. Specifically, literature considering the impact of intersecting gender and racial/ethnic minority identities, such as Latinas in STEM, is significantly limited.

Research has demonstrated that interventions centered on increasing sense of belonging can be effective when integrating incremental self-theories. The promising results are of particular interest when considering the substantial threats to belonging that may be faced by student populations with exposure to multiple stigmatized identities in education, such as that of Latina students in STEM. The added barriers that Latina students may face could negatively impact their path towards degree attainment and upward socioeconomic mobility. A greater understanding of the experiences of Latina students in STEM is lacking from the current literature base, particularly examining belonging after exposure to psychosocial interventions, using qualitative methodologies. The current study sought to remediate this gap by exploring the lived experiences of belonging among four Latina students in STEM, following a psychosocial intervention meant to improve their sense of belonging using incremental theories.

Chapter 3

Methods

The American Psychological Association (2003) has indicated that qualitative methodologies may be optimal approaches for inquiries among marginalized populations, through their focus on listening to participants' experiences, respecting their worldviews, and promoting empowerment. Qualitative approaches are also uniquely able to provide in-depth analysis of complex human and cultural experiences in a manner that quantitative approaches cannot (Plano Clark, Huddleston-Casas, Churchill, Green, & Garrett, 2008). In order to obtain a deeper understanding of Latina students' sense of belonging in STEM following a psychosocial belonging intervention a qualitative method seems most appropriate and culturally ethical (APA, 2003). The present study sought to explore this experience within a multiple case research design using Thematic Analysis as the analytic methodology.

Belonging Intervention

Participants of the present research study were recruited from a pool of students who underwent a belonging intervention that occurred at the beginning of their first year in STEM at the postsecondary education level. This one-time intervention was administered to students during a university course to promote freshman year success in STEM. The belonging intervention took place the second class of students' first semester within the university.

The psychosocial intervention targeted creating an incremental orientation towards improving sense of belonging among students of STEM majors, primarily targeting the sense of community to the university and their chosen academic discipline. The intervention consisted of having all incoming STEM students watch a short video, write a brief reaction letter, followed by an in a class discussion about their reactions, and finishing with having

participants write a letter of what they would suggest in teaching future first year students about what they learned (see Appendix A).

Sense of belonging within the academic domain was described in the intervention as the academic environment feeling like a good fit and feeling like a valued member of the academic community. The growth mindset was defined as "the belief that the sense of belonging you feel in a domain or social situation can be enhanced. A Growth Mindset means knowing that you can change through persistence. That change occurs incrementally through small, gradual steps." (see Appendix B).

Participants

Participants were recruited from a larger pool of students who participated in the belonging intervention detailed above. Students who had completed the intervention and self-identified as Latina or Hispanic female were eligible to participate in the current study.

Four self-identified Latina/Hispanic female participants consented to participate in the current study and were interviewed during the second semester of their freshman year; approximately 16-20[3] weeks after having undergone the belonging intervention. Although, all participants had been enrolled in a STEM major during the first semester of their freshman and received the belonging intervention, one of the four participants had switched from a biology to a psychology major by the time of the interview. Demographic information was obtained during the semi-structured interviews and is provided in the results section.

Data collection. A total of 81 students completed the belonging intervention. Recruitment emails were sent out to the 19 students who self-identified as Latina or as

[3] The exact number of weeks between participants undergoing the belonging intervention and being interviewed varied by recruitment phase. Two participants were recruited and participated in the interview at the 16 week mark, while two others were interviewed after amending the recruitment protocol.

Hispanic female and had completed the belonging intervention, asking if they were interested in participating in an interview regarding their experience of belonging to their STEM major. Students were informed that the interviews would last between 60 to 90 minutes in length and they would receive a twenty-dollar gift card as appreciation for their participation in the study.

In response to the first recruitment email, two participants contacted the primary researcher expressing interest in participating in the in-person interview and were consented. Three additional recruitment emails were sent out without receiving any email responses of Latina students willing to participate in the present study. Then alterations were made to the recruitment protocol and procedures. It was hypothesized that having to complete the interview in-person and insufficient compensation may have been barriers to participating. Therefore, in an effort to increase research participation the methods were modified to offer interviews through a remote video conversation and to increase compensation for participation from twenty dollars to forty dollars. Changes to the recruitment protocol were filed as an amendment through the IRB and were approved. After modifications to the recruitment protocol, a modified email (see Appendix C) was sent out and two additional participants enrolled. All interviews were audio recorded. Interviews were conducted and transcribed by the primary researcher.

Amazon gift cards were sent to all participants to thank them for their participation. The first two participants received an additional twenty-dollar gift card, so that all participants were compensated equally for their participation in this study.

Instruments

Informed consent. Informed consent was reviewed with all participants prior to beginning the interview process. The consent form (see Appendix D) delineated the purpose of the study, risks and benefits, limits to confidentiality, and informed participants that the interviews would be audio recorded for verbatim transcription by the primary researcher. Participants were informed that their interviews would be de-identified and that a pseudonym would be provided to protect their identity. It was also explained that their participation was completely voluntary, meaning they could chose to withdraw from the study at any time and without facing penalty. Participants were encouraged to provide as much information as they felt comfortable revealing and informed they could chose not to answer any question they felt uncomfortable answering.

Demographic questions and semi-structured interviews. Participants were asked demographic questions as part of the semi-structured interview. Demographic questions included but were not limited to questions of age, self-identified race/ethnicity, social class, and generational status. As part of the semi-structured interview, participants were asked to reflect on how these identity markers influenced their experiences in college and in their STEM major specifically (i.e. What has been your experience as a Latina in a STEM major?).

Interviewing is a commonly employed data collection method within qualitative literature due to the ability of interviews to clearly reveal participants' social worlds, feelings, and thoughts (Fossey et al., 2002). Creswell and Poth (2017) recommend researchers ask only a few scripted questions within a one-hour block, to obtain consistent information across participants, while allowing enough opportunity for follow-up questions

to gain a rich understanding of individuals' experiences. Following these recommendations, the semi-structured interview was comprised of a few guiding open-ended questions informed by the literature on sense of belonging and implicit self-theories (see Appendix E). Interviews sought to explore Latina participants' experiences of belonging in their STEM major, their approach to coping with challenges, and their suggestions for tailoring future interventions for Latina students in STEM. In particular, the interview explored various markers contributing to sense of belonging including (a) interactions with peers and faculty (i.e. peer/faculty perceptions of them), (b) involvement on campus, (c) experience of academic and social support (d) experience of STEM classroom environment (i.e. ethnic/racial and gender climate). Interviews lasted approximately 60-90 minutes.

Research Team

The research team consisted of two coders and an auditor. The coding team consisted of the primary researcher, a counseling psychology doctoral student, and an undergraduate research assistant, majoring in biopsychology with a minor in applied psychology and chemistry. The auditor was a licensed Clinical Psychologist and faculty advisor to the primary researcher. In addition to the coding team, an auditor was included to serve the purpose of "checking" the work of the coding team and protect against significant biases in coding (Braun & Clarke, 2006). In addition to the research team, additional consultations with the Director of Research in the department of psychology and psychiatry at a university in the East Coast, with specialty in qualitative research, were sought throughout the data analysis portion of the study as an additional "check". The consultations allowed for additional guidance and support to ensure that the thematic analysis was being conducted appropriately.

Examination of Biases. Braun and Clarke (2006) acknowledge researcher's active role in identifying patterns and themes such that individual assumptions can impact what is identified as meaningful. Researcher characteristics can result in strong biases, which makes it increasingly important to both recognize these biases, as well as strive to minimize the influences that they can have on the trustworthiness of the data to be collected and analyzed. The following section includes the research team characteristics and subjectivities that are important to consider.

Coding team. The primary researcher, dissertation author, self-identifies as a Latina of Salvadorian descent. The researcher identifies as a first-generation college student, currently completing a doctoral degree in combined psychology with an emphasis in counseling psychology. Her training has largely included a social justice lens and strength-based frameworks with an emphasis on multiculturalism. The primary researcher discussed her own experiences of threats to belonging in her experiences in higher education.

The undergraduate coder self identifies as biracial of Mexican and Chinese descent. She is completing a bachelors' degree with a STEM major in biopsychology major and a dual minor in chemistry and applied psychology. In discussing her experiences, she has not experienced feelings of threat to her sense of belonging. She noted living most of her life in an ethnically/racially diverse area in which she felt diversity was highly valued.

Auditor. The auditor self identifies as a European American male. He is a Counseling Psychologist, faculty member, and advisor of the primary researcher. He has an interest in multiculturalism and strength-based interventions. His primary research interests are in Positive Psychology.

The coding team and auditor all described having some level of exposure to implicit self-theories. The undergraduate coder reported previous exposure to implicit self-theories and the growth mindset in her academic coursework. The primary researcher had familiarity with theoretical frameworks of implicit self-theories through participation with the auditor and faculty advisor in his Positive Psychology research lab.

Study Design

A multiple case study design was chosen as the design for this study for its ability to provide in-depth descriptions and analysis of multiple cases (Stake, 2005). More specifically, this study used a collective case study design in which a number of cases are examined in order to explore a shared common experience, which in this case is the shared experience of belonging among Latina students in a STEM major who underwent a belonging intervention.

The present study follows the definition of a case study design put forth by Stake (2005) to provide an in-depth exploration of the experience of interest. Stake (2005) posits that the first function of a case study, including single and multiple cases, is to understand the case and in so doing, have the ability to examine the situation the case is embedded within. He states that qualitative case studies were developed to study the experience of real cases (or entities) operating in real situations. He explains that in a multiple case design, individual cases are chosen due to their shared common characteristic or condition. As is the case of the Latina students who participated in this study, who were chosen for their shared common condition of having undergone a belonging intervention. Multiple case research starts with the central or common characteristic that is sought to be understood, which he refers to as the "quintain." The researcher is tasked with studying the individual cases to explore their uniqueness, while also delineating the similarities and differences among the cases to gain a

better understanding of the overarching condition of interest. Following these recommendations, the present study includes a within and between case analysis of themes in exploring the research questions proposed.

Case selection. Participants were selected to participate in the study after having undergone the phenomenon of interest, in this case having undergone the incremental belonging intervention. All four participants were included in the analysis to gain a variety of unique experiences in answering the research questions. All cases shared case parameters of interest, but there was one particular case that was significantly different from the remaining three cases, in that the participant was no longer a part of a STEM major. This case was of particular interest as it provided a unique perspective on belonging in STEM that could add richness and depth to the analysis. As the change of major was relatively recent, taking place at the start of the second semester, it appeared all participants could be said to have shared a similar length of time within their STEM major prior to the interviews, a one semester period. For this reason, it was deemed that all cases fell within the case delineations and were included for analysis.

Thematic analysis. Thematic Analysis (TA; Braun & Clarke, 2006) is a method for identifying, analyzing, and reporting patterns or themes within the data. It is one of the most commonly used methods of qualitative analysis due to its flexibility in allowing researchers to tailor the analytical process to meet the specific needs of the study, making it ideal for application across various qualitative research designs (Braun & Clarke, 2006). Thematic Analysis allows for examination across the complete data set producing patterns of meaning known as themes. Braun and Clarke (2006) define a theme as important portions of data identified by the researcher for its connection to the research question(s) of interest. The

same theme can be coded more than once in the data set, yet this is not required. The significance or importance of the theme does not rely on the number of times it is found in the data, rather its importance is determined based on whether it is noted as important by the researcher when seeking to answer the research question(s) of interest.

Phases of thematic analysis. This section provides details on the particular phases of Thematic Analysis used in this study as detailed by Braun and Clarke (2006), as they were employed in this study. Prior to the start of the coding process, the coding team underwent training for the current study by reading articles on thematic analysis. Both coders practiced coding sample transcripts, unrelated to the present study, in preparation for coding for the present study. Regularly scheduled video conference meetings were held by the two coders, which focused on training, examination of biases and subjectivity, and the coding process. The following is a step by step description of the coding

First, the coding team immersed themselves in the data by reading through the four interviews a few times prior to the start of the coding process with the intent of gaining detailed familiarity of the data. Throughout the process, the coding team also kept memos which noted important patterns or interesting ideas that arose throughout the coding process. Memos are described by Miles, Huberman, and Saldana (2013) as attempts to synthesize the data into higher level analytic meanings. Memo writing is utilized as a way to document thinking processes that help the coders clarify their understanding of the data (Creswell & Poth, 2017). The primary researcher had a particularly close understanding of the data through having conducted and transcribed all interviews, in addition to reading through each interview extensively.

Second, once an intimate level of familiarity with the data set as a whole was achieved by the coding team and the initial observed patterns were recorded, the coding team proceeded to generate initial codes that highlighted interesting portions of the data across the entire dataset, collecting data relevant to each code. First, each of the two coders in the coding team reviewed each transcript independently to generate the initial codes. They then came together to gain consensus on both the codes created, and the extracts of text identified. Data extracts chosen for codes were marked by the primary researcher using ATLAS.ti, a qualitative software program that housed the data.

Third, once all data were given initial codes, the coding team worked to organize codes into broader level themes. Multiple codes were jointed together if they pertained to the same theme. Fourth, the generated themes were reviewed making sure that the themes that were generated adequately described the extracts that were identified as pertaining to the theme. Some themes were collapsed together, while others were discarded if there was not enough data to support the code. Themes that had a large number of codes were broken down into smaller more narrow themes. Fifth, themes were named and defined. Ongoing analysis to refine the specifics of each theme and subtheme was done by reviewing and re-reading the interviews to help clarify themes generated. Thematic maps were also utilized as visual representation that allowed the research team to better understand the relationship between the major themes (see Appendix F). Finally, data extracts were identified to present examples of themes identified through the coding process to help present a coherent report of the entire dataset.

Throughout the coding and auditing process, careful attention was given to the power dynamics that could potentially influence the analytic process. Power imbalances existed

between the graduate researcher and undergraduate research assistant, as well as between the the graduate researcher and faculty mentor during the auditing process. Power dynamics were directly addressed and explored throughout the analytic process to protect against undue influence among the research team. The expertise and experience that each person of the research team brought to the analysis was also discussed. All members agreed on working to maintain open dialogue regarding the influence members might have on the coding/auditing process. Additionally, for the coding process, both coders agreed to take turns in suggesting, discussing and presenting their independent codes in order to protect against having one coder's opinion overshadowing that of the other. The research team discussed the need for having all members' ideas explored and discussed. For example, the research assistant's insider knowledge as a student in a STEM major, allowed her to call attention to the importance of participants' limited study time and the influence this had on their sense of belonging and academic performance. The open discussion of the importance of this code allowed for the primary researcher to gain deeper understanding of participants' experience and led to the inclusion of codes that reflected this experience. The research assistant's perspective was discussed as a valuable contribution that might have otherwise been overlooked.

Computer software. ATLAS.ti is a software program designed to assist data collection and organization of qualitative research data. Data was housed within this program, codes and themes were entered, and the software was used to generate and house a codebook that was edited throughout the coding process.

Chapter Four

Results

All four participants self-identified as Latina, Mexican, Mexican American, and/or Hispanic female, started at the university enrolled in a STEM major, and had undergone an incremental belonging intervention. Participants were asked to reflect upon the three main research questions (a) their sense of belonging within their STEM major, (b) their approach when facing challenges, and (c) their feedback regarding the belonging intervention. The following section begins by providing descriptive and contextual details of the larger university setting and the university's STEM structure. Following that, each individual's narrative includes demographic and contextual markers prior to providing their lived experience of a sense of belonging in STEM. The section ends with a cross-case analysis, presenting the main themes that emerged across the four cases.

Description of the University Context

The participants' university was a public four-year university located in an urban area in the South West United States. The university was considered one of the top universities in regard to the racial and ethnic diversity of the student body. The university offers degrees of various educational levels (i.e. bachelors, masters, and selective Ph.D.'s). Tuition to attend was one of the most affordable compared to other universities of similar characteristics. It follows a semester system. An additional characteristic of the university was that the large majority of the student body lives off campus. The university was deemed a Hispanic Serving Institution (HSI). The Higher Education Act (HEA-amended 1998) defined the legal criteria for institutions recognized as HSI's as accredited and degree-granting public or private nonprofit institutions with a minimum of twenty five percent of their undergraduate

student population enrolled full-time who identify as Hispanic and at least fifty percent of degree seeking students who are low-income. Institutions who meet HSI criteria were eligible for Title V federal funding to expand and enhance educational opportunities of all their student body, including their Hispanic student population.

All participants shared similar educational characteristics during the first semester of their freshman year at the university, including enrollment in a STEM major. Participants were enrolled in four academic courses, two courses within the STEM field and two general education courses (GE) outside of STEM serving to fulfill graduation requirements. In addition to their major courses, participants were also enrolled in a supplemental instruction course led by an advanced STEM student mentor. The supplemental STEM course was part of the STEM course loads to provide additional support and instruction for STEM courses deemed to be difficult.

The following section provides the individual case descriptions and narratives. Participant's names were replaced with pseudonyms to protect the identity of the participants.

Case Descriptions

Jane. Jane identified as a 19-year-old heterosexual Hispanic female of Mexican decent. She was pursuing a STEM major in biology with the intention of becoming a veterinarian. She reported being employed on campus where she worked 15 hours a week. She lived off campus and commuted an hour and thirty minutes by bus each way, to and from the university. She resided with her mother, older sister, and two younger brothers. Jane's older sister was also enrolled at the same university.

Jane and her siblings were born in the U.S. after her parents immigrated to the U.S. from Mexico. She identified as the first generation of her family to attend college. She identified her family's social economic status as lower working class. In describing her family, Jane disclosed a number of experiences that have impacted her family and her own personal development. Of particular importance for her was her father's involvement with the U.S. legal system which led to their family moving to Mexico for a year during the time she was in middle school. Once back in the U.S. a year later, her family was separated as her father was deported. She and her siblings were put into the foster care system for months while her mother "fought for custody". Jane and her sister were placed together in the same foster home while her two younger brothers were placed together in another home. Jane shared that her father has remained in Mexico since that time, five and a half years. She described this experience as a major life event that significantly impacted the family in various ways. She reported that as a result of her father's deportation, the family's financial earning potential has greatly suffered. She also shared that her mother recently became unemployed at the time of the interview, which put more pressure on her to remain employed while attending the university.

Jane became involved in this research project following the changes in the recruitment protocol. This interview was conducted through video conversation limited to audio at Jane's request.

Jane's Story. In Jane's narrative the relationship between her sense of belonging and her implicit self-theories is evident. For Jane, her sense of belonging was closely tied to her academic performance in STEM, and her sense of social connection. The following narrative presents Jane's lived experience.

Transitional difficulties into the academic environment. A major issue that greatly impacted Jane's sense of belonging and connection to the university was her experience of a difficult transition period into college. Jane repeatedly described her first semester as being very difficult, highlighting the unknowns of how to succeed academically and her initial belief that she was incapable of succeeding academically. She particularly questioned her fit within STEM. While, Jane described feeling as though she obtained a strong STEM preparation in high school, she noted that there was still something missing. She felt unprepared for at the start of her freshman year. She explained that she had not anticipated having to learn skills and study techniques that were different from what she employed in high school. She noted that in order to be successful at the university level, she had to learn to approach learning differently. Lack of knowledge regarding the strategies that she would need to implement left Jane doubting her intellectual abilities. Jane struggled with feeling lost and unsure of what was preventing her from being academically successful.

> Overall first semester, yeah first semester was just so bad for me. I guess the whole part of oh I am in college now what is expected of me? It taking a complete toll and feeling out of control. I just felt like I didn't have what it takes.

Although Jane noted believing that she did not have the ability to succeed during her most difficult moments, she also reported engaging in proactive strategies when she engaged in activities that helped her improve in the academic domain. Something appeared to shift for Jane between the first and second semester of her freshman year. She stated,

> I picked it up the second semester. The first semester was just chaotic. I was just trying to get through it. This semester I was like, oh okay let me make a schedule, give myself some deadlines.

Jane's second semester was marked by a greater sense of control and awareness of the steps that she needed to take in order to succeed academically within STEM.

Jane consistently highlighted proactive strategies in order to accommodate to the new educational environment. She also highlighted an observation of positive academic outcomes that resulted from having implemented proactive behaviors. She described learning and implementing new behaviors in the form of organizational skills, studying strategies, and watching video tutorials that provided her with practice problems that allowed her to solidify her knowledge. Accommodating to a new educational environment, learning new study approaches, and persisting through the difficulties reflected an incremental orientation in coping with her STEM classes. By her second semester, Jane had adapted academically. She reported engaging with the material with great effort, which she reported led to improvement in her grades the second semester. The improvement she observed in her academic performance helped to transform her self-perception, as she began to believe that she was capable of succeeding academically in her major.

Social support. Jane described various sources of support that she attributed to helping her learn the academic skills that she was missing and subsequently helped her to feel more at home in her major. One source of support that she noted was her older sister who was in the same university. Her older sister was influential in providing her with "tips" about to how to succeed academically. Although both she and her sister identify as first-generation college students, Jane was able to learn from her older sisters' experiences of having navigated higher education before her, which was a significant help. Secondly, she noted that the STEM structure provided her with concrete academic support and skills to help her become more organized and learn new study habits. And finally, she credited the

Educational Opportunities Program (EOP), a campus support service that supports first generation students and/or students of low socioeconomic backgrounds, for closely advising her as well as providing her in-depth instruction about the positive effects of improvement through effort. Altogether, Jane attributed her success to the proactive strategies and effort she put forth in the academic domain, as well as to the guidance she received from the resources and supportive services mentioned above. These supports helped her recognize that she could achieve academically through implementing specific behaviors and continued effort, challenging the perception that she was incapable of succeeding. Additionally, the mentoring and support provided by EOP helped her employ incremental proactive strategies towards improving her connections in the social domain.

Transitional difficulties in social connections. Jane not only faced academic difficulties when transitioning into the university, but she faced difficulties within the social domain as well. She described a strong social disconnection from her STEM peers and noted feelings of loss in not having any of her high school friends attend the same university. When describing her difficulty in making new friends, she consistently attributed her difficulties to her own inabilities in connecting stating, "I'm generally not good interacting with people." Jane highlighted her inability to connect with others by repeatedly describing herself as "shy". This self-definition reflected an entity orientation toward her social abilities, labeling herself in an inflexible manner. This inflexibility prevented her from considering that she could learn to better connect with others and improve her abilities to connect trough practice. Jane's perception as incapable of successfully connecting with others led to avoidance of social interactions, as she noted that her social disconnection with her STEM peers was due partly due to the lack of effort she put into building relationships with peers.

Jane described that she was significantly affected by a sense of loneliness her first semester, which took both an emotional toll as well as negatively affected her academic performance. She described feeling her mental resources were split between attending to her emotional distress and her academic work. She stated, “the lack of friends and general feeling of feeling lonely, I couldn’t put as much work as I wanted to my school work. Then I had to pick it up the second semester.” She noted with disappointment that she had received a 2.5 G.P.A. her first semester. Yet, even while describing the academic setbacks, she focused on the positives highlighting that although she did not obtain the G.P.A. she had hoped for, she had felt that she was able to improve academically her second semester.

Similar to her experience of the academic domain, Jane also described an improvement in the second semester in her social and emotional difficulties. Jane described feeling less emotionally distressed about the lack of connection to her STEM peers due to forming social connections with people outside of the STEM environment. She reported proactive acts that indicated intermittent use of an incremental mindset in the belief that she can improve her abilities of connecting through effort and practice. She described having joined a club with the intention of meeting new people, but had to stop attending shortly after joining due to time restrictions because of her on campus employment.

Although work restricted her ability to join extracurricular activities on campus, she noted that work also served to increase her confidence in her social abilities. Work provided an opportunity to interact with students by greeting them and providing directions. She purposefully sought a job that would allow her to interact with others, so she could improve her ability to socialize. She shared, “I have to put myself in those positions to grow and interact with people.” These examples demonstrate very intentional proactive strategies that

Jane employed with the goal of improving her ability to connect with others. Additionally, she shared that working on campus allowed her to feel connected to the university as a whole. She gravitated towards building connection more so with the adults working there rather than other student workers. She described a sense of safety and comfort with adults that she did not feel with peers her age. She described a similar experience during high school where she sought to connect with teachers who she found to be supportive.

An additional example of her proactive behaviors in the social domain included her participation in the present research study. She stated that although she had been nervous in anticipation of the interview, she chose to participate as a way to challenge herself to grow out of her shyness. She explained that pushing herself to interact with new people was her way of working towards growth.

Jane's interpersonal difficulties appeared to be a greater challenge for her to overcome than her academic challenges. Jane's self-perception of being "shy" appeared more fixed than her evaluation of herself as intellectually incapable of succeeding academically in STEM as exemplified in her use of language. While she did not report feeling she was facing current academic challenges, she continued to describe herself as shy at the time of the interview. Moreover, she decided to participate in the study once the video option was offered as opposed to the in-person interview. When using the video communication option, she asked to connect through audio connection only, demonstrating her continued challenge in this domain.

STEM peers. While Jane demonstrated an intermittent incremental mindset through her efforts at engaging in various uncomfortable social situations at work and in participating in the present research project, she continued to describe a social disconnect from her STEM

peers. In Jane's description of her efforts towards incremental growth in her ability to approach others, it was notable that her prosocial behaviors were not implemented within the STEM social context. Jane's description of her STEM peers communicated a prolonged disconnection. She described how little she knew about them and them about her. Jane mentioned having very few interactions with her STEM peers and was unaware of any opinion her peers might have of her. Jane attributed the social distance to her shyness, stating that when she is feeling "too shy" she will refrain from communicating with others. She further explained that the only time she feels comfortable and able to participate in peer conversations is when they are discussing a topic of particular interest to her. She also reported limited knowledge of how her STEM professors might perceive her as well. She shared that her STEM courses up to this point had been large and because she does not participate in class, she does not think her professors knew her. She shared that the only way for a professor to know her would have been if she had attended office hours, which she reported her schedule did not allow.

For Jane, it appeared that her self-perception as "shy" and having larger classes made it difficult for her to feel comfortable enough to make social connections in the classroom setting. This lack of comfort impacted her sense of connection and belonging. Jane expressed that she felt more at ease in classes with peers of similar ethnic/racial background to herself. She described the shared cultural identity as a facilitative factor in connecting with peers.

> I guess I just feel a little more comfortable when I am surrounded by other Hispanics…Even if I am not part of the conversation, I just feel more comfortable…So with the rest of the others [non-Hispanics] it is okay, it's just connecting on related things that us young adults do.

Jane further described that sharing popular cultural knowledge with peers of a similar background meant that she was able to identify songs or celebrities that her Latinx peers were discussing. That similarity allowed a sense of connectedness to others, even when not directly involved in those conversations.

The experience of instant social connectedness was not present for her in the STEM courses, as she noted she felt she was an ethnic minority in her STEM courses. Jane pointed out that a clear distinction between the ethnic/racial identities of her peers within and outside of her STEM courses existed. She described noticing that her math and chemistry courses had a majority of White students. However, she noted feeling a greater sense of comfort when in environments with a larger Latinx student representation.

Another factor Jane attributed to her disconnection with her STEM peers was the fact that she was a commuter. She described that as a commuter she was unable to form study groups. She noted that people who lived on campus had the tendency to head to their dorms earlier and would form study groups with other people who live in the dorms. The separation made it more difficult for Jane to feel connected to her peers, noting that most of her classmates lived in the dorms. She also believed that her counterparts who lived in the dorms had additional advantages as they had more access to campus resources. She noted that once she left campus, she no longer had access to the resources.

While Jane continued to describe a degree of social isolation from her peers well into her second semester, she no longer described the same feelings of loneliness that tormented her previously. Rather, Jane sought social support outside her of peers, which helped her feel connected and better adjusted. For Jane this came in the form of connecting with old friendships, church, and family support. Additionally, Jane shared that she had sought out

counseling services at her university, stating her intention of, "just stepping up and taking care of my emotional being." She noted that she found these sessions helpful. She reported only having the time to attend two sessions even though she expressed that she would have liked to attend for a longer period of time.

Facing challenges. Jane's description of how she dealt with challenges demonstrated an implementation of an incremental mindset in both academic and social domains. Jane described facing the most difficulties within the social domain, with trouble in forming connections to peers. Her proactive orientation toward coping with the social challenges helped her improve her social supports which led her to feel more positive about her college experience. Even though she developed a greater belief in her ability to improve her circumstance by acting proactively and incrementally, her belief in her ability to improve through effort differed between the academic and social domains. In the academic domain, there was a clearer inclination towards employing an incremental mindset, one that led to behavior changes which supported her self-efficacy in her STEM field.

> I know that if I put the work in, it might change things. I know I can change things. I can just put a lot more time in my studies.

In this quote, Jane's confidence in her ability to achieve success in her studies through an incremental belief was clearly expressed. Her motivation to engage in an incremental orientation came from her commitment to her future goals of becoming a veterinarian, her natural interests in the sciences, and her family's influence. Her confidence existed even after experiencing a difficult introduction to the STEM academic environment. Even though her first semester G.P.A. discouraged her, she detailed a significant focus on needing to improve and doing better next time. Again, the motivation for her focus came from the importance of

her goal and desire to help her family by accomplishing her career goals. Jane shared that her parents always communicated their desire for their children to succeed in their job of, "going to school, getting a good job, and helping in that way." An influence that she noted was only getting stronger due to recent financial strains.

In the social domain Jane described moving back and forth between incremental and entity mindsets. While she engaged in proactive strategies to build social connections that helped her feel more comfortable, she also mentioned experiencing more instances, compared to the academic domain, in which she doubted her social ability and sought to avoid challenging situations. For example, of this, Jane described an instance during her second semester, in which she experienced self-doubt within the social domain. She was fearful of giving a speech as part of an assignment in a general education course. Jane described feeling insecure of her abilities and chose to forgo doing the assignment, which negatively impacted her academic standing in the course. She explained that although she was proactive in seeking to improve her skills in this domain, she also experiences moments of doubts. She stated, "I guess it was that, I just didn't feel able to do it."

Belonging intervention. When asked directly about the incremental belonging intervention she underwent at the start of the year, Jane described a vague recollection. With additional description of the intervention she was able to recollect the experience. She noted that employing an incremental mindset was something she applied in her academic life and believed it was useful. She noted that while she did not recollect learning it from the one time intervention, she was consistently exposed to it from the advising she received through the EOP program. She shared that they helped her refocus her perspective when she was doing poorly academically her first semester. She noted that they were presently encouraging her to

employ an incremental mindset in her social sphere to overcome shyness. Furthermore, she noted that while she found it useful to be instructed in this way of thinking in college, she noted that she has employed this mindset in past difficult transitions. Especially important to her was using an incremental orientation when she moved to Mexico and struggled to communicate due to language barriers.

Amanda. Amanda self-identified as a 19-year-old heterosexual Mexican female. She identified as a first-generation college student pursuing a math education major. Amanda was born and raised in Mexico. She immigrated to the U.S. for the purpose of obtaining better educational opportunities. She entered the California public school system during the latter part of her freshman year in high school. Amanda immigrated alone leaving behind her immediate family, which included her parents and two younger siblings. She was living with her aunt and traveled 40 minutes each way, to and from the university. In order to assist her aunt with the household bills, Amanda worked off campus for approximately 15 hours a week while attending college. She reported that during the summer months she planned to work longer hours. At the time of the interview, she was employed as a waitress at a restaurant serving Mexican cuisine but was hoping to get a job in a school setting. She hoped to work as a tutor for students and in this way gain experience that aligns with her career goals of becoming a math educator.

Amanda's Story. Amanda's narrative speaks about the difficulties that she faced in finding a sense of belonging in her STEM major. She felt different from her peers as an immigrant Latina student entering an academic environment with low representation of Latinx and female students in her math major. In particular, she was aware of how her identity markers impacted the social interactions with those around her.

Impact of past experiences of discrimination. Amanda faced negative peer interactions prior to her experiences at the university level. While Amanda noted that she felt more comfortable having attended a predominately Latinx high school, she was also subject to negative peer interactions and instances of discrimination. In high school she experienced a sense of being different and not belonging due to being a recent immigrant. Her peers were predominantly Mexican American students born in the U.S. Peers picked on Amanda when she participated in class due to her Spanish accent when speaking English. She described being called derogatory names that implied that she was uneducated. She explained that as a result she became more reserved, "that is why I am always quiet." The hurtful interactions led Amanda to participate less in class as a way to avoid negative interactions and criticism. She learned to assess situations and avoid interactions with "unkind" people. She continued the avoidant pattern in the university.

She noted that her hardships in high school did not approximate the degree of difficulties she experienced when transitioning into the university setting. She expressed that the greatest difference was that she felt support from her teachers in high school, while she felt alone at the university level. She described feeling particularly supported by her high school math teacher and mentor who she could relate to because both immigrated to the U.S. Her teacher was not only an inspiration for her career goals, but she was also a touch stone that she returned to when facing difficulties and loneliness in college.

> Sometimes I go visit her and she gives me like the strength. Because she is Latina, so she knows. And then she also came from Mexico when she was like ten years old, so I really, yeah, identify with her. She told me that it was really hard, that she would cry, but I didn't believe it was that hard until I came here (laughing) because I

thought that the math classes are what was going to be harder, but I never expected the emotional part. I didn't know about that.

Transitional difficulties into the academic environment. Amanda faced a number of challenges that made her transition into college a difficult experience. Each of the challenges contributed to her overall experience of feeling as though she was not smart enough, that she did not belong in her math major, and that she was alone within her major. Of these challenges, the first Amanda noted was the academic challenge that brought with it a feeling of inadequacy and questioning of her intelligence when comparing herself to her peers.

Amanda recognized differences between the expectations of her high school teachers and her university professors as she began her first semester. She experienced higher academic expectations of university professors compared to high school teachers. The higher expectations made Amanda feel less secure in her math abilities. Amanda noted feeling insecure as she went from receiving A's to B's on assignments. Also, she began to compare her performance with her peers. She was no longer the highest performing student in math. In comparing herself to her peers, she also become aware of the discrepancy in the quality of her high school academic preparation. Although Amanda had immigrated to the U.S. for a quality education, she became aware of the differences in the quality of high school education within the U.S. While some of her peers took seven Advance Placement (AP) courses, she noted taking only two. The educational gap made Amanda feel that she was not starting with the same foundation of knowledge as many of her peers. The perceived lack of preparation contributed to her feeling inadequate and not belonging in a math major. She did not feel as competitive as her peers. She noted that due to not having as many AP options in her high school, she had to take more rudimentary level math courses. Many of her peers

were able to skip the rudimentary courses and advance quicker. Amanda stated that she believed that she was less knowledgeable and therefore she was "not smart enough" as she transitioned into her first year at the university.

Underrepresentation and sense of belonging. In addition to the academic challenge, Amanda felt that she did not belong in her major as she noted differences between her and the majority of her math peers. Apart from the differences in academic preparation, she also noted differences in identity markers. Amanda was conscious that as a Latina student she was underrepresented in her math major in both gender and ethnicity. Awareness of additional differences further contributed to her sense of not being smart enough and not belonging in the space she inhabited. Amanda noticed that the students she identified with in regard to gender and ethnicity were not a part of the STEM environment. Her observation communicated to her that she did not belong in STEM.

Amanda described culture shock when entering her math major. Having immigrated to the U.S. from Mexico just a few years prior, and then attending a predominately Latinx high school, meant that this was the first time that Amanda inhabited a space in which she was a visible minority. In her narrative, Amanda described on multiple occasions the sense of loneliness and self-doubt that she experienced being underrepresented in a major with peers who were predominately White and Asian males. The lack of visual representation of peers like herself increased her experience of not belonging in this space, which significantly harmed her emotional wellbeing.

STEM peer climate. Amanda discussed that the feeling of not belonging was not only influenced by the underrepresentation of Latinas in STEM, but also by the interactions of her STEM peers. In contextualizing her experience, she highlighted the dropout statistic

that STEM students are confronted with, stating that only 30% of students who enroll in a STEM major remain in the major, while 70% end up switching majors. She noted that these rates are probably higher among Latinx students as they are so minimally represented in this field. This dismaying statistic was the lens through which she believed that her peers saw her. She believed her peers assumed that she would be part of the dropout statistic. Amanda felt that the threat of dropping out of her math major was even greater for her because she held two identity markers with drastically lower numbers of representation in this academic arena.

Amanda was aware of the stereotypes regarding ability in math. She reported experiencing stereotypic belief of males dominating females in math achievement, and that of Latinas being less intelligent compared to other females. These experiences left Amanda feeling intimidated and experiencing significant distress.

Amanda stated that she felt math stereotypes were endorsed and communicated to her through her interactions with her STEM peers. In general, she experienced that her peers held typical STEM stereotypes, particularly noting that her peers held the stereotype that "Latinas do not do well in math and science." She discussed instances in which male students who majored in engineering asked her about her major. Upon hearing that she was a math major, their reaction felt invalidating. Amanda found it difficult to articulate just how her peers communicated to her that they did not think she was smart enough to be in her STEM major. She noted experiencing the messages through indirect non-verbal cues.

> Then also there are not a lot of Hispanics in the major and I don't think they, when they see a Latina in math, they don't see it as something serious. Like, I think that some people think that I am not going to make it through the major. When they ask me for example, what is your major, and I say, "oh math" and they don't take it very seriously.

> And it just feels like I don't belong to my major. That is what it feels like sometimes because people don't think I am capable.

In addition, she highlighted the added impact that intersecting minority identities had on her low sense of belonging. She observed intersectionality issues by the way her peers treated White females in comparison to her. She reported when doing a group assignment to complete worksheets, she noticed that her peers would ask each other for help but no one would ask for her suggestions or guidance. She further noted that when a female's opinion was sought it would inevitably be a White female. While not directly communicating lower expectations of her abilities, the observations did communicate exclusion and lower expectations to her. Amanda felt overlooked and undervalued. Amanda interpreted her peers' behaviors as communicating that the males and White female students were more capable.

In other instances, she noted feeling disliked and avoided. Amanda shared details about two female math students who she perceived not liking her because of her difficulty with pronunciation. She noticed that they avoided sitting at her table and moved tables if she was sitting there. Amanda highlighted interactions with STEM peers that contributed to feeling unwelcome. She was certain that being able to have connections with peers in her classes would make her feel happier. Further, she believed her academic performance would be enhanced by forming social academic support groups, such as study groups, rather than only attending individual tutoring sessions.

From Amanda's perceptive, the interactions and disconnection with her STEM peers led to her not feeling a part of the STEM community. Within her math classes her peer relationships were virtually non-existent. She described a typical day at the university as attending classes, leaving for work, completing homework at home, and starting all over

again the next day. She noted having limited interactions with peers within class and none outside of class, which was not what she desired. Amanda yearned for a sense of community and support, a need that without having her family nearby made for an even more difficult experience while transitioning into college. The most significant problem for Amanda was the social disconnection in her math courses and the resultant distress.

Psychological distress. The transitional difficulties that Amanda faced when starting college, both academic and social, ended up creating high levels of distress that impacted her mental health and had her seriously questioning her chosen educational trajectory. Amanda explained how the combined experiences of feeling insufficiently prepared, needing to adapt to a new academic environment, and her peers' low expectations of her left her feeling that she did not belong in mathematics and that she was not capable of succeeding. She described the first months as times of crying daily, tormented by feelings of sadness and stress, and unable to fully focus on her coursework. She noted that while a high school mentor had warned her of the added academic rigor and challenge she would face at the university level, she had never anticipated the emotional challenges that she would have to face in feeling that she did not belong. She recognized that the social challenges took away mental energy that she could have been dedicating to her studies. At her most difficult moments of deep self-doubt, Amanda seemed caught in an entity mindset, viewing herself rigidly as inadequate and unfit to be in a math major.

The degree of distress that she was feeling and the entity mindset she endorsed at that time had profound negative influences. Not only could she not focus on her academic tasks, but she experienced many instances in which she seriously considered changing her major. She described her frequent inner tug-a-war process as one part of herself seriously

considering leaving the major, while another part did not want to be influenced by the harmful ideas or actions of others. She described that in those moments, she would remember the reason she wanted to study math in the first place. She remembered the positive contributions her high school math teacher had on her and the influence she wanted to have upon future students. In connecting with her passion and career goals, she decided that it was not fair to let other's opinions of her deter her dreams.

> Sometimes I think that I need to change my major, but then I think that it is not fair to let others influence, because math [is] what I really like, and it is not fair that because other people think I am not capable, that I am going to change. But sometimes I do think that I need to change my major, but I don't want to**.**

The passage above illustrates her frequent inner struggle. The struggles expended effort and mental energy on questioning whether she should stay in an environment that she was not comfortable in or leave the environment and let go of her career aspirations. The struggle drained Amanda's attention and focus that could have been invested in academic success.

Self-perception as "shy". Amanda attributed the lack of social connections with her math peers to her own shyness. She explained that it was difficult for her to initiate conversations with her peers. In describing her desire for connection within her math major, she noted that she wishes she were less shy. She would like to connect with and study with her peers so that she could increase her chances of succeeding in her major. Even beyond her STEM peers, she reported difficulty connecting with students. She usually found herself walking around campus alone, desiring to have closer friendships.

Amanda's self-description as a shy person was prevalent throughout her interview, yet she was able to form connections with certain students. She explained her process in

determining who she felt comfortable approaching stating, “I think it’s like the way they act. If I feel that they are kind and that they will not laugh at me, that is when I, I start to talk to them.” As detailed previously, Amanda perceived her math peers as not approachable because they undervalued her abilities and intelligence. Amanda defined herself as a shy person in a fixed mindset manner. She stated that she did not believe she could change and did not make attempts to get better at socializing.

STEM peer connections. The behaviors that Amanda noted from her peers in her major courses was not consistent across all math peer interactions, neither was her entity mindset and subsequent avoidance behaviors. Amanda described having better luck in building social connections when attending a general math introduction course focused on providing general support tips for all incoming math students. In this course she was happy to have made a few friends with whom she felt she was able to connect more easily when compared to the peers from her specific math education major. Part of the increased ease in connecting with these peers had to do with the peers’ identity markers, two Latina students and one Asian female. She reported that she felt that they were kind to her and found it easier to relate to them because they were ethnic minority students and females. Finding other ethnic minority females within STEM helped her feel a sense of connection within the STEM educational context stating, “yes [it has been helpful], because we are the same major and almost the same ethnicity and females, so I felt really connected.” She felt that in sharing intersecting minority identities, these peers could better understand her experiences as part of the STEM environment and provide her support.

University support. Amanda faced significant challenges, but her proactive strategies propelled her into a healthier mental space as she actively found ways to cope, seek

support, and improve her wellbeing. Amanda explained that the support she sought became influential in helping her remain in her major and face the challenges she experienced. She expressed that over time she was able to improve in the academic domain and gain social support, which she described helped increase her sense of belonging.

One significant source of support and connection to the university for Amanda was receiving services at the counseling center of her university. Recognizing the significant turmoil, she was experiencing, she researched the resources the university offered to students in need of emotional support. She stated, "I was struggling with like emotionals (emotions) because I felt like I couldn't do it and I would cry every day of my first semester and I had to go to the psychologist to ask for help." She reported recognizing very early on that she needed help as she consistently felt lost, sad, and scared. She explained the profound impact of the services. The services helped her avoid internalizing the negative interactions and messages about her abilities. She explained that counseling taught her that her own expectations and ideas of herself are more important than the perceptions of others. She described learning that, "if you see yourself like at the bottom, no one is going to see you at the top." After counseling, Amanda recognized that she changed her way of relating to hurtful interactions with peers. She intentionally tried to remain positive and let go of the negativity rather than letting these interactions make her "feel sad or bad about herself." Amanda reported attending counseling continuously for two months and then on an as needed basis.

In addition to the individual counseling sessions, Amanda attended a process group for Latina students. In this group, Latina students from across the university shared their experiences, and provided support for one another. Participating in this group allowed

Amanda to feel that she was not alone in her journey. She stated, “I feel like I have a family outside of the classroom. And I feel like, like that support from someone.” Amanda pointed out that most of the members in that group were non-STEM majors.

Amanda found that connecting to the counseling center for support at the onset of her freshman year helped her to feel connected to the university. The support was particularly important for Amanda as she reported little outside support, and her immediate family was out of the country.

Through the university’s counseling center, Amanda’s experience began to change. By her fourth month into her first semester she began to feel that she did belong in her major and was able to focus more fully on her academic challenges. She felt she could better manage the social challenges she encountered.

Peer connections outside of STEM. Amanda also sought social support and sense of community with class peers outside of her STEM major. In her general education courses outside her major, she was exposed to a greater representation of Latinx students. She described the sense of comfort that she feels when she is in a space with greater representation of peers who share her ethnic background. She reported experiencing not only a sense of comfort and belonging around these peers, but sharing this space was of great support to her. She noted with some dismay, that although she is able to have this sense of connection and community to peers outside of her major, she was aware that this was only temporary. Most of these students were in majors such as psychology and business which meant that upon completing her GE courses, she would no longer have as many Latinx peers.

She noted a difference in her relationship with Latinx peers in college compared to the interactions she had with her high school Latinx peers. When she took a speech course, she

found herself feeling shy and self-conscious about her difficulties with pronunciation in English, particularly as it was a course with a large number of Latinx students. Yet, to her surprise she found that her peers did not interact negatively with her for mispronouncing words in English, which she reported calmed her nerves significantly. She stated, "at the beginning I was really nervous because I didn't know what to expect. But they have been really respectful, and I really like that. I feel like they support me."

Amanda's interactions with the Latinx student population in college was reparative of past rejection and helped her to feel connected to people her age. Her connections lowered her fears and anxieties. Her social successes further supported her proactive behaviors and increased her sense of belonging.

Family support. Amanda attributed her ability to let go of her view of herself as incapable of succeeding not only to having found support on campus, but also to her family's influence. She explained that her mindset changed in big part due to her focus on her immediate family in Mexico. She reconnected with the desire of not letting them down. Her family, the counseling and the social support outside of STEM helped her to start to feel more positively. She stated that approximately four months into college, she began to feel like she belonged in her major. Being a role model for her younger siblings and her aunt's message not to give up were her motivation to keep trying. They helped her face the challenges she encountered rather than avoiding them.

Her family was her motivation for persisting in her academic pursuits, yet following her academic pursuits required her to remain separated from her parents and siblings. She noted that her family was both her strength and weakness. She noted the sense of loss she felt when experiencing emotional turmoil without having her family present to support her

through her difficulties. She shared the difficulties of her first day of college. Especially the pain of her family's absence. She shared, "oh, it has been really hard. Because I would cry also because I didn't have anyone to tell about my first day of college. It wasn't the same like telling my aunt and telling my friends."

While holding back tears, Amanda described how much she misses her family and wishes to reunite with them. She shared that she calls them twice a day and tries to visit them during the summer. She noted that as time has passed the additional responsibilities has made it harder and harder to see her family. Noting that her visits have gone from staying two months to staying only two weeks in order to work in the summer to be able to pay her expenses. As she examined her future, she anticipated the length of visits would dwindle further as she may need to take summer classes. The separation was described as hard on her parents as well. Her parents want her to achieve her academic goals, but they also feel deep sadness at being separated from her.

Proactive behaviors when facing challenges in math major. The social and academic support, and her family's influence energized Amanda to persevere through the challenges she faced. In doing so, Amanda learned new ways to study and succeed academically. She stated that although she felt ill prepared at the start of college, in time she was able to improve her study habits as she watched instructional videos and attended tutoring sessions. Her proactive strategies were clearly present when she described how she approaches her education a few months into the first semester. She reported learning to move at her own pace taking small steps, with the awareness that in this manner she would reach her goals.

Amanda recognized that she had not always held this approach. She explained that in high school she was the top student in her math class. She had not faced a significant academic challenge. She primarily attributed her success in math to talent or ability in this domain and she noted that she had not previously experienced a significant challenge in her understanding or performance prior to the start of college. Her view of herself was challenged when she was no longer the top student upon entering the university. When she saw other students performing better than her, the fixed mindset of being one of the best at math no longer fit. She began questioning her abilities. She went from viewing herself as being at the top to perceiving herself at the bottom, fitting the polar thinking of the entity mindset. The following passage illustrates her change in self-understanding regarding her performance in math, as she normalized the academic struggles she was facing without letting them define her abilities.

> In high school I was used to being like the best in math. Like because in all the classes I took in math I was always the first one. Like 100 % in every exam. And when I came here, it wasn't the same. There were people better than me in math. And I felt like, like sad. But I have been learning to, to not think that I am the best in everything. And that has been, that has been hard because I wasn't used to getting like B's, but I guess that is normal in math.

Amanda had not needed to believe in improvement through incremental steps prior to attending college because she never faced a significant academic challenge in math. With the help of the psychological, social, and academic sources of support noted previously, she changed her self-perceptions. Although they had been positive self-perceptions, they still embodied entity thinking, seeing her achievements as effortless. She stated that recognizing

that she did not have to be the best, helped her stop feeling incapable and began endorsing the belief that she could improve through effort.

Amanda demonstrated that even a positive self-perception, if accompanied by an entity mindset, could be detrimental in the face of challenges. Effort was the key to coping with challenge as she recalled trying "really hard" and implementing small steps to move toward her goals. The change in mindset allowed her to continue to be "competitive" and work towards overcoming challenges. Her quick attention to her emotional and academic challenges facilitated her successful transition into college. She reported achieving a 4.0 GPA her first semester. Obtaining high academic marks made Amanda feel even more confident her second semester. She felt she had overcome a substantial hurdle and had now caught up to the knowledge level of her peers.

Her high academic performance successfully countered the feelings of self-doubt and intellectual inferiority. She admitted continuing to having "bad moments" from time to time in which she held the expectation of not performing well, yet she continued to perform well. Even though the threat of inadequacy and not belonging was not fully gone, through determination and effort she continued to have success that further challenged her self-doubts.

> You have to really be committed to the work and practice. And practice because that is what makes perfection. And, I don't know. I really like math! I am very competitive, so I think like I need to do it and I study hard, and I don't know. I just do it.

Her love of math was also instrumental in her employing an incremental orientation. She described having fun with her major, stating that during her tutoring sessions she would

engage in friendly competition with the tutors to see who could solve the math problems first. She said her love for math was because there always being an answer and multiple ways to reach it; a process that she enjoyed.

STEM professors. While Amanda received messages of negative expectation from peers, that was not her perception of the faculty. She explained that she did not believe her STEM professors held any negative stereotypes or expectations of her. She felt that they had been supportive. Amanda reported attending the office hours of her math professors both semesters. In particular, she highlighted the ability to connect to both of them because of their ethnicity. Her first semester instructor, an Asian female, related to Amanda's experiences and struggles because she too had immigrated to the U.S. at the age of 16. Her second semester math professor was Latino. She felt that he could also empathize with her experiences. She felt supported when he provided her additional practice material to help remediate her poor high school preparation.

Belonging intervention. Amanda's recollection of the intervention was not in the forefront of her awareness. She needed further prompting and a description of the intervention to recollect the experience. Once she recalled the intervention, she was able to provide specific suggestions that she considered would improve the intervention for Latina students. She wished that the concept of improvement through incremental steps and effort would have been presented at the very beginning of her first semester, having priority over other topics. She stated that having received this message at the very beginning of her transition could have made her experience less difficult. She also noted that the video would benefit from featuring students speaking on the subject with whom she could personally identify with and look up to as role models. She noted that she lacks Latinx role models in

her field. The older students that serve as tutors were mostly White students. While she stated that her tutors have been kind and share similar interests in math, she did not feel they represented her experience. They did not provide a model of a successful outcome for someone facing similar challenges. She noted that her high school teacher was the only role model she had of a Latina individual completing a math major and succeeding in her career goal in the STEM field. For that reason, having diverse representation in the video could have helped counteract some of her experiences and fears of not belonging.

Liz. Liz self-identified as a 19-year-old heterosexual Mexican-American female and Latina. She identified as a second-generation college student and the third generation of her family to reside in the U.S. She commutes a short distance to the university and lives with her immediate family, which includes her mother, father, and three younger siblings. She reported being employed and having two jobs with varying weekly time commitments. While her mother did not graduate from college, her father competed a bachelor's degree in engineering. She described her family's socioeconomic status as lower middle class, which she further explained meant they were neither poor nor fully financially comfortable. Her decision to pursue a STEM major grew from her desire to be financially stable. She stated that she has always known that a STEM major leads to a greater chance of financial prosperity.

She also shared that the value placed on a STEM major was also communicated to her by her family. In particular her father communicated the financial stability afforded by a STEM major. Although experiencing pressure to enter a STEM major, she also expressed having a personal connection to her chosen STEM major of molecular biology. Liz explained that her connection to this major is based on a significant childhood experience. She

recounted having been born with three kidneys, which were failing at birth creating significant medical complications. As a result, Liz underwent surgery at three weeks old. Her family shared details with her about another baby at the hospital with the same medical problem who did not survive. Learning that the other baby died while she lived provided Liz with a deep sense of meaning and motivation to accomplish her goal of completing a STEM degree in molecular biology. She reported that her career goal is to become a medical doctor to provide others another chance at life as she was given. She felt that having survived this experience meant that she has a purpose. She believed her experience provided motivation to keep pushing herself and not allow herself to "fall short" of her life's purpose.

Liz's story. The following section describes Liz's lived experience of belonging as a student in a molecular biology major from an in-person interview. In her description of her experience in a STEM major, Liz described both an ease in transition, while also highlighting threats to her sense of belonging due her most salient identity; her gender.

Transitioning into STEM and peer connections. Liz relayed that she did not experience many difficulties in her transition into the university or into her STEM major. She shared that she has had an overall positive experience at the university thus far, without experiencing any issues with peers, staff, or professors. She described that she found it easy to bond with her STEM peers, making a few friends early in the academic year. She described forming friendships with two White males and one Latina in her courses. She experienced that forming connections with her STEM peers was easier than connecting with students outside of her major. She felt a stronger degree of connection and ability to identify with her STEM peers due to sharing the same academic experiences and academic goals. She stated, "I think probably because we are going through the same stuff. Taking the same tests,

having the same homework. It is just easy to connect with people when you know that they are someone just like you."

Sharing experiences related to career goals and interests allowed her to feel a sense of closeness with STEM peers that she did not experience with other students. She explained, "it's probably because in the other classes, everybody is different, so you don't, can't really relate to them." She sensed a greater degree of difference and diversity with peers in her non-STEM courses which made her disinterested in forming connections outside of STEM.

While noting that she found it easy to connect with her STEM peers, she also described a level of disconnection. She stated that she had the intention not forming many peer friendships in or out of STEM. Rather, her interest in attending the university was purely academic, not social. She described that a regular day consists of attending the university, going to work, going home to do homework, then starting that routine all over again. She noted that even the friendships she made revolved solely around the academic sphere. They typically did not spend time with each other outside of classes.

> I mean I was always shy but once you get the ball rolling I'm fine. And honestly when I started at college I didn't really care whether I would get along with people or not. It just was not a priority for me because I'm just here for school, I'm not here to socialize. So that was always my thing.

She referred to socialization among peers as a negative aspect of her experience, stating that it got in the way of her academic goals and her ability to focus on academic material. She described her frustration with peers in a STEM course which was particularly social stating, "I am just like it's not social hour guys we're actually trying to improve."

STEM peer perceptions. Liz noted a social dynamic among her peers in relation to her gender. Liz described feeling that her intellectual abilities were largely overlooked. She stated that her peers neither considered her to be the best or the worst. She felt they subscribed to the idea that if you are not the best in the class then you are not succeeding.

Liz had a small group of peers across her STEM classes. She explained that in interacting together through group work, she experienced their overlooking and underestimating her intellectual abilities. She explained, "like they don't expect much from me, but when they see what I am capable of they're like 'oh'. So it has to be proven, that I am actually capable."

Liz felt that the low expectation of her was based upon gender stereotypes within STEM, which she felt was supported by the top student being a White male. Liz stated that her peers typically valued the opinion of males over females. She described her peers checking in with the beforementioned male in the class prior to making their answer selection. When she offered a contradictory answer, she noted that her peers dismissed her input and sought to align their response to the male's answer. She noted that female students were also complicit in creating this environment, as they too valued a male's suggestion over hers.

Liz pointed out that the perception of males being smarter than females was only communicated to her through peer interactions. She reported that neither her professors nor the advanced student mentors underestimated her. She stated that her professors and advanced student mentors perceived her as smart and serious about her education. She noted that her interactions with a female student mentor were positive. The female mentor noticed Liz's effort and potential.

Impact of peer perceptions. At times Liz contradicted herself during the interview about the influence of the negative peer perceptions. At first, Liz denied feeling influenced by her peers' actions or perceptions. She explained she simply noticed the interaction dynamics. Yet as the interview progressed, Liz shared a slightly different story. She explained that her peers' perceptions of her led her to doubt her own abilities, stating,

> I think for a while I was doubting myself. Like not thinking that, or thinking that maybe I am not as smart as he is [male student]. But I think that over time, I have just been working by myself so. I mean not like at school but at home. Um and I've gotten more comfortable. When I get more comfortable with the material then I am fine. But like maybe at the beginning, I'll get like the little doubt things in my head.

She noted that her peers' dichotomous way of viewing performance, as either you are the smartest or not, left her feeling insecure and that she was "not smart enough". She described ascribing to entity thinking paralleling her peers. She viewed herself as either being the best or not being good enough in her STEM ability. She reported that the competitive nature of her STEM courses made her feel this dichotomy more strongly. At the same time, she felt that this competition with her peers also fueled her to work harder because she realized that she is competing against them to get into medical school once she graduates.

Even though the sense of competition was present, she described wanting to feel some validation about her ability from her peers. When peers asked for her input or help with coursework she described feeling like, "you see me! (laughs) Like you know what I am capable of." Whereas when she felt that her peers did not view her as able to provide the assistance they were looking for, she felt "unworthy" and questioned whether she was not smart enough. She explained, "I feel like if people ask me for help, then it's like, oh like you

know that I am worthy I guess, but if not then, I'm like I don't really care if you ask for my help or not." Liz went from stating that she cared to stating she did not care at all about her peers' perceptions of her.

Being Latina in STEM. For Liz, her gender identity was the most salient marker in her interactions with her STEM peers. She attributed STEM stereotypes about gender to the differences in the ways peers valued male opinions over that of females. The same was not the case when it came to her ethnic identity. She reported that her ethnicity was not an identity marker that was really salient for her in her experience thus far. She also shared that she had not been aware of the ethnicity make up of her peers. When she stopped to think about it, she did notice differences in the ethnic identity of peers within and outside of her STEM courses stating,

> Honestly, there aren't that many Latinas. There are some Latinos, but you know now that I notice it. It's not that much. Latino people it is very little, very, very little. There is a lot of White people, Asian people, there's like no Black people.

She noted that in her general education courses, the student body is much more ethnically diverse, which reflected the overall diversity of the university campus. Yet within her STEM courses the same level of ethnic diversity was not present.

While Liz stated feeling that peers stereotyped her negatively due to her gender she stated she did not experience the same thing in relation to her ethnic identity. She described that in general interactions with others she is typically is misidentified and is usually not perceived to be Latina.

> They think I am more White, but I am actually, both of my parents are from Mexico. And they're like 'Whoa really, like you didn't seem like that'. I am just like 'no they

> are, (laughing) I am definitely Mexican'. But I think it's because I look more like White, that they're like 'Oh you're not Latina you're White right?' I'm like 'No, I'm Latina'. They're like 'oh!'

She described that her light physical features are not generally registered by others to fall within their expectations of what a Latina looks like. In discussing this misperception, she communicated frustration at being stripped from her ethnic background and in having to convince others of who she is. At the same time, she also discussed that she is aware that having a lighter complexion has led others to treat her more favorably. The difference in how she is treated when she is perceived to be non-Latina has been clear to her when comparing herself to Latina co-workers at the restaurant where she worked. She noted that her coworkers with darker features or "more Mexican features" are treated with the expectation that "they are not capable of that much" and they are "seen at a lower level". This dynamic bothered Liz because although others did not recognize it, she too identifies as Latina and was unhappy to witness how expectations of her peers were lowered due to their ethnic identity.

Approach to challenges and academic performance. Liz's experiences of academic self-doubt were described as stemming from her peers' perceptions of her and their stereotypes of intelligence. She described feeling initially negative about the stereotyping social cues because they led her to question her ability for growth. She noted that the self-doubt was transient. Liz described employing proactive strategies that allowed her to remain engaged academically. She described academic challenges as something that she engaged with, valued, and even enjoyed, rather than describing challenging material as something she sought to avoid or disliked. She observed that if she is not continuously challenged

academically, she tends to lose interest in the learning process and her academic performance suffers. She explained that having challenging material allows her to remain intellectually stimulated and engaged, which leads her to a learn more and put more effort into incrementally reaching her academic goals. She noticed that generally within her educational trajectory if material is too easy, she becomes disengaged, puts forth less effort, which leads her to learn less and perform more poorly.

She described not only learning more but enjoying having a certain level of intellectual challenge stating, "um, honestly, I just like the academic challenge. I don't know. I like being given challenges. I mean it hasn't been easy, but I enjoy it." She reported that the academic challenges she has faced in her STEM major have been the best part of her university experience thus far. Furthermore, even though Liz did not like being underestimated by her STEM peers, she used her peers as motivation toward greater academic achievement. Like her peers, Liz described a heightened focus on the aforementioned high achieving male in her courses. She did not endorse an entity mindset in her approach to this situation. Instead of internalizing the idea that if he is the best, then she is not, which might have led her to further disengage and stop trying, she took a different perspective. She described having a secret competition with him of which no one else knew. The competition was her way of further engaging with the material and seeking to improve, while having fun in the process. She noted that although he continued to be at the top of the class, she would score almost at his level, trailing behind by a few points Her peers appeared not to notice that she was at the heels of this individual, which bothered her. In her competition with him served as motivation for her to achieve more and push herself harder.

In so doing, she demonstrated her orientation towards approaching academic challenges rather than disengaging from them.

Altogether, Liz's approach to the academic challenges and peer perceptions resulted in an incremental orientation in her STEM classes which aided her in achieving academically. Her experience of not achieving the highest grades and not being perceived as the smartest student among her STEM peers served as fuel to seek personal improvement. Believing that additional effort would lead to improvement demonstrated an incremental approach to the academic domain that led to positive outcomes. Liz was not fully expecting the extent of her success as she noted her surprise at receiving a 4.0 GPA.

Stressors and family influence. Liz experienced academic stressors and periodic insecurity in her abilities. However, Liz felt these difficulties were manageable challenges that she could overcome. For her, a greater stress than academic performance was having the time to be involved in all the additional activities required to be a competitive applicant for medical school. She described feeling pressure to become more involved in extracurricular activities related to her choice of major to have more to show than high academic marks. She noted, "I feel like if I wanted to go anywhere like after college, like to med school. I am gonna have to stand out in some way. So it's just hard trying to fit in, standing out, plus working, plus school." Part of the time that she could dedicate to extracurricular activities was taken up by her employment.

She stated that financial stressors were particularly salient. Having to work in order to pay her bills (i.e. car payments, cellphone bills) took up not only time but also mental resources. She explained that worrying about finances was something that she could never rid herself. Liz's concern for her future financial stability was a message that her parents

highlighted for her as well, which at times created more stress. She described feeling that her parents were not a source of support for her in her studies. Rather, she experienced a level of pressure and expectations for her to accomplish academically in STEM in order to do well economically. “They are not really that supportive I guess. They just more like, ‘you gotta get it done’. So basically all of its on me. It’s all on me.”

Her parents communicated to her that it was her job to do well and stated that they, “do not know what’s [going to] happen” if she did not get a well-paying job. She recollected that her parents believed in a STEM degree as the only way of achieving financially stability. She recounted that, “they [parents] said that if you are an English major or anything other than STEM, how are you going to make money?” Liz described feeling as if she were on her own and knew that she would need to make her own way financially. Although, she declined her father’s suggestion to study engineering, she noted that his message about STEM influenced her decision in choosing a major within the STEM field.

University evaluation and connection. Liz appeared to be aware of the impact that financial limitations can have in limiting one’s choices and opportunities. An example was attending her current university. She shared that she had been admitted to more prestigious universities, but was unable to attend due to financial restrictions. She was unhappy with having to miss out on this opportunity, yet she had a positive perspective on her situation. She recalled people who attended more prestigious institutions, having their parents pay for their tuition, but who are not doing well academically. She noted that an “education is an education” and refocused her attention on trying to achieve academically. She explained that going to a prestigious university is not beneficial without achieving a competitive G.P.A.

While she was displeased at not being able to attend a different university, she shared an overall positive evaluation of her experiences thus far at her current university. She highlighted that she felt that the campus had multiple student resources. She believed that the professors provided high quality teaching, and was grateful for the academic advising. She also described having additional support as a student in a STEM major. In particular, she appreciated having the supplemental courses led by advanced STEM students. The supplemental courses were offered first year students to assist their understanding and performance with particularly difficult major courses. She was grateful that the supplemental courses offered practice and guided study. Also the supplemental courses were automatically included into their course requirements and academic schedule. She appreciated not having to find space in her academic schedule for this additional instruction.

Liz reported that she did not feel particularly connected to the university. She explained only being on campus to attend classes, use the gym, or go to the library. She stated awareness of social activities offered by the university, but stated that she feels she doesn't have a friend that would go with her to those events. Again, she highlighted her decision that friendships formed at the university remain constrained solely to the academic domain and within the bounds of the classroom experience. Her time on campus was limited to activities that are academically required, which she described as influenced by her living off campus and her employment-related responsibilities. Of the opportunities offered by her university, she wishes she were more involved in extracurricular activities. She reported having joined a few health related clubs at the start of the year, but had not attended many of their meetings due to time restrictions.

Academic advising limitations. Overall Liz felt positively about the academic advising offered at her university because it helped her feel confident in knowing what direction she is going in with check points along the way. This clear advising was something she felt was missing from her high school experience where the message was to apply for college but there was not much in terms of assistance and information about what the steps to get to that point needed to be. The only negative part of advising was the push she experienced to take more than four years to complete her bachelor's degree. She felt that the message communicated to her was that she would be unable to successfully complete more than 12 units a semester. She explained feeling, "like they don't really want us to go over, because they don't think we can handle it, I guess." She noted that this was a uniform message given to all of the students. She reported that the majority did not complete their degrees within four years. She also reflected on the fact that all of her peer mentors, advanced level students who lead the supplemental assistance courses within STEM, were in their fifth or sixth year of college. Liz was very adamant about not wanting to spend more than four years. Liz felt that she could take on more classes, including taking classes in the winter and summer. Her advisor recommended against her plan. She recollected,

> She [academic advisor] even told me. She was like, 'What's the rush?' And I am just like, 'I'm paying money'. You know like, 'I don't want to be here for...I mean I just want to get out of here as fast as I can.'

Regardless, of the rules and restrictions set forth by her academic advisor, she found ways around these rules and ended up taking additional courses. She reported performing well academically, even when warned against taking the extra classes.

Belonging intervention. Liz reported that the belonging intervention video shown did not provide her with novel information. She expressed that she and most students attended that course begrudgingly because the information presented was either something they had heard before or was presented in a manner that they disliked. She reported that most of the students did not take that class seriously and felt they wasted an hour each time they attended class. In reflecting on the belonging video intervention, she noted that she had not directly been taught the idea of improving through effort. However, she had known about this idea for many years. She reported that having a growth mindset to her means, "like not staying in the same place. Trying to achieve more than you have already. Um, growing intellectually. Growing spiritually" She shared that she employs an incremental orientation academically, stating that she views her goals as made up of small incremental steps that she tries to accomplish over time. She shared, "I don't think you can get to point A to point B just in one step." She gave the example of achieving incrementally with a focus of taking it step by step stating, "I am just gonna take it step by step, like five percent more and then five percent more. That's how I do it."

In critiquing the video, she advised that it needed to be more relatable and tailored to their experiences. She also stated that the portrayals of people speaking about their use of the incremental orientation felt inauthentic. She stated, "because a lot of the stuff we saw was other people's lives and it sounded really cheesy and corny and it was like okay sure, went right over my head." She shared that having random people speak to her about what she should do, when they had vastly different life choices, left her disinterested.

What she found personally helpful was hearing advanced student mentors discuss their own experiences. She believed the information and suggestions from her mentors. Her

belief was because of their relationship and because they went through the same things that she would be experiencing too as she worked to complete her STEM degree. She noted that the advanced students, the mentors, were particularly helpful in talking about their experiences through the same journey.

Sarah. Sarah self-identified as a 19-year-old, heterosexual, Latina of Mexican descent. She commuted a short distance to and from school. She lived with her father, mother, and three younger siblings. She identified as a first-generation college student and as the second generation of her family to live in the U.S. She described her family as middle class. She shared that her father worked as a welder and her mother worked to care for the home. She reported that her family provides financial support for her to attend the university and she is not currently employed. Her desire to remain connected to her family made her decide to attend the closest university so that she would be able to live at home and commute to school.

Sarah provided a different vantage point due to her switching majors from biology to psychology in her second semester. She explained that she entered as a biology major with the intention of becoming a medical doctor. Even before beginning at the university, Sarah hoped to help others through being a physician, but she found that helping through a career in psychology was a better fit. Sarah shared that while she grew up in the U.S., there were two periods in her life when she and her family lived in Mexico for a period of time. Sarah's most recent move back to the U.S. occurred prior to starting her freshman year in high school. These moves marked significant life transitions that impacted Sarah.

Sarah's story. In Sarah's narrative, her experience of not belonging in her pre-biology major centered on recognizing a lack of goodness of fit with her major. She

recognized that a biology major did not align with her interests. Additionally, she noted that the STEM environment and peer climate was also not a good fit. The following are the salient themes that arose from an interactive video interview with Sarah.

Sense of belonging and goodness of fit. Sarah described taking two STEM courses her first semester (microbiology and pre-calculus) as part of her biology major. While taking the STEM courses she realized that she was not finding enjoyment in her studies and believed that she would be miserable if she remained four years in a major in which she felt disconnected. Prior to experiencing biology as a poor fit, she described feeling a strong desire to become a medical doctor. She described that her interest in medicine arose from traveling to Mexico. She witnessed the lack of medical assistance available to poor and disadvantaged families. Sarah's desire to help others, combined with her experiences, led her to imagine a career of providing medical assistance to the most disadvantaged. In addition, when volunteering in a hospital during high school, Sarah had the opportunity to spend time with patients at their bedside providing them comfort through their illnesses. Her volunteer services felt meaningful and fulfilling, a method for helping others that she anticipated a career in medicine would also provide.

Upon beginning her STEM courses Sarah encountered the activities of a biology major. Gradually she became certain that biology was not the field for her. She described feeling disconnected while learning about amino acids and proteins, and performing experiments with animals. She began to realize that her original vision of a career in medicine that allowed for a close connection with patients was inaccurate. She described her STEM activities as not fitting with her desire to share knowledge through dialogue and her desire to develop interpersonal connections with those she wanted to help.

Sarah attributed her discovery of the types of activities that she enjoyed to the dialogues and experiences she obtained in high school after becoming involved in her church. She described her church involvement contributing to her journey toward a meaningful and enjoyable career. Sarah joined a leadership group in her Catholic church which allowed her to attend conferences and workshops, and gave her the opportunity to interact with and learn from other people's perspectives. The experiences provided insights into what she enjoyed doing and helped her recognize her curiosity for understanding and analyzing human behavior. Her church experiences provided a stark contrast to her biology major experiences. She noted that her interests did not align with a biology major.

Sarah reported noticing activities occurring in the psychology department when walking across campus. The experiments conducted in the psychology department were much more interesting to her because the experiments explored how people think and behave. "It's not something I want to do, spend hours in the lab to test species and stuff like that. I wanted to actually analyze data about something that is happening now, kinda like connecting reality." Sarah noted that her initial interest in biology was the connection she felt with the patients. Once in the major she realized that she would be unable to make the personal connections which originally drew her to that field. Sarah described her proactive behavior in educating herself about the activities involved in psychology. She reported following psychologists online and researching psychology topics of interest to her.

She noted that in addition to experiencing a better fit with activities that she could do as a psychology major, she also wanted to study and learn more about the psychology field. She reported having a strong desire to understand her parents and to help them. She explained that an initial interest in understanding human behavior emerged from the personal

experience of having her father suffer from alcoholism. She shared that she became interested in learning the reason behind his addiction as she recognized contextual influences impacting his life trajectory. She found that both her curiosity, the activities she found enjoyment in, and her desire to help others were better served by a psychology major.

Even though Sarah noted an obvious disconnect to her major, she shared that her decision to leave her STEM major was not straightforward. She reported experiencing uncertainty at the beginning of the year about whether she should push through her dissatisfaction and continue with her original plan of completing a biology major. She shared that she did not experience self-doubt about her abilities of succeeding in STEM and felt she could have remained in her biology major. She believed that through hard work, pushing herself, and seeking assistance when needed, she could successfully complete a degree in biology. She further stated that she obtained a 3.5 G.P.A. her first semester, which confirmed to her that she could have successfully completed a STEM degree. Performing well academically made her decision to leave the major even harder. She did not feel she had to leave due to performing poorly. She struggled with changing directions after dedicating her high school years to preparing for a STEM career, and being involved in various extracurricular activities related to the medical field. Additionally, Sarah noted that as a first generation student, she felt uncertain about whether leaving STEM was the correct decision. In order to feel more confident in deciding, Sarah reported seeking guidance from a high school mentor who could give her a better sense of whether a degree in psychology would benefit her. She described that her mentor helped her feel more certain about her decision to leave STEM.

Upon switching majors in her second semester, Sarah noticed a dramatic shift. She stated,

> You know like I said it [biology] wasn't my fit, so I just felt like this is probably not something for me and I don't think I will make it here. And um, but when I got into psych it was like oh yeah this is totally something I enjoy doing and learning and I would actually enjoy spending hours and sleeping late at night just so I can learn and read more on a specific topic. And compared to bio I was just like 'I want to go to sleep now'.

Switching majors confirmed to her that she made the correct decision. Although she knew she could successfully graduate with a STEM major, doing so would not have allowed her to feel fulfilled and excited about her future career.

Biology versus psychology major: Departmental support. Having had two majors, Sarah was able to reflect on the benefits she experienced from the departmental supports offered through her STEM major compared to her psychology major. She noted that while the STEM major did require more time commitment compared to other majors in order to successfully complete the major, the department also offered more assistance to their students in navigating their educational trajectory. She noted that the biology department offered various activities, programs, and resources to help their students, whereas she experienced the psychology department to be less structured and lacking supportive guidance for their students.

> I mean it's [psychology] an area that I think is so open, so open to people and um, it's up to the person if they want to, to want to do something and then they have to do something. In comparison to the bio where um That [bio] department is like, there is

> always a lot of people behind you, always encouraging you to do this and that because they know that, that major requires a lot, and um, it's a little bit harder than all the other departments.

She believed that because biology was more difficult, the department put forth more effort in supporting their students. She described the STEM academic structure as providing connections with peers, advanced level student mentors, and counselors. She believed the STEM efforts made it easier to form study groups with peers, get guidance from advanced students, and connect with resources. She stated that the transition into STEM was smoother than her transition into the psychology department which required more effort on her part when building social support and connecting to resources.

Sense of non-belonging through peer interactions. While Sarah noted that the STEM structure had courses with the same group of students which facilitated the formation of study groups. She also noted the intensity of being with the same peer group exacerbated a number of issues. Through the regular interaction with her peers, Sarah became aware of their differences, which further cemented her idea of not belonging in STEM. She described STEM peer interaction patterns that created an unwelcoming and contentious climate that she did not want. She portrayed her STEM peers as very outspoken in class and in sharing their personal opinions. She recognized that she did not share the same personality traits as her STEM peers and held divergent ways of interacting with the world.

> Actually, they were so different from me. It was like, I didn't really get along with everybody because they just had a different view. The fact that they are so openly expressive. Like they don't mind if what they say will eventually hurt other people.

Sarah shared her disapproval of the insensitive and hurtful comments of some peers that created a negative climate. While Sarah stated that no one directed an insensitive comment to her, she stated having observed various hurtful interactions among peers. She provided an example of witnessing an African American and a White female student criticizing a student of Asian descent for her pronunciation and her difficulty in expressing herself in English. She noticed a general devaluing of students of Asian descent among STEM peers. Sarah noticed that these types of negative peer interactions were not evident in her psychology major. She stated, "you didn't really hear stuff about being uncomfortable around other people [of different ethnic/racial groups among psychology peers]. It was just like you are there and that's it." Sarah explained that the STEM environment, characterized by smaller classroom sizes, the same peer group in multiple courses, and the sense of competition fueled hostile peer dynamics.

Sarah lamented that the biology department did not foster support between the peers. She observed that instead of peer support there was a degree of peer disconnection. Sarah believed that her peers held no opinion about her. She felt her peers did not know her. She described a propensity for independence and competition among peers which favored their personal interest over supporting others. She shared that many times during class peers sought to "show off" that they knew the material and to demonstrate their superior high school preparation, which added to the competitive nature of peer interactions.

> All throughout the semester it was like 'oh okay I got it' and then they would just leave early. Yeah so, it wasn't like, yeah it was like you had to go ask them [ask peers for help], and even if you asked them they would ignore you, they would say 'ask the professor or ask someone else'.

She pointed out that her experience was that students were usually focused on their own grasp of the material without a desire to help others. She noted that there were two or three peers who she felt were willing to support peers, but she noted that these peers were the exception to the rule.

The division of living on and off campus. A division between students who lived on and off campus was apparent to Sarah. She noted that STEM students who lived on campus were less willing to share their knowledge and assist others than commuting students. She reasoned that living on campus provided students with greater opportunity to meet as a group to learn the material, so they did not engage in class group work as much. For example, she noted that dorm students spoke of dorm study groups, and studying late into the night at the campus library. She also reported that the dorm STEM students were more involved in other campus activities, which also minimized their willingness to socialize with or help other peers. To illustrate her perception, Sarah described a group of three students living on campus who regularly met to learn the material outside of class. They did not need connections with others in class for learning and thus offered others no help; "they were just like 'I know it and I'm good'."

Another difference between living on and off campus that Sarah described was familial responsibilities. She reported needing to contribute to the functioning of her family. While the responsibilities took her valuable time, she enjoyed the time with her family. She noted that those who lived on campus did not appear to hold the same level of familial responsibilities which gave them more time and flexibility.

Transitional difficulties. Sarah described that she did not feel that she belonged to the academic or social STEM environment. However, her greatest difficulty in entering the

university was actually related to what she perceived to be a personal barrier. Sarah had to stop her typical social avoidance in order to be proactive in interacting with others and in seeking resources. In order to change her field of study, Sarah had to pursue information through interpersonal contacts. She noted that her transition into the university was similar in many ways to her experience of entering high school after moving back to the U.S. from Mexico. In both situations, Sarah felt she needed to be proactive and push herself out of her comfort zone to seek resources and build social support that could put her son track academically.

She found that the personal growth she had experienced since high school allowed her to transition into the university more successfully and protected her against negative self-evaluations that might have arisen from the negative peer environment in STEM. Sarah noted that although she felt she had room for further growth, she noted that she employed a different approach to dealing with difficulties in college than she had previously. At the university she noted that she was able to approach people socially and identify social connections that felt safe and positive. She was able to engage her challenges in a way that served her. She sought support and mentorship that ultimately helped her make a decision with which she could be happy. She also demonstrated that she could have let other's opinions of her switching majors negatively affect her self-perception, but she felt confident in her abilities which served as protection.

In reflecting back on her manner of approaching challenges, Sarah explained that she had not always been proactive. She described that previously when faced with a challenge she would avoid them. She began to realize that avoiding challenges was not serving her. With support, she gained a new perspective toward facing both academic and personal

challenges. She grew to believe there was a positive side to every difficulty faced. She described this by saying, “it might seem challenging right now, but if I work through it, step by step, you know I’ll find what’s that, that treasure in there. There is something that is going to help me build up my steps and just work harder.”

Sarah disclosed that her inclination to avoid challenges was present for the majority of her high school years. She shared that at that time she suffered from low self-esteem and had a deficient self-perception in spite of what she was able to accomplish academically. She described viewing herself as “too weak” and believed that she was unable to accomplish as much as others. She described herself as a “shy person” who would avoid performance related activities. She noted that during group presentations she intentionally stood in the back of the group so that she did not have to speak.

Feelings of inadequacy. Sarah shared that her shyness originated from having to move schools both in elementary and middle school, as she moved to Mexico on two occasions. In particular, she noted the difficulty of transitioning from one language to another and then back again. She shared her feelings of inadequacy in the dominant language each time she entered a new environment, which diminished her self-esteem. Additionally, she noted the problems with social interactions strengthened her avoidance. In Mexico, others perceived her to be showing off whenever she spoke English. To avoid criticism, Sarah minimized her social interactions and avoided talking to people so that they would not misinterpret her intentions. Additionally, by avoiding the use of English in Mexico, she was less able to able to speak English once back in the U.S.

Upon returning to the U.S., she noted social criticism from U.S. peers. She described difficulty in communicating and understanding English at the same level as her peers, noting

a particular difficultly in expressing herself. She shared experiencing more peer rejection and criticism when entering high school. Feeling that the Latinx students were not reaching out to help her, she attempted to connect socially with an Asian female. The Asian female made fun of her accent and criticized her lack of English fluency. Sarah received messages from peers in both countries that devalued her bilingualism. Her silencing of the non-dominant language led to not feeling fluent in either. Instead of developing both languages simultaneously, she experienced alternating between using and suppressing languages. She felt deficient in both languages through loss of practice. The interactions communicated to her that it was better to remain quiet.

> So then, I felt more like, it just shut me down like I was just like 'okay then maybe I am just speaking too funny' or I don't like people making fun of me because that makes me feel more inferior.

Sarah noted that with time her insecurities grew stronger when comparing herself to others who seemed to have a natural proclivity towards being able to approach social situations. In her descriptions she demonstrated having had an entity mindset regarding her social capacity. She shared that in comparing her shy interaction style to others, some peers appeared to have a natural ability that she felt she was missing. Her entity belief led to more social avoidance, which further supported her self-perceived deficits. She noted that not having outside validation of her abilities meant that no other feedback was available to disprove her own negative perceptions. She described being aware of her ethic to work hard that was recognized with awards. She appeared to have an incremental mindset for her school work. Her dissatisfaction with her shy personality style remained a hurdle.

Sarah demonstrated proactive behaviors toward language development as she described working to improve her English ability for three years in high school and reconnecting to her future goals. She described recognizing that she needed to stop being fearful and avoidant because she realized that approach would not allow her to accomplish her goals.

Spirituality and proactive strategies when facing challenges. Sarah described the influence that her religious beliefs and involvement within her religious community had in helping her employ proactive strategies in several domains of her life. She reported becoming more involved within her religious community three years prior to freshman year at the university. Sarah noted that her religious involvement helped her change the manner she approached many challenges and ultimately, how she viewed herself. She recounted many times wanting to give up. She reported focusing on her shared humanity, noting that others have failed yet persevered, which motivated her to persevere as well. In examining the journey of others, she expressed coming to the realization that she had the same capacity as any other human to overcome failures and persevere. She stated, "l'm like you know, I am a human too. There is no difference. So I think I can make it too." She also noted that her parents' testimony and life experiences were additional proof that everyone has the potential to accomplish something meaningful in their lives. She spoke of the strength she received through her connection to God and her faith. She treasured the message that everyone is worthy and has something special. Through her faith she experienced feeling valued which built her sense of esteem and counteracted previous internalized messages of inferiority.

She explained that her faith allowed her to approach challenges by means of sustained effort and progressive achievement across various domains. She expressed that she believed

that God is with her, supporting her through her life journey. She believed that whatever is impossible for her, is not impossible for God. She did not specify the domains of her incremental mindset. She spoke about the impact of her faith when facing challenges generally. She assumed that in all areas she operated from the belief of her ability to achieve her goals step by step. She believed her faith allowed her the capacity to view possibilities in circumstances in which she might have fallen into believing she could not accomplish something due to not having the capacity or talent. Having faith allowed her to push on step by step in the face of challenges and self-doubt.

Additionally, she described the Biblical scripture about everyone having a talent being particularly meaningful to her. She stated that hearing this scripture made her feel she was talented and had something to contribute. She spoke of attending a church leadership group that helped her build greater confidence in her interpersonal skills. Through personal reflection and prayer she described connecting with her talent and the goal of helping others. Her religious experiences motivated her towards her career goals.

> And so then in my senior year I started to work at, just starting to consider that I am worth a lot and then you know I am beautiful in every way and that I am just capable of accomplishing just as much as other people. That spiritual part of my life is something that has really helped me. Its having that faith that everything is possible. It's just like a matter of commitment and dedication and just believing in yourself, because if you don't believe in yourself then it's like you are already giving up.

Sarah spoke of her church leadership group creating community leaders. She learned public speaking through the leadership workshops. She traveled to another state during the summer to attend a leadership conference which she considered further enrichment.

She reported that her religious connection allowed her to begin healing the negativity and discrimination she experienced. During the interview she stated feeling most of that hurdle had been overcome. She felt greater self-confidence and recognized the benefits of being bilingual.

Family influence on the belief of improvement through effort. In addition to the religious influence, Sarah shared that her belief of improvement through effort was also facilitated by her family's values and influence. Her parents, she stated, taught her to value the little things in life. She shared that this perspective helps her remain grateful and aware of the positives things in her life. Her parents communicated the value of celebrating and being mindful of every small step in her progression. She stated that this mindset has helped her particularly during life transitions. As an example, she described her transition from high school to the university. She shared that beginning her undergraduate education was possible because of the accumulated small steps in high school allowing her accomplishment. She described her cultural strength as being grateful for little things and the accomplishments that small steps create. She noted that the value of humility allowed her to be aware and appreciate the incremental steps along the way towards greater accomplishments.

From her mother she spoke of learning the value of hard work, dedication, and persistence. Another important part of her life was to be a positive role model for her siblings. She shared an anecdote from her senior year in high school year in which she received multiple awards and medals. After receiving the honors her mother told Sarah that her younger sister was inspired to also achieve awards and accomplish important goals. Sarah had been unaware of her sister's attention to her accomplishments. The discovery motivated her to be a positive role model stating, "wow you know you never know like, we're always

doing things in life and you never know who is looking up to you." After learning about her sister's attention to her educational trajectory, Sarah stated that she took her role as an older sibling more to heart and sought to embody optimism and hard work to be a positive influence for her siblings.

> So then, now it's like I feel more that pressure over me because you know my brother just graduated high school too, so they are like putting me like an example, like she did this and that, and then so it's just like wow I need to work harder and do better so that they have me as a guide, as a mentor for future years.

She described that her younger siblings served as motivation for her to work hard and accomplishment of her goals.

Proactive strategies when facing challenges. Sarah described approaching challenges through proactive effort and step by step progress. She also endorsed beliefs of her ability of improving and succeeding through effort. This approach was evidenced when she described knowing that she could succeed in a STEM major through effort. Additionally, although there were social difficulties and lack of fit that were apparent to Sarah when in her biology major, she demonstrated a proactive stance as she described identifying a group of female peers she deemed to be friendly to find support. She noted that this group of girls appeared to be dedicated to achieving academically and demonstrated support for one another. She noted these characteristics were uncommon among most of her STEM peers. She shared that upon identifying this group of peers, she was able to overcome her shyness and engaged them. She described the social engagement occurring by asking them questions in class and starting conversations. The group of girls eventually responded by inviting her to

study with them outside of the classroom, which allowed Sarah to become part of a study group.

She also described employing a proactive orientation in the face of challenge when she moved back from Mexico and entered high school in the U.S. She stated that during this time, she felt she had to get out of her comfort zone and seek out necessary assistance to "get back on track" to ensure that she would be admitted to a university. She again noted her proactive stance when describing her intentions to connect with a mentor at the university. She purposefully sought support when transitioning into a new environment. She also noted that, like with her transition into high school, her intentions to connect with her Chicano Studies professor included a desire to receive assistance in order to continue improving her English abilities, just as she did when returning to the U.S. for high school.

Family Support. When Sarah wanted to change majors, she described worrying about communicating to her parents about her decision to switch majors. She described the extracurricular activities and classes she took in high school to prepare her for a career in medicine. She feared that her parents would think that she should not waste her prior investment in medicine by changing majors. Yet her parents responded in a very supportive manner. She recalled them saying,

> You know if you believe that you will succeed in that field and if you are the one that believes it, then you'll, you'll make it far. You know we're just here to support you whatever you wanna make. It's your decision and it's gonna be your future.

Sarah noted that while her parents had not attended college and could not provide concrete guidance and suggestions, she did feel supported by them in their backing the decision she decided to make. In addition, Sarah noted that during this time of confusion and stress for

Sarah, her family supported her in their own way by taking her to the park or beach to help her relax.

Mentorship. Sarah formed two mentorship relationships that supported her academic and personal life. One mentor was a teacher in high school and the other a university professor. Finding mentors was another example of Sarah proactively seeking assistance and support in order to improve.

In high school, Sarah sought out a teacher who coordinated a health academy program which she joined. Sarah developed a close, trusting relationship with the teacher who became her mentor. Sarah described her mentor as a mother figure who she trusted with her personal struggles at home and future dreams of becoming a physician. Her mentor provided interpersonal support and facilitated connections in the community. The teacher's level of active involvement in Sarah's academic was viewed as particularly helpful due to her first-generation student status. Whenever Sarah had a big educational decision, she sought her mentor's guidance. The teacher informed Sarah about scholarships, learning opportunities, and organizations that could be helpful.

Once at the university, Sarah formed a mentorship with a Chicano Latino Studies professor who taught her general education required course of English composition. The mentorship developed from a required reflective writing journal dedicated to exploring current experiences they were facing and then receiving feedback from the professor. Sarah noted that receiving the feedback was meaningful and paved the way for her to attend the professor's office hours. Sarah described this mentorship centering on discussing Sarah's experience at the university. The professor clearly communicated her availability through email, office hours, and texts. Sarah recalled the professor stating, "you guys are my only

students for this semester, so I will be giving my time to anybody, anybody that wants to, that needs help this semester." Sarah described her university mentor as a source of motivation and support by communicating positive messages that felt validating.

> So she was motivating me and telling me I am growing, and I am doing good and just to continue persevering. She was one of the people that made me feel comfortable, like college is for me.

Sarah expresses appreciation for the supportive message that counteracted her insecurity as she questioned whether she could succeed in college, especially because she was a first-generation student. The mentorship helped counteract her feelings of doubt. Because the professor self-identified as Chicana-Latina, Sarah believed this professor had more cultural insight which facilitated Sarah's identification with her university mentor. The university mentor echoed the same cultural values as her family, including the values of hard work, perseverance, and commitment to finishing what you start. Sarah also noted that they also shared some similar life experiences such as the importance of family, which cemented her experience of being understood.

> We just felt so comfortable. And uh, I think that really helped that she was so open and being willing to share examples or experiences just so like I could feel comfortable. Compared to my high school teacher I think she was more like educational based than willing to share personal experiences.

Sarah shared that her university professor had the ability to be open with her, to understanding her circumstances, and share her own personal experiences. Sarah experienced a sense of comfort and safety. In the safety of this relationship, Sarah felt she was able to improve her writing skills. She noted the perfect balance of receiving needed assistance in

improving her writing skills, feeling that her previous experiences were not discounted, and having her strengths highlighted and celebrated. All of these elements helped Sarah feel more confident in believing she could succeed at the university level and that she belonged in higher education.

Belonging intervention feedback. Sarah lacked an immediate recollection of the belonging intervention, yet she was able to contribute feedback on improvement to the intervention using her own experiences of facing challenges one step at a time. She conveyed that employing incremental thinking does improve one's sense of belonging. She reflected that she employs an incremental perspective in terms of her academics and her personal life. Again, she noted the positive results that result when approaching a challenge rather than running from it, stating that it leads to personal growth, becoming more mature, and more open. She noted that her father was a strong influence and believer of taking things one step at a time, which is how he worked on his recovery. In providing advice for an effective belonging video, she noted that it would have been helpful to see other Latina students sharing about how they have been able to move from avoiding challenges to approaching them.

At the end of the interview Sarah shared that she was grateful that this research project occurred. She shared that she believed this project was valuable because many Latina students, particularly first or second-generation students, could benefit from developing an incremental orientation. She believed that these students experience many barriers to feeling comfortable when entering the university. The barriers become even more difficult when Latinas are not able to share the difficulties with their parents because their parents did not attend college. Hearing from Latina students that successfully overcame similar difficulties

can help Latina students build confidence to successfully complete a level of education that others in their family have not. She shared that she believed that it would be helpful to produce videos with information from interviews focusing on how other first and second-generation Latina students were able to overcome the challenges of entering a university. These would provide specific actions that other Latina students could emulate and put into practice.

> And everybody has the same experience but in a different way, like they take a different approach. It is kind of nice to be able to identify and relate to different people and be like 'I am not the only one going through this, she went through this too.'

In summary, Sarah noted that difficulties in experiencing that one belongs in higher education is an experienced shared by many first and second-generation Latina students. Yet, she believed in the importance of gaining insights of what other Latina students did to overcome the challenge of feelings of inferiority or non-belonging.

Cross Case Analysis

The following section details the salient themes that arose across the four narratives. There were five prominent themes identified across cases which influenced participants' sense of belonging: (a) initial transitional challenges (b) STEM environment and structure (c) STEM peer interactions, (d) personal factors impacting experience of belonging, (e) connecting to social support, and (f) proactive strategies to overcome challenges. The areas of social connection and intellectual ability were interconnected in each participant's sense of belonging within STEM. The mutual influence of both areas is reflected within the five major themes identified.

Initial Transitional Challenges

The first major theme was defined as issues and difficulties that arose for participants when starting their first year and semester of college. Participants reported experiencing a number of challenges at the onset of their first year in adapting to the university environment and their STEM major. The initial challenges impacted their sense of belonging and connection to sources of support. The challenges often led to feelings of self-doubt, especially regarding the participants' ability to successfully remain in a STEM major. The following areas were noted by some participants as challenges faced at the onset of the academic year, which added to the difficulties faced throughout the year.

Adapting to the STEM academic environment. Participants encountered transitional difficulties adjusting to the STEM academic domain. Participants described difficulty in adapting to a new environment which required learning different ways of achieving academic competence. Jane described struggling with learning an unfamiliar computer system used to complete assignments. Participants reported having realized that their typical patterns of studying and approaching learning were no longer enough to succeed academically in STEM. Jane and Amanda spoke of learning better study skills and time management skills.

High school preparation. The theme of high school preparation was described in relation to the ease in transitioning into participants' STEM major. Participants reported feeling dissatisfied with their high school academic experiences. Liz detailed that her high school offered various AP courses, yet she felt that the quality of instruction was significantly lacking. She described that it was not until going to the university and receiving better quality instruction, that she was able to fully comprehend the material she had been

exposed to in high school Amanda described the highest level of dissatisfaction with her high school preparation. She highlighted being aware that her peers had taken multiple STEM AP courses during high school, while her high school offered limited options. She described that her poor of high school preparation contributed to self-doubt of her intellectual abilities. Amanda described her STEM professors as holding higher academic expectations of their students. Amanda shared that adapting to a higher level of academic rigor and feeling that she needed to catch up to her peers' level of knowledge created feelings of self-doubt. Jane on the other hand, reported feeling that she received adequate high school preparation in STEM and felt that she was able to recall knowledge from AP STEM courses in high school that she found helpful when taking university level courses.

Challenges in connecting with resources outside of STEM. Participants described experiencing difficulty in connecting with university-wide resources outside of the STEM structure. Participants noted that connecting to university resources required increased effort and to become more proactive in independently researching available services or programs offered by the university. Participants also noted that the need for exploration of resources posed a personal challenge that required them to get out of their "comfort zones" in order to interact with new people and ask what was available. For example, one participant reflected on the differences in connecting to resources at the university compared to her high school experience. She stated that in high school help was "already around you" and she did not have to seek out support because it was already incorporated for students.

Participants described that transitioning into the university meant a separation from previous sources of support including friendships and mentors. Starting in a new environment was compounded by the additional effort participants had to put into building or

connecting with new sources of support. Jane described that her anxiety when interacting with new people and being in a new environment created an additional barrier for her in connecting with university-wide services. Amanda noted wishing she had received more assistance in learning about and connecting to resources at the university at the very start of her first year. Greater assistance would have lessened her struggles during the transition into the university. In particular she described that the transition into higher education was more difficult than transitioning into high school from Mexico. In her high school she felt automatic support from her teachers. At the university she felt she was "alone." She had to make the connections and find the support she was missing.

STEM Environment and Structure

The second prominent theme described across participants was the STEM environment and structure which was both a helpful and a hindering characteristic of being part of a STEM major/STEM department. Although, participants had varying class sizes depending on their courses and major, they all reported enrolling in a supplemental instruction course during their first semester. The STEM structure made it so the same cohort of students were together across various courses, which was the case for all participants their first semester. The following themes highlighted how the STEM structure affected the participants' sense of belonging.

STEM academic support and structure. Participants collectively acknowledged that they felt academically supported by the STEM structure. They shared liking the automatic enrollment into supplemental courses that provided a small class taught by an advanced student mentor who provided supplemental information for a difficult class. Participants described finding the advanced student mentors and their STEM professors to be

a source of academic support. Participants noted that they did not feel as though these individuals held negative expectations of them or believed in STEM related stereotypes. When describing her interactions with STEM faculty, Amanda explained, "professors they don't, I think they don't really make you feel bad, I think. Because they are there for you." In moving from a biology to a psychology major, Sarah noticed a loss of structure, resources and support. She described the STEM structure as providing concrete support and encouragement. Participants described the STEM structure as making it easy to connect with tutors, counselors, and classmates.

Impact of commuting and being employed. Participants highlighted that having to commute and work created restrictions that impacted both academic and social domains. They described their daily routine consisted of attending the university, going to work, commuting home, completing homework and studying. Participants expressed that having to work meant having less time available to study compared to their non-employed counterparts. Having less time to study was described as a significant impairment particularly in the STEM classes. They noted that they were unable to study the recommended number of hours.

Participants found that being employed and commuting made it difficult to create study groups with STEM peers. They noted that their inflexible schedules and family responsibilities at home, limited the time available to study with peers. Participants noted that this limitation not only reduced their academic preparation but their social connections as well. For example, Sarah described a division among STEM peers who commute and those who lived on campus. STEM peers living on campus were advantaged by creating social connections with each other and having the opportunity to meet throughout the day.

Divisions were noted within the classroom as well with friendship groups bonds forming more quickly among those who lived on campus. Participants shared feeling disadvantaged in their peer connections and friendships because of their limited time on campus. They reported not socially interacting with friends outside of the classroom. Instead, if they meet with friends, it was for educational purposes only and finding time was difficult.

Living and working off campus also created a disconnection to the university, its services and resources. While participants noted attempts to access services and resources including attending campus psychological services and club meetings, involvement was not sustainable. While experiencing the programs beneficial on various levels (i.e. mental health, academically), they reported that these programs were the first things they took off their schedules. For Jane, who worked on campus, her experience of employment was slightly different in that she experienced a greater sense of connection to the university as a whole due to being a part of the university system. Yet, she too noted that being employed and living off campus prevented her from joining clubs that she felt might be helpful in her career goal and use campus psychological services.

Lack of ethnic/racial and gender representation and belonging. Participants named ethnic/racial and gender underrepresentation as a common theme that they noticed in their STEM environment. Participants noted that while they considered the university to be very diverse, the level of diversity present among the general student body was not reflected within STEM majors. Participants described being underrepresented in their STEM major across identity markers of ethnicity/race and/or gender. Three out of four participants began with a biology major and reported being underrepresented across ethnicity/race, while noting that females were well represented in biology related majors. Amanda on the other hand, the

only participant in a math major, described the added underrepresentation of females in her major and its impact on her sense of belonging to her major.

Participants described their visible sense of underrepresentation in their STEM majors led to a greater sense of self-doubt in their abilities and sense of belonging. Amanda noted the lack of representation of Latina students made her feel that her STEM major was not a space she was meant to inhabit. She described feeling "intimidated". She observed the harm to her self-esteem and her emotional wellbeing attributed to the lack of Latina representation. Overall, participants noted an underlying feeling of discomfort in being minimally represented that was reflected in their social disconnection with STEM peers.

STEM Peer Interactions

The third prominent theme described across participants was defined as the impact and interaction styles observed within other students in STEM. Participants noted both positive and negative aspects of having the same peers in their STEM courses. Participants pointed out the benefits of consistency across courses and a general sense of respect observed by peers. For example, Jane reported that having the same group of peers in each class was helpful in lowering her level of anxiety in meeting new peers with each new course. For her, the consistency in peer group allowed a greater sense of comfort in knowing that someone she could count on was in all her STEM courses. Amanda however, described that a positive aspect of her STEM peer interactions was that she had not been made fun of by her peers for having a noticeable accent, which was a fear stemming from her high school experiences. At the same time, Amanda described feeling as though a few girls deliberately avoided sitting at her table due to her accent, which further made her feel othered and unwelcome.

Social disconnection. Social disconnection among peers in STEM was a salient theme present throughout the narratives, which was enforced by the structured peer groups. Participants noted more aspects of disconnection than they did positive interactions. Participants described their social disconnection as a result of their avoidance of approaching their peers. For example, Jane described that her anxiety in the social domain made it difficult for her to engage her peers and build relationships. Amanda also noted limited interactions and described only initiating interactions with peers who she perceived to be kind.

Liz and Sarah described their limited social connection with STEM peers were a result of their peers' distancing behaviors. For example, Sarah explained that she experienced her peers to be very competitive which led to lack of support among peers. She stated witnessing students declining to helping each other and observed how some students taunted other peers. Sarah not only noticed an unsupportive peer environment, but she also witnessed peers making insensitive and discriminatory remarks toward others.

Sarah and Jane described that their limited social interactions with their STEM peers led them to think that their peers did not know them and thus did not hold any perceptions of them.

Ethnic comfort among peers. The domain of participant's ethnic comfort among peers in the STEM environment was apparent when they spoke of feeling more comfortable in environments with greater Latinx student representation. Participants described having the opportunity to interact with more Latinx peers in their general education courses outside of STEM structure. Some participants described feeling a greater sense of peer connectedness and a general sense of comfort in non-STEM courses. Participants described that peer

connections were facilitated among peers who they felt shared similarities to them. For three out of the four participants, a sense of similarity and connection was felt with other Latinx peers. For example, Jane described that when in spaces with greater Latinx representation she experienced a greater sense of relaxation and social comfort due to shared cultural understanding. Amanda shared that connecting with other Latinas was instrumental in building a sense of community that she felt she was lacking within STEM. Even though less comfortable, participants reported forming STEM peer connections with other ethnic/racial minority females.

The exception was Liz who reported feeling most connected to STEM peers due to shared academic experiences and career goals. Unlike the other participants, Liz's peer group included students of majority ethnic/racial and gender identities, yet she also reported feeling closest to the Latina peer in her friend group, stating that they shared "similar personalities".

Stereotypes in STEM. Amanda and Liz both stated that they felt that their STEM peers underestimated their intellectual abilities as a result of holding STEM stereotypes. They both believed they had peers with STEM stereotypes. Both participants reported experiencing that male students' opinions were valued over female students and experienced peers reacting with surprise when the observed behaviors did not fit their stereotypes. Liz noted that while others were assumed to have superior knowledge, she felt that she had to prove her knowledge by competing with her male peers. Amanda and Liz both explained that their peers' perception of them was communicated nonverbally through their disinterest in their input during group work. Amanda reported that her peers believed that Latina students were incapable of being successful in math or science. She also sensed that her peers expected her to be statistically one of students who leave STEM because they find it too difficult. Amanda

believed that the STEM stereotypes were supported by the lack of representation of Latina students in math.

While participants noted experiencing negative stereotypes from peers, none reported feeling this among their STEM professors or advanced student mentors. Participants generally believed that they felt valued by their professors and peer mentors.

Impact of peer interactions/disconnection. Participants described the negative results stemming from their sense of disconnection occurring at the beginning of their first year. Both Jane and Amanda described negative consequences including a sense of "loneliness" and emotional distress that distracted them from fully attending to their academic challenges. Jane reported that splitting her attention reduced her academic performance. She described feeling disconnected from university peers, compounded by separating from previously established social supports. Amanda's early difficulties in both social and academic realms led to significant distress and "negative thoughts" in which she questioned whether she belonged in a STEM major to the point that she considered leaving her major. While Amanda performed well academically, thus demonstrating her intellectual ability to remain in her major, she described the greatest level of emotional distress of all participants interviewed. For her, the social challenges she faced within her STEM major, decreased her sense of belonging in social and academic domains at the start of the year.

Participants also reported many of their peer interactions decreased their belief in their academic abilities. Participants noted that peer held stereotypes of their lower intellectual ability harmed their self-efficacy. For example, Amanda noted that peers' underestimation of her abilities led her to question herself and question whether she should remain within STEM. Liz began to wonder whether she might actually be less intelligent

than her male counterparts because of her peers' lower expectations of female students. Participants described the threats to their intellectual belief as influencing their sense of self-worth and self-esteem.

Personal Factors Impacting Experience of Belonging

The fourth prominent theme was defined as participants' past personal experiences and their identity markers that influenced their experience of belonging within STEM. The participant's past experiences and identities were described as impactful in their sense of comfort in initiating interactions with their STEM peers. Participants noted the following past experiences or identity markers that influenced their sense of threat of not belonging in STEM.

Self-perception as "shy" and language barriers. A prominent theme across all participants was their self-description as shy. When discussing social disconnection all participants to some degree noted a level of fear and avoidance of social situations attributed to shyness. Participants explained that their caution in initiating social interactions with peers was connected to past negative peer experiences. Amanda linked her shyness to experiences of discrimination by her high school peers, who criticized her lack of dominion of the English language after immigrating from Mexico. Sarah noted that she was unhappy with her "shy personality" in high school so she purposefully worked on her social confidence through participating in leadership groups at her church. She noted that her shyness stemmed from having moved schools and country of residence several times. She also described being judged by peers based on her language ability, which led her to be more reserved and "quiet".

Some participants reported moving between Mexico and the U.S. These transitions created adjustment challenges in learning to be fluent in the dominant language with each

move, while losing dominion over the nondominant language. Sarah noted that moving between two countries harmed her language fluency in both English and Spanish. These difficulties were further compounded by negative social evaluations from others due to the loss of fluency in both languages. Sarah described that her peer experiences in both countries made her feel anxious in social situations. She chose to avoid social interactions to avoid criticism.

Visible markers. The theme of identifiable markers that communicate a minority status appeared across several narratives. Amanda was aware that she had a readily identifiable Spanish accent when she spoke English. Experiencing the complete opposite, Liz was aware that her lack of visible features caused many to misidentify her ethnicity, which changed how she felt others interacted with her. In both cases, visible markers influenced their sense of belonging and other's interactions with them. In Amanda's case, she felt that her accent more profoundly highlighted the degree of difference between her and the majority of her STEM peers, leading her to feel that she was not meant to be a part of the STEM environment. Liz on the other hand, believed that due to being visibly perceived as White rather than Mexican-American shielded her from receiving lower academic expectations. In her place of employment, she reported noticing that others placed lower expectations on Latina co-workers who were phenotypically identified as Mexican. Thus, Liz believed that her appearance prevented her from experiencing additional threats to her sense of belonging within STEM.

First generation college student status. Most participants identified as a first-generation college student and those who identified in this way noted that this identity marker influenced their sense of comfort and belonging in STEM and higher education.

Participants experienced struggles navigating higher education as a whole. They felt a need to connect with resources and mentors to assist them through their academic challenges and the emotional distress associated with feelings of not belonging in higher education. Some noted that because their parents could not provide them with step-by-step guidance in navigating higher education, they relied on other people's input to discuss and explore options prior to taking actions about their education. For example, Sarah noted that every time she was going to make a big decision regarding her education, such as her decision to switch majors, she relied on consulting her high school mentor to help make her decision.

Connecting to Social Support

The fifth prominent theme described across participants was defined as participants' engagement with people or activities that promoted well-being or was used to manage stress. Across all participants the theme of social support was important in acclimating to the university and overcoming challenges. Some participants noted that receiving social support allowed them to increase their confidence and self-esteem which countered self-doubt.

Campus psychological services. Participants noted connecting with campus psychological services after experiencing emotional distress that was negatively impacting their academic focus. Participants noted that attending counseling was beneficial in helping them cope with the difficulties they faced when starting at the university. One participant noted that the new environment made old forms of coping and stress relief no longer feasible due to having less time to dedicate to these activities. Participants noted that the new coping skills were very useful. Jane noted that her counselor encouraged her to engage in social situations with new people. Amanda found it helpful to be told that she is worth just as much as anyone else, which appeared to improve her self-esteem and perseverance. Amanda shared

that due to having limited family contact, she relied on her campus support network, such as counseling, to get her through difficult times.

Mentorship support. Some participants identified the important role that mentorship played in providing support and a sense of connection within the university. Mentorship was obtained through different avenues. Jane found mentorship through the friendships with the older adults that she met through her campus employment. Jane described that it was easier for her to connect with older adults. She enjoyed that, "they provide me with instructions, and they are guiding my way." Other participants noted the importance in seeking out professors as mentors who could provide emotional support in addition to instructional support. Sarah described that she valued the personal connection and support provided by her Chicano professor mentor who she felt understood her emotional experience as a Latina student. She described feeling understood, encouraged, and pushed to grow which led her to feel that she did belong in higher education.

Participants described that finding mentors who shared their ethnic/racial identification improved their mentorship experiences. Participants described Latinx professors as demonstrating greater support of Latinx students. When describing a supportive interaction with a male math professor, Amanda specified that he was Latino as an explanation for his support of her in that interaction. Participants experienced Latinx mentors as better able to connect with their experiences in higher education. In particular, Sarah noted the importance that she placed on having a mentor who she felt was "more aware of what Latinos or Hispanics go through".

Family support and motivation. Family support was generally noted as providing important motivation and assistance for participants in their pursuit of higher education.

Participants reported emotional support from parents, siblings, and other close family members through their educational journey. Because the majority of participants' parents had not attended higher education, they could not provide academic guidance. However, they provided support in other ways including providing encouragement, supporting participant's academic decisions, being a source of motivation towards persistence through challenges, and engaging participants in activities to lessen their stress levels. At times family members also served as a source of additional stress. Participants noted the family need for greater financial income requiring participants to remain employed. Sarah and Amanda noted that their parents served as models of persistence, hard work, and step-by-step advancement.

Liz was the only participant who described not experiencing family support. Rather, she described experiencing added pressure and stress from her family. Her father's experience of completing a degree in STEM was not a source of guidance and support. Her father's education level and experience increased his expectation that she achieve academically in a STEM major. Liz noted that her social support came from her friends and romantic partner.

Religion and spirituality. Participants noted receiving support and building social connections through their involvement in their church. Participants noted that engaging in church provided a sense of community that was particularly helpful in facing social disconnection and academic challenges at the university. Sarah felt that her religion supported her ability to improve her self-esteem and change her self-perceptions. Religion gave her strength and hope to persist in facing challenges rather than running from them. To Sarah, religion communicated "that everything is possible, it is just a matter of commitment

and dedication, and just believing in yourself." Her religion helped her feel that she is "worth a lot" and believe that she is "capable of accomplishing just as much as other people."

Proactive Strategies to Overcome Challenges

The sixth prominent theme was proactive strategies used when facing challenges which was defined as behaviors that demonstrated an orientation toward addressing and working to improve in the face of challenges through step-by-step actions and a flexible belief that participants could overcome challenge through sustained effort and step by step improvement. Participants noted the belief that with practice and effort they were able to improve performance and improve their feelings of initial doubt, replacing it with a greater sense of confidence in various domains. Jane described a continued struggle between avoiding difficult social situations and proactively seeking to engage socially. However, she described feeling increased confidence the more she pushed herself to interact with new people. By their second semester the majority of the participants reported feeling confident and comfortable with their abilities within the academic domain. Participants described learning that the more effort they put into their studies, the better they perform. They described approaching challenges more proactively when they believed that they could improve if they put time and effort into thing. All participants endorsed the belief that they could improve in various domains through effort, yet many spoke of occasional doubts about their ability to improve, particularly academically. Amanda described occasional self-doubt, yet the positive results of the effort she expended countered the negative self-beliefs and helped diminish her self-doubt. She noted that little by little she felt more comfortable and overcame academic challenges, which helped her feel that she did belong in her major and could succeed. She noted that for her the key was to build her self-esteem which she did

through counseling. Only then was she able to recognize her ability to successfully achieve goals and overcome obstacles with effort and incremental steps.

Goodness of fit and personal connection. Various participants described that their connection to a greater goal served as an important factor in moving them to face challenges rather than moving away from them. Participants noted career goals and personal experiences that motivated them when challenged. Amanda noted a personal connection to her major as well noting that her high school teacher had influenced her greatly. She shared her desire to do the same for other students, particularly mentoring immigrant students and supporting their education. She noted wanting to connect with students, help them achieve, and demonstrate the importance of an education. Sarah also felt that the material matched her interests and preferred method of interacting with material. Additionally, she felt STEM was connected to her personal experiences in her family and in particular with her father's personal struggle. Finally, Sarah emotionally invested in becoming a physician, so she could give back to the less fortunate. However, upon discovering the lack of fit with her biology major, she discovered that she had a better fit with psychology and could still obtain her goal of helping others.

Enjoyment of chosen major. Another theme that emerged as supportive of facing challenges was a sense of enjoyment in the activities and processes participants engage in as well as a general enjoyment of being challenged. Participants noted finding pleasure in completing assignments within their major. Sarah noted that when she moved to a psychology major she was able to find enjoyment in the activities that her major required. Jane described that she was able to socially engage with new people if the topic of discussion

included a topic of particular interest to her, such as topics related to her interest in becoming a veterinarian.

Additionally, Liz and Amanda also noted finding enjoyment in challenging material. Amanda spoke of enjoying math problems because there is always a solution to the problem and multiple paths to arriving at the correct answer. Liz noted that she learns more when she perceives the material as challenging. The sense of enjoyment allowed both participants to remain engaged with challenging material. Additionally, Amanda and Liz described enjoying the competition, which also served to motivate them. Both participants described having competitions, spoken and unspoken, with others to see who could perform better. Liz described having an unspoken competition with the highest performing male in the class, which she felt motivated her to improve and work harder.

Belonging intervention feedback. When asked directly about their evaluation and thoughts regarding the belonging intervention they underwent, most participants described having either employed the orientation of incremental effort in the past or presently. Yet, their direct feedback of the belonging intervention seeking to increase the belief that they could improve through effort was noted to be lacking when considering tailoring the intervention message to Latina students.

Of those who were able to recall the intervention with prompting, participants described the theme of relatability to the speakers as a way to improve the intervention. They shared that the belonging message would have been better received if the message had been given by someone they valued and trusted. An example provided was to have an advanced level student mentor within their STEM major deliver the message. Participants noted that the message could be better tailored to particular experiences within STEM, rather than

having someone from another university and from a non-STEM major provide the message. Amanda noted that it would be important to have another Latina who was an advanced level student talk about their struggles of feeling that they did not belonged in STEM due to difficulties in social and academic domains. Similarly, Sarah felt it was important to have another Latina student talk about incremental mindsets and give examples of what helped them approach challenges rather than running away from them.

All participants agreed that talking about approaching challenges through incremental efforts was an important message to provide. Some believed this message would be particularly useful for first generation Latina students. Participants also noted that having other Latina STEM students serve as role models can help build Latina students' confidence in their ability to tackle the challenges experienced within STEM and increase their belief that they can successfully complete a STEM degree.

Chapter 5

Discussion

This study sought to understand the experience of four Latina first-year university students who majored in science, technology, engineering or math (STEM). The literature informing the study was primarily from the sense of belonging construct and the implicit theory of change (Deci, 1992; Good, Rattan, & Dweck, 2012; Hurtado & Carter, 1997; Walton & Cohen, 2011). While these two bodies of knowledge captured a great deal of the lived experiences of the Latinas in this study, this study contributes new information to the literature. This was the first study to examine the experiences related to intersectionality of Latina STEM students; the first study to examine the influence of an incremental theory of growth applied to a students' sense of belonging; and the first to examine Latina students' perceptions of the development of their growth mindset.

Interventions normalizing the initial low sense of belonging or seeking to increase the incremental theory of intelligence have highlighted the literature on social and academic outcomes of college students (Good et al., 2012; Spitzer & Aronson, 2015; Walton & Cohen, 2011; Yeager et al., 2014). This study was the first to study participants after receiving an intervention that combined both forms of interventions. That is, participants received the message that feelings of uncertainty that one belongs is a typical doubt experienced by most students in their first year (i.e., the social belonging intervention message), as well being told that through use of a growth mindset students' sense of belonging can improve (i.e., the incremental theory of change intervention message). Since the Latina students were exposed to both intervention perspectives they were able to illuminate their experience of both approaches to coping with the difficulties of the first year of a STEM major.

Summary Findings

In order to understand whether these issues were relevant to the Latina participants, these research questions were pursued: (a) what are the Latina participants' experience of belonging in STEM majors after having undergone a belonging intervention? (b) how do these Latina participants cope with challenges (i.e. belonging)? (c) what are their suggestions for tailoring future interventions for Latina students in STEM?

Sense of belonging. The results from the case analysis supported the majority of the literature presented in the literature review portion of this paper regarding the factors that influence sense of belonging among stigmatized minority groups. Results demonstrated that sense of belonging was a salient issue for the participants as predicted in the literature (Bonous-Hammarth, 2000; Rankin & Reason, 2005). The factors included in Hoffman et al., (2002) expanded description of sense of belonging were all present in the participants' narratives. The factors included (a) interactions with peers and faculty (i.e. peer/faculty perceptions of them), (b) involvement on campus, (c) experience of academic and social support, and (d) experience of STEM classroom environment (i.e. ethnic/racial and gender climate). The participants reported their problematic sense of belonging undermined their academic performance, connection to the university, and self-efficacy as reported in the literature (Steele & Aronson, 1995; Walton & Spencer, 2009). Their perceptions of being unwelcome or underappreciated created insecurity about their academic abilities, which the literature describes as the effect of a "chilly climate" (Bonous-Hammarth, 2000: Flam, 1991).

The influence of peer interactions was central to the Latina participants' sense of belonging in STEM (Lovelace & Rosen, 1996;Walton & Cohen, 2007). The STEM class structure amplified the influence of peer interactions by having the same peer cohort for all

their STEM courses. The participants experienced their peers as expressing negative social stereotypes of Latinx and/or females in STEM. The peers were perceived as communicating that the Latina participants had lower intellectual abilities and capacity to remain in a STEM major. The negative peer interactions diminished the participants' self-confidence in their academic abilities and their sense of comfort within STEM, which were most prominent for the participants during the beginning of their first year. Also threatening the participants' sense of belonging was the significant underrepresentation of peers who reflected aspects of Latina identity. Some participants wondered whether the low representation of Latinas was a confirmation of their peers' messages about Latina's lower intellectual ability.

An issue not included in the sense of belonging model that influenced the Latina students was their past experiences. The Latina students described challenges and barriers in connection to past experiences of discrimination and stereotype threat that harmed their sense of belonging in their university STEM major. Research results have found that influential past experiences of discrimination create a sensitivity to the reoccurrence of discrimination (Cook et al.,2012; Goff, Steele, & Davies, 2008; Walton & Cohen, 2007). The past experience made it difficult for the participants to view the interpersonal micro-aggressions as something that could happen to any student. Their experience was that the behavior was targeted at them because of their intersectionality of gender and ethnic/racial identity markers.

Implicit theory of change. Results in this study were consistent with the research on incremental/growth mindsets. The participants' descriptions of their chosen strategies when dealing with challenges largely demonstrated incremental/growth mindset and strategies. Participants described largely attending to challenges by incremental effort and perseverance

that improved their confidence in their abilities and sense of belonging. Although participants did note entity thinking in their insecurities of their abilities and belonging at the start of the year, their mindset tended to change to an incremental mindset in which they believed that they had the ability to improve, which led to proactive strategies rather than avoidance of challenges. The growth mindset that participants described having employed, appeared to be central in maintaining motivation, resilience, and ultimately helping participants achieve goals. Results of this study align with the literature, which has shown that having an incremental mindset can help students be more likely to understand that their abilities can grow and circumstances improve with effort, which allows them to persist through setbacks (Spitzer & Aronson, 2015). Participants reported instances of using an incremental mindset in social and academic domains to strengthen their sense of belonging and perseverance in STEM. Participants reported approaching challenges and accomplishing goals through proactive strategies and incremental steps. Participants revealed the belief that they had the capacity to improve and overcome hurdles through small proactive steps. The approach allowed them to engage in proactive actions rather than give up when challenged. Even so, participants noted that thoughts of insecurity occasionally appeared, but they were able to fight through the insecurities. By engaging in proactive strategies, they accomplished small successes which supported the idea that they could improve through effort. While their growth orientation did not remove their STEM related challenges, their approach helped them achieve academic confidence to meet the challenges of their major.

Their growth mindset related to sense of belonging was revealed in their searching for social support through many avenues. The most reported avenues were outside of the STEM peer environment (i.e. Latina support group, initiating social interactions with people at

work, church). In pursuing sense of belonging outside of their peer environment the participants could select more welcoming and accepting targets. The community outside of STEM decreased their feelings of isolation, thus improving their well-being.

The use of an incremental mindset to improve sense of belonging has not been previously explored among Latina students in STEM. This study documents new insights into participants' use of incremental orientation to build support and community, bolster their sense of belonging, and both persist and achieve academically. Participants described using an incremental mindset to successfully approach challenges which created more confidence in their intellectual abilities and greater comfort in their environment. Each participant described persisting in actively searching for information, support, and guidance. Each contributed examples in applying the growth mindset.

The intervention that participants experienced prior to this study combined two interventions from the literature with two distinct messages about coping with a low sense of belonging upon entering college (Good et al., 2012; Spitzer & Aronson, 2015; Walton & Cohen, 2011; Yeager et al., 2014). One message in the intervention asserted that believing in a growth mindset about belonging in their STEM major would assure their success. The other message sought to normalize their initial low sense of belonging. The second message asserted that a low sense of belonging was a natural experience for everyone entering college, and asserting that after a while they would feel a part of the STEM major.

The part of the intervention that sought to normalize their low sense of belonging did not feel affirming or helpful by the participants report. The intersecting minority markers of the Latina participants where obviously different from their peers. Some participants expressed that their experience was not the same as their peers' experience of transitioning

into college/STEM because of the stereotyping and the minority status. One participant felt that while her peers and advanced student mentors shared similar educational interests, their experiences in the STEM environment did not represent her own, due to their majority status.

Participants reported resonating more with the incremental mindset message that was also communicated. By employing the incremental mindset, they reported improving their sense of belonging. This was exemplified by the contrast in participants' descriptions of their first and second semester experiences, noting the improvement in sense of belonging. Although participants continued to face some level of discomfort with their STEM peers, by their second semester they described having more confidence as a result of implementing incremental strategies. They described that the experience of threat had diminished because they had proof (i.e. G.P.A.) that they could succeed in their major. Additionally, their proactive strategies with peers in STEM eventually allowed them to form relationships with peers that they felt safe to approach. Although still cautious about their social connections to STEM peers, making new connections and performing well academically, increased their sense of belonging.

Implications

The participants of the current study attended a Hispanic Serving Institution, which meant that a significant portion of the student body identifies as Hispanic and that the university offers particular services to help promote this populations' academic success. However, the small Latina representation in STEM created part of the problematic circumstances reported by the participants and reported in the literature (Lovelace & Rosen, 1996; Walton & Cohen, 2007). The sense that STEM majors are not inhabited by Latinas contributed to the participants perceptions of cold peer interactions and self-doubts. This

study's results parallel the past research (Blackwell, Trzesniewski, & Dweck, 2007; Mueller & Dweck, 1998; Yeager & Dweck, 2012) highlighting the importance exploring and promoting protective factors among Latina populations in influencing sense of belonging and persistence. Participants' description of the usefulness in employing a growth mindset had on their sense of belonging may have significant implications for higher education institutions. Providing incoming students with growth mindset interventions might be helpful in defending against negative peer interactions that might otherwise perpetuate the low representation of Latina students in STEM.

This study has implications that inform future belonging interventions that include an incremental mindset focus. Significantly, each Latina participant suggested using tailored interventions for Latina students. Latina students wanted coping strategies to counter their negative experiences of discrimination. An intervention presenting social difficulties as common for all students was not acceptable to them. Participants wanted messages that directly affirmed their equivalent worth and ability-to-grow when compared to their peers. These messages were identified as supporting their belief in themselves and communicating that an incremental mindset could work for them. Participants also suggested the importance of trusted sources delivering the messages and testimonials from role models with similar identity markers. Having an advanced Latina student represented in a belonging intervention video was suggested to help Latina students believe that they are capable of succeeding in STEM.

In summary, results highlight the use of incremental mindset as a promising area to foster sense of belonging that may strengthen Latina students' ability to navigate hostile climates and persist in STEM. The potential for greater Latina representation in STEM may

ultimately serve to weaken the negative stereotypes many stigmatized groups face and change the climate and culture within STEM.

Strengths and Limitations

A strength of this study was the in-depth exploration of Latina students' experiences of belonging in STEM which was accomplished because of small number of participants. Using an open-ended qualitative method to explore the research questions allowed for greater understanding of each participant's experiences. Having two coders with different areas of understanding that related to the focus of the study was another strength. One coder had in depth understanding of the implicit theory of change, while the other had personal experience of identifying as an ethnic/racial and gender minority within STEM.

Another potential strength and limitation of the study was that the primary researcher and interviewer had a partial in-group status as she identified as Latina but did not major in STEM. Although identifying as Latina might have allowed for an understanding of culture and climate in this area, it might also have served to create incorrect or blanket assumptions about the population because of prior knowledge. Additionally, identifying as Latina might have both facilitated or hindered the interview process. The similarity of identity markers might have made participants feel more comfortable in reflecting about their experiences, while at the same time they might have neglected to provide in-depth explanations with the assumption that the interviewer already had a level of understanding. Further, the interviewer not being in a STEM field might have also impacted the responses that the participants provided. An additional limitation was the manner of inquiry about implicit self-theories. Participants described their approach to challenges rather than directly calling their approach

entity or incremental thinking. Therefore the researchers imposed theory onto the data, which might have been reductionistic.

Future Directions

The within and between case analysis of four Latina students' experiences illuminated that being successful and supported in both the social and academic domains influenced the participants' sense of belonging in STEM. The Latina students from this study appeared to face challenges and barriers in connection to past experiences of discrimination and stereotype threat that harmed their sense of belonging in their university STEM major. Believing in their capabilities and noting positive outcomes through incremental efforts helped participants continue employing an incremental mindset that increased their sense of belonging. Based upon the participants successful use of an incremental mindset, future research should consider tailoring existing or developing new belonging interventions to serve the needs of underrepresented students in STEM, particularly those with intersecting minority identities.

The development of special programs and assistance for students has led to approaches for diminishing and even eliminating systemic barriers for underrepresented student populations majoring in STEM. Based upon this study, the development of psychosocial interventions targeting incremental orientations to improve sense of belonging should be viewed as an area with the potential for significant benefit for Latina students and perhaps other students with intersecting minority markers. While Latina students have proven their intellectual capacity to succeed, psychosocial barriers continue to undermine their success. In particular, it is important to note that while incremental orientation interventions helped the four participants of this study to increase their sense of belonging, the social

barriers of negative peer interactions and stereotypes persisted. Caution should be taken not to ignore the continued university level efforts that need to take place in order to foster safe educational environments for all students. Through the insights of the four Latina students sampled, this study contributes to the development and support of future interventions to increase Latina students' belief in their ability and reach their goals.

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Appendix A: Growth-Mindset Intervention Transcript

Belonging Intervention

Introduction & Consent (5 – 10 minutes)

Hello and welcome to our class activity today!

The activity today is part of a research project that I am doing with two other researchers. What we're asking of you today is to participate in this project that explores ways to improve students' success at college, which is closely linked to what you're learning in this course! To be clear, though, your participation is not linked to your credit or grade in this class.

If you choose to participate, you'll be asked to watch a short video, write a brief reaction letter, and join in a class discussion today. There's also a follow-up survey given the end of the quarter than you can choose to participate in at that time!

If you do not want to participate, you can complete the alternative exercise (see end of script). This consists of reading a selected research article and writing a reaction paper on it. It should take you approximately an hour to complete, as we have tried to make this option equivalent in length to participating in class today.

So at this point please take a look at these consent forms we're passing around, let me know if you have any questions about them, and sign and date at the bottom if you would like to do the in-class activity!

Play Video (10 minutes)

Great, thank you to those of you participating in the research activity today! We'll start now by watching the in-class video…

Play Belonging video

Individual Free-Write Reactions (5 minutes)

What we'd like you to do now is please take about 10 minutes to think about what you heard in the video and write out your ideas and reactions to yourself. Specifically, think about your personal answers to any/all of the following questions:

- What did you learn from the video?
- What are the advantages to feeling you belong?
- How can you use these advantages in your life right now?
- How can you remind yourself to have a Growth Mindset?

Pair-and-Share Discussion (5 minutes)

Now that you've taken the time to write-out some of your initial thoughts, turn to the person next to you are discuss some of your answers to these questions together. See what you had in common and some things that maybe you hadn't thought of that they did.

Full-Class Discussion (15-20 minutes)

Great! Now we'll ask you to all come back together and can we share some of the things we thought about them?

- If students are being quiet, go through the discussion questions one by one
- If students are still quiet or we get through all of the discussion questions, open it up to general reactions/questions about the video or the topics discussed in the video (e.g. belonging in college being a process, the growth mindset helping you persist through challenges, when you ask whether you should stay with your major or even stay in college, how can this help? etc.)

Letter Writing (10 minutes)

Thank you so much for sharing all those insights with one another! We just have one more activity as part of this research project in-class today. That is to write a letter to a future incoming student.

Many incoming students report that they appreciate orientation advice from other students, particularly at the beginning of their first year. Please write a brief letter to a future incoming student that summarizes the concept of Belonging and the Growth Mindset and provides advice about how that student can use this information to help them succeed and persist through difficulties during their first year in college. You can think of this as writing a letter to yourself, one that you would feel grateful to receive because it would help you to feel inspired and motivated even when first-year challenges feel overwhelming.

Appendix B: Video Transcript for Incremental Presentation-Belonging

Introduction: PRIMARY SPEAKER (Caucasian male professor)

Hi, my name is Dr. X. I'm a Professor of Psychology at ------university. Today, my graduate students and I would like to talk to you a little bit about your first year of college.

During the last few years, psychologists have made huge strides in understanding how life transitions and academic success work. We're going to share with you some of the most transformative research in our field that focuses on your mindset going in to your first year of college, and some of the best ways to help you grow and flourish during this time.

Prior beliefs
Before we get started, I'd like to ask you a couple questions about your beliefs right now:

- Do you believe that the degree to which you feel that you **belong** at the university is an important factor in determining your success in college?
- Do you believe that the degree to which you feel you fit in at college is unchangeable?
- What about your sense of belonging at the university? Is that changeable?

Well, to answer the first question, research tells us that, in fact, your feeling of belonging does predict success at college.

But what does a sense of belonging really mean?

Belonging - SWITCH TO SPEAKER B (Caucasian female graduate student)

Like Dr. X mentioned, research has demonstrated that when you feel that you belong, you are much more likely to succeed in college. For example, a key factor driving students' commitment and willingness to persist in math comes from their personal sense that they belong in mathematics. A sense of belonging within an academic domain means that you feel that it is a good fit for you, that you are a member of the academic community in question. Also, a sense of belonging often includes feeling valued and accepted by fellow members of the discipline, your student colleagues and your professors. Your commitment, enjoyment and future contributions are greater when you view yourself as being inside the discipline rather than on the fringes.

Transition – SWITCH BACK TO PRIMARY SPEAKER

So now we know that feeling like you belong can help you succeed in academic domains. But, what about those other questions we discussed? Is the amount that you feel you belong in an academic domain something you can change?

Scientists have looked into this question deeply, and have discovered that, in fact, your sense of belonging within a group or domain can and does change! The key is having a **growth mindset**.

What is a growth mindset?

Growth mindset – SWITCH TO SPEAKER C- (Caucasian female graduate student)

As Dr. X described, having a Growth Mindset can be the key to experiencing belonging during your first year of college.

Now, a **fixed** mindset is the belief that your sense of **social belonging** is predetermined and unchangeable: You either have it or you don't. People with a fixed mindset tend to give up when they face difficult challenges, because they see failure as a sign that they don't belong. This is the opposite of the growth mindset. A growth mindset, on the other hand, is the belief that the sense of **belonging** you feel in a domain or social situation can be enhanced. A Growth Mindset means knowing that you can change through persistence. That change occurs incrementally through small, gradual steps.

Understanding the flexible nature of transitions and believing you can become an integral part of your academic social situations by persisting through challenges: that's the growth mindset.

As it turns out, your first year of college is an especially important time to have a Growth Mindset. Researchers found that almost every upper year student has worried during their first year about "fitting in" and "whether this was the right place for them" (Walton, 2015). Most students reported that the road to feeling accepted by other students was "bumpy," and that most students felt "intimidated by professors." Many students felt nervous about the unfamiliar nature of college life in general.

However, those with a growth mindset were helped by knowing that the feeling of being part of their university and fitting well in an academic major grows over time. A growth mindset encourages students to adapt to the social and academic challenges of college. Students with Growth mindsets were able to gradually become comfortable with the academic climate; these students came to feel that they belonged, even though at first, they felt different from other students. The Growth Mindset leads to persistence. Your brain develops through "Productive Persistence," which is tenacity plus effective strategies.

To understand how this productive persistence works, let's hear from some students about their transitions to college.

This first example is a typical experience:

When I first got to the university, I worried that I was different from the other students. Everyone else seemed so certain it was the right place for them and were so happy to be here. But I wasn't sure I fit in—if I would make friends, if people would respect me. Sometime after my first year, I came to realize that almost everyone comes to the university and feels uncertain at first about whether they fit in. It's something everyone goes through.

Now it seems ironic—everybody feels different the first year, when really, we're all going through the same things.

— "Karen," Mathematics and Statistics; (Caucasian female undergraduate student)

The next depicts a concern

I didn't go to a very good high school, and I worried that my high school courses had not prepared me well for university. Honestly, when I got here, I thought professors were scary. I thought they were critical and hard in their grading, and I worried about whether other students would respect me. I was nervous about speaking in class, and I didn't want to ask people for help with assignments. After some time, I began to feel more comfortable—I made some close friends, and I started enjoying my classes more. I also became more comfortable asking for help when I had trouble with an assignment. And I saw that even when professors are critical, or their grading is harsh, it didn't mean they looked down on me. It was just their way of pushing us. Since I realized that, I have been really happy at the university. It took time, but now I really feel like I belong in the intellectual community here. And to be honest, I'm glad I have been challenged. It's made me better.

— "Tomas," Chemistry & Biochemistry; (Latino undergraduate student)

Thanks so much for learning about the importance and malleability of sense of belonging with us! So, before we close, here are a few questions for you to consider:
How can you use your understanding of belonging to your advantage? How can you remind yourself to have a Growth Mindset? How can you use your belief in a growth mindset to help you meet new challenges?

The science is <u>in</u> on the relationship between a sense of belonging and academic success. This relationship is real. If you believe your brain; your abilities, and your sense of belonging grow best when challenged; then can we take full advantage of the benefits that come with recognizing that you belong at university!

This knowledge can change the way that you think about the challenges that you encounter in your first year of college. When you are having a hard time, feeling stuck or frustrated, when you feel alone, remember that these are exactly the times that persistence can make all the difference.

So be sure not to avoid challenges: rising to the occasion, embracing setbacks, and challenging yourself is the only way to ultimately become your best self, your best you.

Appendix C: Recruitment Email

Subject: Research Opportunity for Latinas in STEM!

Body of Email:

Hello!

I am a Latina doctoral student working in conjunction with -----university and am looking for Latina participants for my dissertation study to explore Latina students' experiences of fitting in and feeling they belong and are valued within STEM majors. I am looking for 10 Latina students to part take in my research study.

Please consider sharing your valuable insights and experiences as a Latina student in STEM.

We are offering a $40 Amazon gift card to interview you for 60-90 minutes, at a time and place that is convenient for you. Additionally, interviews can be conducted by Skype or FaceTime for your convenience.

Please consider participating in my study if you:

1. Self-identify as a Latina student majoring in science, technology, math, or engineering…
and
2. Have participated in the NSCI 190A class, which heard the video of the experiences of belonging of three current -----university students.

If you are interested in participating please email me to schedule the interview, at:

bbello@ucsb.edu or bellobeatriz01@gmail.com

Thank you for your consideration and support of this study!

Best,

Beatriz Bello
Doctoral Candidate

Note: This research is conducted under the direction and guidance of Dr. Collie Conoley, UCSB and has been approved by the ------Institutional Review Board

Appendix D: Consent Form

Approved by the [university] Human Subjects Committee for use thru: 8/30/2017

CONSENT TO PARTICIPATE IN RESEARCH
Growth Mindset Intervention in Science Success Class (NSCI 190A):
Individual Interview

You are asked to participate in a research study conducted by Beatriz Bello, M.A. in collaboration with a larger study conducted by Dr. X and Dr. Z from university A and university B. You were selected as a possible participant in this study because you were in the Growth Mindset Intervention, are in a STEM major, and self-identified as Latina.

PURPOSE OF THE STUDY
The purpose of the study is to explore Latina students' experiences of fitting in or belonging in science, technology, engineering, or math (STEM) majors. Participants of interest are those who underwent a growth mindset intervention(video-activity), through your participation in the NSCI 190A course. Interview questions hope to explore Latina students' experiences of difficult or positive experiences that might influencing students' feeling like they fit in or belong in STEM.

PROCEDURES
If you volunteer to participate in this study you will be interviewed for approximately 60-90 minutes about your experiences of being at CSULB, in your STEM major, and your experience of the belonging growth mindset video-activity you participated in as part of your NCSI 190 A course. The interview will be audio recorded so that your answers can be transcribed and analyzed at a later time. Interviews will be de-identified and your identity will not be connected to your answers.

POTENTIAL RISKS AND DISCOMFORTS
Psychological Risks:
The questions in the interview ask about your thoughts, observations, and experiences. The most intrusive questions ask about how you believe you have been treated at CSULB by faculty and other students, and your experiences relating to your minority identities.

Confidentiality Risk:
A breach of confidentiality would potentially expose sensitive student information. To guard against a breach of confidentiality, your demographic information and your interview answers, will not include any connection to your name (will be left off of the recording). Recordings will be kept in a secure location and will be deleted upon transcription of the recording to protect your confidentiality.

POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY
The purpose of the research is to explore Latina students' experiences of belonging and to explore their experience of the growth mindset (Implicit Theory of Incremental Change) belonging intervention. Exploring Latina students' experiences of belonging in STEM after

completing an intervention to improve feeling of belonging, can provide information of the daily experiences of Latinas in STEM. Latina participants' lived experiences can help increase knowledge with the goal of informing future research aimed at improving Latina students' experiences and persistence in STEM.

PAYMENT FOR PARTICIPATION

You will receive a $40 gift card AMAZON gift card for your time in participating for the interview. You will be sent this card through email after the interview is completed.

CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law.

The interview will be audio recorded. You have the right to review the recording, edit the recording or have the recording erased at any time you choose. Only the researchers have access to the audio recording. The audio recording will be erased when your statements have been coded and at least within one year of this recording.

PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. Participation or non-participation will not affect your grades or any other personal consideration or right you usually expect. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which in the opinion of the researcher warrant doing so.

IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the research, please feel free to contact Beatriz Bello at bellobeatriz01@gmail.com or by phone at (818) 919-8165. Or feel free to contact Dr. Collie Conoley of the Department of Counseling, Clinical, and School Psychology, UCSB at cconoley@education.ucsb.edu

RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact the Office of University Research, [university details].

SIGNATURE OF RESEARCH SUBJECT

I understand the procedures and conditions of my participation described above. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

_____ _____

Signature of Subject Date

STATEMENT and SIGNATURE OF INVESTIGATOR
In my judgment the subject is voluntarily and knowingly giving informed consent and possesses the legal capacity to give informed consent to participate in this research study.

_____ _____
Signature of Investigator Date

Appendix E: Demographic Questionnaire and Semi-Structured Interview Protocol

Demographic Portion

1. First, I want to ask you a few demographic questions and I may ask you follow up questions as we go along in the interview.
    a. What is your age? What is your sexual orientation?
    b. What do you identify your ethnic/racial background to be?
    c. What do you consider yourself and family to be? Lower class, lower-middle class, middle class, upper middle class, or upper class?
    d. What generation are you in your family to have attended college? (i.e. first-generation-parents did not attend college, second-generation-parents were the first in the family line to attend college, etc.
    e. What is your major?
        i. How many classes in your major did you take your first semester? Second semester?
    f. Are you currently employed? Full time/part? On campus or off?
    g. Do you live on campus or do you commute? Tell me more about how that has been for you (i.e. how long is the commute?).
2. Tell me a little bit more about yourself:
    a. Who is in your family?
        i. Do you have siblings? Number of siblings? Your birth order: oldest, middle, youngest?
    b. What made you choose your major?
        i. Has your family influenced your chosen major?
    c. What generation are you in the U.S.? First-immigrated to the U.S., Second-parents immigrated to the U.S., etc.

Open-Ended Interview Portion

3. What has been your experience as a Latina in a STEM major? Has your identity as a Latina, or any other identity marker we may have discussed, been salient to you in your college experience so far? If so, how?
4. What has your experience at the university been overall? What about in your major?
5. What have you liked the most/what have liked the least about starting at the university? Starting your major?
6. How connected do you feel to the university? How involved are you on campus?
    a. Do you use any on campus resources? If so, what and why or why not?
7. How diverse (i.e. ethnic/racial and gender) are your peers and professors within your STEM major?
    a. How diverse are your peers and professors outside of the STEM courses?
    b. How, if at all, do you think the diversity of your peers/faculty impact your experiences?
8. How easy has it been for you to become friends/acquainted with your STEM peers? What about with peers outside of your major?
9. Some people have difficulty fitting in right away when starting in a new environment. Have you had those feelings while at the university? Your major?

    a. If no difficulties mentioned: What do you think has helped you feel like you fit in well or belong in your major? The university?
    b. If yes: How have you dealt with the difficult of fitting in at university or fitting in within your major?
10. How do you think your STEM peers and professors perceive you? What do they think of you?
    a. How have they communicated this to you?
    b. Do you feel accepted and valued by your STEM peers and professors? What about outside of your major?
11. Have you ever experienced any stereotypes by peers or professors within your STEM major? If so, what has been your experience?
12. All students face some level of stress throughout their education. How have you dealt with the challenges you have faced since starting at the university? How do you cope?
    a. Is this different from how you would have dealt with similar difficulties in the past (i.e. high school)? If so, how?
    b. Who do you turn to, on and off campus, when you are feeling stressed or need support?
13. What has been the toughest challenge that you have faced since beginning college?
    a. How have you dealt with this challenge?
       Have you felt judged or stereotyped by others? If so, what were the circumstances?
14. At the beginning of the year you were shown a video in your NSCI 190A class about the difficulties of fitting that most students experience at the start of college.
    a. Do you remember the video? If so, what do you remember?
        i. Provide details if don't remember.
    b. Thinking back to it, what have you learned from the video?
    c. Has any of the information you learned from the video made a difference or changed the way you have approached or thought about your college experiences so far?
15. In this video the students said that it took persistence and small steps to accomplish making friends, fitting in or belonging. What do you think about that?
    a. How well would this approach work for you?
    b. Do you have any suggestions to improve the video/activity presentation in the future? What would have made it more helpful to you?
16. Thank you for your openness. That concludes the interview, is there any final comments you would like to make?

Thank you for your time. I appreciate your participation!

Appendix F: Thematic Map of Major Themes of Cross-Case Analysis