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Investigating Psychological Capital as a Moderator in the Relationship Between Incivility and STEM Students' Major Embeddedness

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**INVESTIGATING PSYCHOLOGICAL CAPITAL AS A MODERATOR IN THE
RELATIONSHIP BETWEEN INCIVILITY AND STEM STUDENTS' MAJOR
EMBEDDEDNESS**

by

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B.A. June 2019, Gustavus Adolphus College

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ABSTRACT

INVESTIGATING PSYCHOLOGICAL CAPITAL AS A MODERATOR IN THE RELATIONSHIP BETWEEN INCIVILITY AND STEM STUDENTS' MAJOR EMBEDDEDNESS

Kristen Denae Egger
Old Dominion University, 2022
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Increasing the number of students who graduate from science, technology, engineering, and mathematics (STEM) majors is a national priority in the United States as there is a need for more STEM employees in the labor force. However, less than half of students who initially declare a major in STEM graduate college with a STEM degree, in part because of the unwelcoming climate in STEM. The aim of the current study was to understand how incivility may undermine a student's embeddedness within their undergraduate major and whether the individual difference of Psychological Capital could assuage the undermining effects. The presence of incivility is likely to limit a student's ability to feel like they fit, have social connections, and have attachments with their STEM major. Psychological Capital has been established as a buffer of adverse experiences such as bullying, harassment, and incivility. In addition, Psychological Capital can be learned, making it an accessible and valuable resource for students. It was hypothesized that major incivility would have a negative relationship with major embeddedness and that psychological capital would moderate the relationship such that the relationship is weakened. Archival survey data that was collected for a larger project was used to test the hypotheses. Senior students majoring in STEM were emailed with a link to a web-based survey in their final semester prior to graduation. The survey asked students to report if they had

experienced incivility from peers, faculty, and advisors within their STEM major and included the Psychological Capital Questionnaire and the STEM Major Embeddedness Scale. A total of 324 returned surveys passed quality checks. To test the hypotheses, a hierarchical regression analysis was conducted. Neither hypothesis was supported, but there was a significant effect of Psychological Capital on major embeddedness such that students with higher Psychological Capital were more embedded in their major. Results of the study provide insight into ways universities can help promote student embeddedness.

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INTRODUCTION

Major embeddedness captures the web of formal and informal ties keeping students in their college major and is associated with important outcomes such as major satisfaction, major commitment, and persistence within the major (Major et al., 2020). These ties include the perceptions that student's skills and passions align with their major, that students have peers and advisors who support their success and challenge them to grow, and that their major leads to positive career prospects (Morganson et al., 2015). Students become embedded as they accumulate ties; however, environmental factors such as incivility may undermine students' embeddedness. Incivility is low-intensity, rude and disrespectful behavior and is a common problem for students, with over 75% of students reporting having experienced incivility from faculty and peers while in college (Caza & Cortina, 2007). Because of the prevalence of incivility in education and positive outcomes associated with embeddedness, this research aimed to study incivility as factor undermining students' major embeddedness.

Embeddedness theory emphasizes that factors within the environment are instrumental in embedding a person in a job, organization, or career (e.g., Howes & Goodman-Delahunty, 2015; Mitchell et al., 2001; Ng & Feldman, 2011). In addition, the theory briefly alludes to individual differences playing a critical role in the embedding process, though little research has been conducted on these differences (Giosan et al., 2005; McGinley et al., 2020; Ng & Feldman, 2011) and how they interact with the environment (Erkutlu & Chafra, 2017; Holtom et al., 2012). In education, embedding factors include alignment between students' passions with their major, relationships with peers and faculty, and prestige associated with one's major (Burleson et al., 2021; Major et al., 2020; Morganson et al., 2015). While researchers have focused on positive factors that facilitate embeddedness (e.g., Allen & Shanock, 2013; Harris et al., 2011; Singh et

al., 2018), there is limited research addressing how embeddedness can be undermined (Dirican & Erdil, 2020; Hom et al., 2009) and whether individual differences mitigate the undermining effect (Erkutlu & Chafra, 2017).

One potential environmental factor that could undermine embeddedness is incivility. Incivility is rude and disrespectful behavior with ambiguous intent of harm (Andersson & Pearson, 1999). Experiencing incivility is associated with several negative outcomes for students such as academic burnout and disengagement (Bai et al., 2020), reduced academic performance and commitment (Caza & Cortina, 2007), and feelings of isolation, exclusion, and psychological distress (Park et al., 2020). As a result of incivility students experience in their major, it is likely they will be weakly embedded in their major.

Most of the research studying ways to assuage the negative effects of incivility has examined factors at the organizational level (e.g., human resource practices; Cortina et al., 2017; Schilpzand et al., 2016) or traits of a person which are outside of their control (e.g., personality; Milam et al., 2009; Sliter et al., 2015), with little research to date examining factors the individual can control (e.g., coping mechanisms; Cortina & Magley, 2009; Itzkovich & Dolev, 2017; Welbourne et al., 2016). While organizations should take responsibility and act to remedy both the causes and consequences of incivility, these processes may take time, leaving the person to manage incivility on their own. Thus, having individual resources aids people in the interim. To address this gap and answer calls to further examine individual differences and factors mitigating incivility (Itzkovich & Dolev, 2017; Schilpzand et al., 2016), this research draws on the principle of person-environment interaction to propose that psychological capital (PsyCap), a collection of an individual differences a person can develop, acts as a buffer to the undermining effects of incivility on embeddedness.

PsyCap is a core construct, theoretically grounded in positive psychology (F. Luthans et al., 2007). It consists of individual-level characteristics that help people adapt to adversity and challenges and can be learned through training (F. Luthans & Youssef-Morgan, 2017). These characteristics include optimism, self-efficacy, resiliency, and hope. PsyCap improves student wellbeing (Finch et al., 2020), increases academic satisfaction (Sánchez-Cardona et al., 2021), and improves academic performance (Siu et al., 2021). In addition, research has demonstrated PsyCap buffers negative experiences such as bullying (Cassidy et al., 2014) and incivility (Nawaz et al., 2020) in the workplace, but has not yet been studied as a buffer for incivility in a student context.

To fill these gaps in the literature, this study examined the relationship between incivility and embeddedness, with PsyCap as a moderator in the context of science, technology, engineering, and mathematics (STEM) education. The climate in STEM education has historically been unwelcoming to students, making it a pertinent context of study (Freeman, 2020; Grossman & Porche, 2014; Hall et al., 2017). In addition, there is a growing need for increasing the STEM workforce which is challenged by high attrition rates in STEM education (National Science Board et al., 2020). Just under half (48%) of students who declare intentions to major in STEM leave STEM altogether before completing their degrees (Chen, 2013). STEM major embeddedness has been identified as a significant predictor of persistence in STEM education, making it a valuable construct to understand in improving STEM retention rates (Major et al., 2020).

This study contributes to the literature in a number of ways. First, we introduce incivility as an experience that diminishes embeddedness, adding to the limited literature on undermining factors of embeddedness. Further, we use the person-environment interaction framework to

examine how characteristics of the individual influence the relationship between incivility and embeddedness, by studying whether the personal resource of PsyCap can mitigate the negative effect of incivility on embeddedness. Finally, we identify PsyCap as a learnable personal resource that helps students cope with incivility – particularly when external resources are unavailable – adding to the incivility literature which has largely focused on organizational practices rather than individual resources as ways to mitigate the effects of incivility (Cortina et al., 2017).

BACKGROUND

Embeddedness

Embeddedness theory was developed to explain environmental factors that encourage employees to remain in their jobs and builds on the turnover literature which had been focused on why employees leave their jobs (Mitchell et al., 2001). Mitchell and colleagues contended that voluntary turnover was not sufficiently explained by the factors most frequently studied (e.g., job attitudes), which led them to reframe their approach. According to embeddedness theory, people encounter and develop a network of ties that, together, create a force keeping them in their jobs. These ties are grouped into three dimensions: *fit* – how well one perceives their skills and values align with their current role, *links* – the duration and quantity of informal and formal relationships associated with the position, and *sacrifice* – investments and benefits that will be given up if one were to leave. Together, these factors represent how embedded a person is in their job and better account for retention and turnover than the commonly studied factors of organizational satisfaction and commitment, job attitudes, and job alternatives (Jiang et al., 2012; Lee et al., 2014; Mitchell et al., 2001). Embeddedness theory has been expanded to explain how a person can be embedded in their community (Mitchell et al., 2001), organization and occupation (Ng & Feldman, 2007), and most recently, in education (Larkin et al., 2013).

Research in the educational context has focused on understanding college students' embeddedness in their majors and universities (Burleson et al., 2021; Major et al., 2020; Morganson et al., 2015; Prasad et al., 2017). Morganson et al. (2015) conducted a qualitative study to contextualize embeddedness theory in a STEM education context and found fit, links, and sacrifice were more nuanced than the original definitions used for job embeddedness. For STEM major embeddedness, fit is the match between students' interests and their major, in

addition to the match in their passions, aptitudes, and being challenged by their major. Links are the connections students make with peers, faculty, and advisors within their major. Lastly, sacrifices are the unique advantages associated with one's major that would be lost if one left the major, and in STEM, they include career prospects and major prestige. Research on major embeddedness has linked it to potential antecedents such as social and human capital and demonstrates that embeddedness predicts persistence in one's major (Major et al., 2020).

While embeddedness theory explains how people become rooted in their environment, the theory does not provide a framework regarding what facilitates or impedes the embedding process (Mitchell et al., 2001). Instead, it is noted that the embedding process differs for each person, and early theorizing implies each tie is developed through its own process. To expand the theory, researchers have studied antecedents and impediments that would influence acquiring ties in all three embeddedness dimensions, examining factors at the individual, leader, and organizational levels (e.g., Harris et al., 2011; Ng & Feldman, 2011; Wheeler et al., 2010). Most of the focus of the antecedent literature has been on the positive factors that promote embeddedness, with less attention to the ways in which embeddedness is undermined by harmful aspects in one's environment (Dirican & Erdil, 2020; Karatepe, 2013) and how characteristics of the individual interact with the adverse environment (Erkutlu & Chafra, 2017; Holtom et al., 2012). Studying how characteristics of the person interact with the environment allows for a better understanding of the boundary conditions in relationships between adverse conditions and embeddedness.

Person-Environment Interaction

Person-environment interaction is a fundamental principle of psychology, stating behavior is a function of both the person and their environment and that behavior cannot be fully

understood when only one of these factors is studied (Lewin, 1951). The principle acknowledges that individual differences interact with factors in the environment, explaining why people respond differently to identical stimuli. For embeddedness, person-environment interaction is particularly relevant as illustrated by early embeddedness theorists' proposition that individual differences influence what environmental factors are perceived as ties (Mitchell et al., 2001). In adverse environments, characteristics of the person may help them adapt and be resilient, buffering the negative effects of the environment.

Adverse environments have been found to diminish embeddedness, specifically environments created by abusive interpersonal relationships (Dirican & Erdil, 2020; Erkutlu & Chafra, 2017). Research examining adverse leadership found abusive supervision and leader narcissism are associated with lower levels of job embeddedness, as adverse leadership reduces feelings of fit, limits relationship building, and causes employees to negatively appraise the potential benefits associated with their job (Dirican & Erdil, 2020; Erkutlu & Chafra, 2017). While these studies have focused on leaders engaging in more extreme behaviors, research is needed on the way smaller, more subtle acts of disrespectful behavior such as incivility can impede embeddedness.

Research by Holtom et al. (2012) and Erkutlu and Chafra (2017) demonstrates that individual differences can exacerbate or mitigate the undermining effects of adverse factors on embeddedness. In a study of negative shocks (i.e., events that cause an employee to consider quitting), Holtom et al., (2012) found that employees with higher negative affectivity were less likely to feel embedded after a negative shock than employees with low negative affectivity, highlighting how individual differences exacerbated the relationship between a negative event and decreased embeddedness. Research addressing the relationship between abusive supervision

and job embeddedness found that employee's moral attentiveness, or attention to moral cues, weakened the negative relationship, acting as a buffer to abusive leadership (Erkutlu & Chafra, 2017). These two studies highlight the relevance of both individual and environmental factors in understanding the impact of incivility, pointing to the need for future research to use a person-environment interaction approach when studying impediments to embeddedness and factors that assuage the negative effects.

Incivility and Embeddedness

Incivility is defined as behaviors that are disrespectful, rude, and have an ambiguous intent of harm (Andersson & Pearson, 1999). There are three major characteristics within the definition of incivility that distinguish it from other forms of deviant behavior: a) the intent of harm is ambiguous, b) actions are less severe than behaviors such as harassment, bullying, aggression, and c) these behaviors violate the norms of the setting in which they occur (Andersson & Pearson, 1999; Cortina et al., 2001). Incivility has been found to be highly present in work and educational settings, with 70% of employees (Cortina et al., 2001) and 75% of college students (Caza & Cortina, 2007) reporting experiencing incivility at work or school. While incivility may be subtle, its impact on people can be substantial, causing emotional distress (Cortina et al., 2001), reduced wellbeing (Gabriel et al., 2014), and diminished physical health (Lim et al., 2008).

Although no research to date has examined the direct relationship between incivility and embeddedness, research examining the outcomes of incivility suggest that experiencing incivility is likely to impede the development of ties in all three dimensions of embeddedness. Incivility causes students to question if their passions and skills align with their major, impairing the development of the dimension of fit (Jensen & Deemer, 2019; Kabat-Farr et al., 2018; Zurbrügg

& Miner, 2016). Further, incivility reduces students' feelings of social support and inclusion which limits the relationship ties students would develop, thus impeding the development of the dimension of links (Bai et al., 2020; Caza & Cortina, 2007). Finally, incivility impairs the dimension of sacrifice in numerous ways. Incivility experienced in the first year of college is associated with maladjustment, which causes students to perceive few benefits associated with attending both their university and higher education in general (Alt & Itzkovich, 2016). Additionally, incivility causes people to reevaluate the benefits of their position, leading to conclusions that leaving is the better alternative (Cortina et al., 2013; Lim et al., 2008). Based on the above evidence, incivility experienced in one's major is expected to be negatively related to major embeddedness as incivility undermines the development of embedding ties.

Hypothesis 1: Incivility has a negative relationship with major embeddedness, such that as incivility increases, major embeddedness will decrease.

Psychological Capital as a Moderator

Luthans et al. (2007) identified PsyCap as a set of positive psychological resources that can develop over time and with training. PsyCap is a construct consisting of hope, resiliency, self-efficacy, and optimism that better explains behaviors and affective outcomes than each component individually (F. Luthans et al., 2007). Hope, which has been conceptualized to represent the common idiom, "Where there's a will, there's a way," is a cognitive state reflecting a person's determination to meet their goals (will) and their ability to identify pathways to meet those goals (ways; Snyder et al., 1991). Resiliency is the ability to cope and adapt in adverse situations (Masten, 2001). In the context of PsyCap, self-efficacy is a person's belief about their ability to utilize their skills and resources to accomplish a task (F. Luthans et al., 2007). Unlike most literature on efficacy which focuses on one's belief in their ability to accomplish an

outcome in a specific domain, self-efficacy in PsyCap is a broader set of positive beliefs (F. Luthans et al., 2007). Optimism, as defined within the PsyCap literature, is the positive appraisal of events and situations while remaining realistic about the potential outcomes of the situation (F. Luthans et al., 2007).

PsyCap has been found to moderate the relationship between negative experiences (e.g., job insecurity, work-family conflict, incivility) and various work outcomes such as thriving, wellbeing, compassion competence, and job performance (Darvishmotevali & Ali, 2020; Nawaz et al., 2020; Woo & Kim, 2020; Yu & Li, 2020). Recently, studies have examined incivility and PsyCap, finding PsyCap to buffer the negative effects of incivility on work outcomes. In a study of workplace thriving, PsyCap mitigated the effects of incivility on thriving (Nawaz et al., 2020). Similarly, a study of nurses found the relationship between incivility and compassion competence was mitigated by PsyCap (Woo & Kim, 2020).

Based on theory and previous research, PsyCap should provide students with resources to withstand incivility (F. Luthans et al., 2007; Nawaz et al., 2020). Empirical studies of components of PsyCap indicate that the mitigating effects of PsyCap should apply to other incivility relationships and contexts outside of the workplace. For example, research on family incivility found that hope moderated the relationship between incivility and emotional exhaustion (De Clercq et al., 2018). In a study of customer incivility, resiliency mitigated the effects of customer incivility on emotional exhaustion (Al-Hawari et al., 2019). Similarly, self-efficacy was found to moderate the relationship between coworker incivility and job performance (Rhee et al., 2017) as well as incivility and job seeking behaviors (Ali et al., 2016). Finally, optimism was identified as a mediator in the relationship between incivility and two

outcomes – job burnout and job satisfaction (Bunk & Magley, 2013). Altogether, this suggests that PsyCap will mitigate the effects of incivility on embeddedness.

Hypothesis 2: Psychological capital will moderate the relationship between major incivility and major embeddedness such that the relationship is weaker when psychological capital levels are higher.

METHOD

Participants and Procedure

Participants were recruited for a larger study focusing on undergraduate experiences in STEM. Participants were recruited by emailing seniors with declared majors in STEM at a large southeastern university in the United States during their final semester in college. Participants were emailed a survey link and informed that the survey would take 30-40 minutes and they would receive \$25 compensation for participating in the study. Surveys were sent to 1,000 graduating seniors and 409 responses were obtained, for a response rate of 40.9%. Data were collected over the course of two years (i.e., four semesters), with 162 responses collected in Spring 2014, 86 collected Fall 2014, 130 collected Spring 2015, and 31 collected Fall 2015. Of the 409 responses, 14 were removed as participants were not in their final semester of school before graduation, and 57 were removed for being incomplete (i.e., missing complete sections within the survey) for a potentially viable sample size of 338. Based on literature recommendations to best identify careless responding (Meade & Craig, 2012), three quality checks were placed throughout the survey and contained items such as “For quality purposes, please select strongly disagree.” An additional 15 responses were removed for failing to pass quality checks at two or more points (final $N = 324$). Within the sample, 61.7% were men, 38.3% were women, and the mean age was 23.11 ($SD = 5.42$). Participants identified as being white (63.3%), Black (14.2%), multiracial (9.3%), Asian (6.8%), Hispanic (4.0%), Native American (.3%), or other, not listed (1.9%).

A compromise power analysis was conducted using the software program G*Power to determine whether the given sample size is sufficient to detect the hypothesized effects if present (Faul et al., 2009). In a compromise power analysis, the implied alpha and power values are

calculated given the sample size ($N = 324$), effect size, and Type I (i.e., rejecting a true null hypothesis) to Type II (i.e., accepting a false null hypothesis) error ratio. Power analyses for various Cohen's f^2 effect sizes of .02 (small), .15 (medium), and .35 (large) were computed, with the error ratio set to one, assuming both error types are equally important. Number of tested predictors was three (incivility, PsyCap, and incivility-PsyCap interaction) with the total predictors being four (adding the control variable of gender). For small effect sizes, the predicted alpha (e.g., Type I error) and beta (e.g., Type II error) would be .20, for a power (1- beta) of .80. For medium and large effects, the alpha and beta were predicted to be $< .001$ and power was predicted to be $> .99$.

For a more appropriate estimate of what effect sizes to expect, examples of direct effect and interaction effect sizes for incivility were found in the literature. Because there are no studies to draw on for estimates of the expected effect size between incivility and embeddedness, the effect sizes for turnover intentions, job satisfaction, and affective commitment provide guidance as they share conceptual similarities to embeddedness (Mitchell et al., 2001). A meta-analysis examining the incremental validity of incivility above other forms of mistreatment on workplace outcomes found incivility to have f^2 effect sizes of .09 (turnover intentions), .24 (job satisfaction) and .13 (affective commitment; Yao et al., 2021). Similar to direct effects, there are no clear examples within the literature to draw on for the expected interaction effect on embeddedness. There are two examples of incivility interacting with PsyCap on thriving ($f^2 = .14$; Nawaz et al., 2020) and compassion ($f^2 = .03$; Woo & Kim, 2020), and one example of incivility interacting with emotional support on job satisfaction ($f^2 = .10$; Miner et al., 2012), demonstrating a wide range in the potential effect size of the moderation.

Additional power analyses were run with f^2 of .03 and .09 to determine if the sample size would yield a power greater than .80 for these effects, as initial analyses indicate the sample size may not be able to detect small effect sizes. Results of the power analyses indicate that with an effect size of .03, the predicted alpha and beta were .13 and power was .87, and .01 and .99 for an effect size of .09. Based on the above information, a conservative estimate of effect sizes (i.e., .03) indicates the sample size may not have the power to capture the interaction effect. However, as .03 is on the low end of the range of related effects, a more moderate assumption of the potential effect size (i.e., $>.04$) would indicate the sample size is sufficient.

Materials

Major Embeddedness

Major embeddedness was measured using the STEM Major Embeddedness Scale; a 14-item scale that captures fit (e.g., “My major fits my passion”), links (e.g., “I enjoy being around other students in my major”), and sacrifice (e.g., “Because of my major, I am likely to have a good career”) for one’s major (Major et al., 2020). Participants were asked to rate how much they agreed on a Likert-type scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Cronbach’s alpha for the original scale is .89 and is .87 for the current study. Cronbach’s alpha for each dimension was also calculated; fit, $\alpha = .83$, links, $\alpha = .76$, sacrifice, $\alpha = .69$.

Major et al. (2020) discuss the validation of this measure, using convergent, discriminant, concurrent criterion-related, and predictive criterion-related validity. For convergent validity, major embeddedness highly correlated with social capital ($r = .44, p < .001$) and human capital ($r = .54, p < .001$). For discriminant validity, the authors compared their six-factor model, containing both university and major links, fit, and sacrifice to one, two, and three-factor models, finding theirs to have the best fit. For concurrent criterion-related validity, major embeddedness

was highly correlated with theoretically relevant proximal outcomes, STEM major satisfaction ($r = .64, p < .001$) and STEM normative commitment ($r = .41, p < .001$). Finally, for predictive criterion-related validity, major embeddedness predicted persistence at a future time point and demonstrated incremental validity beyond other predictors (i.e., major satisfaction and major commitment). The full STEM major embeddedness measure can be found in the appendix.

Incivility

To measure incivility within one's major, we used the Work Incivility Scale (WIS; Cortina et al., 2001) and adapted the opening question so that it asked participants if, since joining their major, they had been in the following situations with peers, advisors, and faculty. This is similar to an adaption used by Caza and Cortina (2007), who asked participants to think about their experiences with university members. The WIS is a 7-item scale asking participants to reflect on whether they have experienced behaviors that are a) disrespectful, b) have an ambiguous intent to cause harm, and c) are not as severe as harassment or bullying. Example behaviors include "Made demeaning or derogatory remarks about you?" and "Ignored or excluded you from professional camaraderie?" Participants responded regarding the frequency with which they had been in each situation on a 5-point Likert-type scale ($1 = \textit{never}$ to $5 = \textit{most of the time}$). Cronbach's alpha for the current study is .88. The full incivility measure can be found in the appendix.

Psychological Capital

Psychological capital was measured using the 24-item Psychological Capital Questionnaire developed by Luthans et al., (2007). The measure has six questions for each subscale: hope (e.g. "There are lots of ways around any problem"), self-efficacy (e.g., "I feel confident analyzing a long-term problem to find a solution"), resilience (e.g., "I can get through

difficult times while working because I've experienced difficulty before”), and optimism (e.g., “When things are uncertain for me, I usually expect the best”). Participants were asked to rate the extent to which they agreed with each item using a 6-point Likert-type scale ($1 = \textit{strongly disagree}$ to $6 = \textit{strongly agree}$). The Cronbach's alpha for the current study is .90 and has shown consistent reliability across several studies. (See Dawkins et al., 2013 for a systemic review of the psychometric properties of the scale.) The Cronbach's alphas for the subscales in the original study are as follows: hope, $\alpha = .76$; self-efficacy, $\alpha = .80$; resilience, $\alpha = .70$; optimism, $\alpha = .75$. Luthans et al. (2007) discuss the measurement validation, examining convergent, discriminant, and criterion validity finding the measure to meet standards for each type of validity. The full PsyCap measure is not provided in an appendix due to copyright laws.

Control Variable

Gender is included as a control variable as men and women are expected to differ in the level of incivility they report. Research shows women face more incivility in the workplace than men (Cortina et al., 2001; McCord et al., 2018) and at greater intensities than men (Cortina et al., 2013). This is especially true for women in male-majority contexts where their gender is made more salient (Dicke et al., 2019). As such, studies have found that women in male-majority fields experience greater levels of incivility than women in other fields (Cortina et al., 2001; Dorrance Hall & Gettings, 2020; Lim & Cortina, 2005). Studies with college students have also reported gender differences in perceptions of incivility, mirroring findings in the workplace (Itzkovich & Dolev, 2017; Welbourne et al., 2016). In STEM education specifically, research with high school engineering students found gender differences in the awareness of incivility, with women reporting greater awareness of incivility for most instances than men (Carmona-Cobo et al., 2019).

RESULTS

Preliminary analyses were run to test the assumptions of regression. All assumptions were met, so no transformations to the data were necessary. Descriptive statistics and correlations can be found in Table 1. Correlations indicate gender was significantly correlated with incivility ($r = .136, p = .014$), with women reporting higher levels of incivility than men. As such, gender was kept as a control in the model. In addition, PsyCap was strongly correlated with major embeddedness ($r = .541, p < .001$) while there was no correlation between incivility and major embeddedness ($r = -.007, p = .902$).

To test the hypotheses, a hierarchical regression was used. Hierarchical regressions are a special form of linear regression analysis that rely on theory and hypotheses to add predictors in sets (Darlington & Hayes, 2017). These regressions are used to as a method of statistical control, allowing researchers to see how much variance in the model is explained by control variables, before adding the variables of interest to the model. In addition, hierarchical regressions allow researchers to determine if adding sets of predictors significantly improves the explained variance in the model. Further, hierarchical regressions can be useful when models contain higher-order factors and researchers are interested in main effects of the lower-order factors. When analyses contain significant higher-order factors, such as an interaction, all lower order factors are no longer interpretable (Darlington & Hayes, 2017). In a hierarchical regression, lower-order effects can be examined in earlier sets, prior to the inclusion of the higher order, allowing for the interpretation of any main effects.

Table 1*Descriptive Statistics and Correlations*

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7
1. Gender	.4	.5							
2. ME	4.2	.5	.067	(.87)					
3. Major Fit	4.3	.5	.050	.861**	(.73)				
4. Major Links	4.0	.6	.089	.864**	.616**	(.76)			
5. Major Sacrifice	4.4	.5	.005	.711**	.477**	.400**	(.69)		
6. Incivility	1.6	.6	.136*	-.007	-.014	-.064	.101	(.88)	
7. PsyCap	4.7	.6	.065	.541**	.483**	.416**	.445**	.028	(.90)
8. Incivility x PsyCap	.0	.3	.041	-.091	-.063	-.111*	-.039	.089	-.109*

Note. $N = 324$. ME = major embeddedness. Gender was coded as men = 0, women = 1.

Cronbach's alphas are reported on the diagonal.

* $p < .05$, ** $p < .001$

Prior to analysis, scores for incivility and PsyCap were mean-centered to improve interpretability of the regression values, as the measurement scales do not include zero (Darlington & Hayes, 2017). In step one of the hierarchical regression, the control variable of gender was added as predictor, with major embeddedness as the outcome. Gender did not account for significant variance in major embeddedness, $B = .06$, $t = 1.20$, $p = .232$, part $r^2 = .004$. Table 2 includes the results for each step of the regression.

Step two included the addition of incivility as a predictor to test Hypothesis 1. Incivility did not account for significant variance in major embeddedness ($B = -.12$, $t = -.289$, $p = .773$, $\Delta R^2 < .001$); as such, Hypothesis 1 was not supported. In the third step, PsyCap was added as a predictor, in addition to an interaction term of incivility multiplied by PsyCap to test the moderating effect of PsyCap. The interaction was not significant, $B = -.046$, $t = -.667$, $p = .499$, part $r^2 = .001$. As such, Hypothesis 2 was not supported. The main effect of PsyCap was significant, $B = .438$, $t = 11.31$, $p < .001$, part $r^2 = .286$. For every unit increase in psychological capital, major embeddedness increased by .438 units, holding gender and incivility constant. Analyses were also conducted without gender as a control variable and results did not change.

Table 2*Hierarchical Regression Results on Major Embeddedness*

Variable	Major Fit		
	Step 1	Step 2	Step 3
Gender	.06	.07	.04
Incivility		-.01	-.02
Psychological Capital			.44*
Incivility x PsyCap			-.05
<i>F</i> (overall model)	1.43	.76	33.47*
<i>R</i> ²	.004	.005	.296*
ΔR^2		.000	.291*

Note. Unstandardized regression coefficients are reported.

* $p < .001$

To further examine the data because the hypotheses were not supported, additional analyses were conducted to determine if incivility had a significant relationship with any of the dimensions of major embeddedness. Hierarchical regressions were run in the same manner as for hypothesis testing, on each dimension of major embeddedness. Table 3 includes the results of the regressions. Incivility did not significantly predict any variance in fit ($B = -.018$, $t = -.38$, $p = .706$, part $r^2 < .001$), links ($B = -.078$, $t = -1.38$, $p = .168$, part $r^2 = .006$), or sacrifice ($B = .077$, $t = 1.64$, $p = .101$, part $r^2 = .008$), and there were no significant interactions between incivility and PsyCap in predicting any of the dimensions; fit, ($B = -.014$, $t = -.17$, $p = .863$, part $r^2 < .001$), links, ($B = -.121$, $t = -1.22$, $p = .222$, part $r^2 = .004$), and sacrifice, ($B = .006$, $t = .08$, $p = .939$, part $r^2 < .001$). PsyCap predicted significant variance in each dimension of major embeddedness;

fit, ($B = .454, t = 9.75, p < .001, \text{part } r^2 = .228$), links, ($B = .448, t = 7.98, p < .001, \text{part } r^2 = .162$), and sacrifice, ($B = .406, t = 8.85, p < .001, \text{part } r^2 = .195$).

Table 3*Hierarchical Regression Results for Major Embeddedness Dimensions*

Variable	Major Fit			Major Links			Major Sacrifice		
	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3
Gender	.06	.06	.03	.11	.13	.10	.01	-.01	-.04
Incivility		-.02	-.03(-.61)		-.08	-.08		.08	.07
Psychological Capital			.45*			.45*			.41*
Incivility x PsyCap			-.01			-.12			.01
<i>F</i> (overall model)	.81	.47	24.49*	2.54	2.23	18.42*	.007	1.36	20.63*
<i>R</i> ²	.002	.003	.225*	.008	.014	.188*	.000	.008	.206*
ΔR^2		.000	.232*		.006	.174*		.008	.197*

Note: Unstandardized regression coefficients are reported.

* $p < .001$

DISCUSSION

The purpose of the current study was to examine the undermining relationship between incivility and students' major embeddedness and whether the personal resource of PsyCap would buffer the relationship. Incivility is common, with over 75% of university students reporting experiencing incivility at some point in their education (Caza & Cortina, 2007). Experiencing incivility decreases students' sense of belonging (Bai et al., 2020; Caza & Cortina, 2007), feelings of fit with their major (Jensen & Deemer, 2019; Kabat-Farr et al., 2018; Zurbrügg & Miner, 2016), and reduces their perceptions of benefits associated with education (Alt & Itzkovich, 2016) which are similar to the embeddedness dimensions of links, fit, and sacrifice, respectively. Students in STEM are likely to experience even greater rates of incivility, as STEM education has historically been a unwelcoming environment (Freeman, 2020; Hall et al., 2017). This climate may be one of the reasons that STEM attrition rates are high (National Science Board et al., 2019), making STEM a pertinent context for this study. This study had two hypotheses: 1) there would be a negative relationship between incivility and major embeddedness and 2) PsyCap would moderate the relationship between incivility and major embeddedness, such that PsyCap buffered the negative effects of incivility.

As indicated in the results, Hypothesis 1 was not supported. In fact, there was no correlation between incivility and major embeddedness. These results were surprising as there is strong theoretical support and empirical evidence pointing to a relationship between the two constructs. Specifically, studies have found incivility at school causes students to question if their skills and competence are aligned with their major (Jensen & Deemer, 2019; Kabat-Farr et al., 2018; Zurbrügg & Miner, 2016), which is closely related to the embeddedness dimension of fit. Further, incivility is associated with students feeling more isolated and having reduced peer

support (Bai et al., 2020; Caza & Cortina, 2007); factors that are related to links. Finally, students who experienced incivility were more likely to reevaluate the benefits associated with their major and conclude leaving was a better alternative (Cortina et al., 2013; Lim et al., 2008), which aligns with the dimension of sacrifice. One potential explanation for the results is that the sample included only senior students, who may represent “survivors” of incivility. If the proposed relationship did exist, it is likely that students who experienced incivility would leave before the final semester of school, in part because of low levels of embeddedness. This argument is particularly plausible given the low levels of incivility reported and high levels of embeddedness reported in the results.

A low correlation between the incivility and embeddedness is not immediately indicative of the absence of a relationship, specifically if there is a potential for a suppressor variable to exist that reduces the strength of the relationship between the factors. Hypothesis 2, which predicted PsyCap would buffer the relationship, is an example of how a variable may suppress a relationship. However, Hypothesis 2 was also not supported. Given the research demonstrating PsyCap as a moderator of negative experiences (Darvishmotevali & Ali, 2020; Nawaz et al., 2020; Woo & Kim, 2020; Yu & Li, 2020) and evidence of PsyCap specifically moderating the effects of incivility (Nawaz et al., 2020; Woo & Kim, 2020), the results are likely a product of the sample and range restrictions on incivility and major embeddedness and is not necessarily indicative of the true relationship between the constructs.

Though not hypothesized, a significant positive relationship between PsyCap and major embeddedness was found. Theory for PsyCap and how it is related to various outcomes draws on the positive psychology literature and resource theories such as conservation of resources (COR; Hobfoll et al., 2018; Luthans et al., 2007; Newman et al., 2014). Each component of PsyCap

provides unique resources and skills such as motivation, persistence, positive cognitive appraisals, and confidence that together, create a foundation that facilitates further resource acquisition (F. Luthans & Youssef-Morgan, 2017; Newman et al., 2014). COR theory posits that individuals are in a continuous process of collecting resources in order to reduce the impact of future resources loss (Hobfoll, 1989). Additionally, COR theory has identified that individuals with more resources will continue to aggregate new resources with more ease than those with fewer resources (Hobfoll, 2011). Embeddedness has been theorized to be a web of resources as well as ties, with the dimensions being either instrumental (fit and links) or intrinsic resources (sacrifice; Kiazad et al., 2015). With this, it is possible that students who have more resources through PsyCap are more likely to acquire additional resources that contribute to the development of embeddedness. This proposition is supported by the results of this study, as well as recent empirical research that found PsyCap was positively related to job embeddedness (Ren et al., 2019; Sun et al., 2011).

Limitations and Directions for Future Research

As previously mentioned, results should be interpreted with caution as there are limitations in the current study. First, having only seniors in the sample caused range restriction on both incivility and embeddedness which limited the ability to find a relationship between them. However, given the theoretical support and established prevalence of incivility among students (Bai et al., 2020; Caza & Cortina, 2007), the data may be reflecting the outcomes of the proposed relationship. Specifically, if incivility is related to embeddedness, it is likely that students who experienced high rates of incivility as a STEM major left before reaching the final semester of their senior year as they had fewer ties causing them to stay. Similarly, students who experienced lower incivility – as is the case for the current sample – would have had fewer

environmental impediments to the development of their embeddedness, and as such, should have higher levels of embeddedness – again, as is the case for the current sample. Thus, the absence of a significant relationship between incivility and embeddedness may be an artifact. Future research with students in all levels of education could provide greater variability in incivility and embeddedness, increasing the chance of finding a relationship.

Further, this study relied on cross-sectional data, so a causal relationship between the PsyCap and major embeddedness cannot be definitively confirmed. Future research would benefit from a longitudinal design that tracks students for the duration of their time in STEM. This would allow for observation of changes in incivility, PsyCap, and embeddedness throughout the college career and would allow better opportunity for testing directional relationships.

In addition, this study relied on self-report measures for each construct which has been cautioned as it can lead to positive bias (Podsakoff et al., 2003). However, given the nature of the constructs, self-reports are the best method for collecting data on embeddedness, PsyCap, and incivility because these are all constructs that rely on participants' perceptions and internal psychological thoughts. As such, other measures would not accurately reflect the constructs. While there is criticism for using the same method for each construct, researchers have shown common-methods do not always upwardly bias results and personal constructs can often not be assessed in a more accurate way than through self-reports (Conway & Lance, 2010).

Finally, the measure of incivility used did not distinguish between incivility from peers or faculty. A few studies have theorized that the source of incivility (faculty or peer) may be associated with different outcomes and relationship strengths (Caza & Cortina, 2007; Itzkovich & Alt, 2016). This may occur because of the added power difference between students and faculty which influences how students may perceive and interpret incivility (Caza & Cortina,

2007). For example, one study found incivility from faculty has a stronger relationship with perceived injustice than incivility from peers (Caza & Cortina, 2007).

For embeddedness, incivility from faculty may be interpreted by students as a sign they do not belong and would not excel in the field, reducing feelings of embeddedness. Research has found that incivility from faculty impairs students' adjustment to college (Alt & Itzkovich, 2016), and faculty are a key source of support for students, promoting their success and persistence in school (Lawson et al., 2018). Regarding peer incivility, research has found students who experience peer incivility perceive lower levels of peer support and higher levels of isolation (Bai et al., 2020; Caza & Cortina, 2007). In an employee context, unethical leadership was found to reduce employees' job embeddedness, while unethical peer behaviors only negatively influenced job embeddedness when there were also low levels of supervisor support (Ferreira, 2017). In other words, supervisors were most important to job embeddedness and peer behaviors were only influential when supervisors were not supportive. While ethical behaviors in this study were not necessarily directed at employees like incivility, it does demonstrate that the source of an impediment matters to embeddedness. Because research has found the source of incivility is related to different outcomes and the impediment source is differentially related to embeddedness, future research should examine both faculty incivility and peer incivility to determine if there are differential effects on students' embeddedness.

Practical Implications

It is not recommended to take any actions related to incivility and embeddedness based on this study alone, due to the nature of the sample. However, there are practical implications for students and universities regarding the findings related to PsyCap and embeddedness. Specifically, a training intervention was developed to improve individuals' PsyCap (F. Luthans

et al., 2006) and was tested in a student population, showing students who went through training had improvements in their PsyCap (B. C. Luthans et al., 2014). Both studies demonstrated that the content of the training adequately targets PsyCap, as participants in the training conditions showed significant improvements in PsyCap, even when accounting for initial PsyCap levels, and these changes were not found in the control groups. The training is facilitated by a leader who provides a series of exercises and facilitates groups discussions, lasting about two hours. Training is relatively easy to implement, making it a practical tool for universities to utilize. For universities trying to improve student embeddedness, improving students' PsyCap is a feasible and practical solution that also brings other benefits such as improved academic satisfaction and performance (Carmona-Halty et al., 2019; Hua et al., 2016; Sánchez-Cardona et al., 2021), school belonging, (Datu & Valdez, 2019), and wellbeing and life satisfaction (Datu & Valdez, 2019; Riolli et al., 2012).

Conclusion

This study aimed to expand the literature on embeddedness by identifying incivility as an impediment of embeddedness, while also examining the relationship from a person-environment interaction framework. PsyCap was proposed as an individual difference that would buffer the effects of incivility. The proposed relationships were not supported, though results should be interpreted with caution as the current sample may have limited the ability to find a relationship. However, the study did reveal a positive relationship between PsyCap and major embeddedness, which contributes to the literature as this relationship has not yet been found in a student population. This information is beneficial to universities interested in promoting student embeddedness as PsyCap can be improved through training, making it an easy and accessible intervention.

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APPENDIX**STEM MAJOR EMBEDDEDNESS**

Instruction: “Please indicate your level of agreement with the following statements”

Response scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly

Agree

Fit

1. The way I think fits well with my major.
2. I have the right skills and abilities for my major.
3. I am well suited for my major.
4. I thrive on the challenge my major offers.
5. My major is my passion.

Links

6. I like that people in my major think the same way I do.
7. My professors make me feel more connected to my field.
8. I feel well understood by other STEM students.
9. I try to bring other people into the STEM community.
10. I enjoy being around other students in my major.

Sacrifice

11. Because of my major I am likely to have a good career.
 12. I take a great deal of pride in being a STEM student.
 13. I've invested a great deal in my major.
 14. I stand out from others because of my major.
-

INCIVILITY

Instruction: “Since you have been in your major, have you been in a situation where your teachers, advisors, or other students in your major or classes...”

Response scale: 1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Most of the Time

-
1. Put you down or was condescending to you?
 2. Paid little attention to your statement or showed little interest in your opinion?
 3. Made demeaning or derogatory remarks about you?
 4. Addressed you in unprofessional terms, either publicly or privately?
 5. Ignored or excluded you from professional camaraderie?
 6. Doubted your judgment on a matter over which you have responsibility?
 7. Made unwanted attempts to draw you into a discussion of personal matters?
-

VITA

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Publications

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