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Effects of Matching Personal and Organizational Mindsets on Belonging and Organizational Interest

Laura E. Wallace[1], Jennifer A. LaCosse[2], Mary C. Murphy[3], Ariana Hernandez-Colmenares[4], Lauren J. Edwards[5], and Kentaro Fujita[4]

[1] Department of Behavioral Science, The University of Chicago Booth School of Business
[2] Department of Psychology, University of Michigan—Flint
[3] Department of Psychological and Brain Sciences, Indiana University Bloomington
[4] Department of Psychology, The Ohio State University
[5] School of Social Work, University of Washington

Growth mindsets are beliefs that abilities, like intelligence, are mutable. Although most prior work has focused on people's personal mindset beliefs, a burgeoning literature has identified that organizations also vary in the extent to which they communicate and endorse growth mindsets. Organizational growth mindsets have powerful effects on belonging and interest in joining organizations, suggesting that they may be a productive way to intervene to improve individual and societal outcomes. Yet, little is known about for whom organizational mindset interventions might be more or less effective, a critical question for effective implementation and theory. We examine whether people's personal mindset beliefs might determine the effect of organizational growth mindsets, and if so, whether this moderation reflects a matching or mismatching pattern. Three experiments manipulated the espoused mindset of an organization and found that organizational growth mindsets primarily increased belonging and interest in joining among participants who personally endorsed matching growth mindset beliefs. An additional field study provided ecological validity to these findings, replicating them with students' experiences of belonging in classrooms. This study also revealed a divergent mismatching pattern on grades: rather than bolstering the grades of students with growth mindsets, growth mindset classroom contexts primarily enhanced the grades of students with more fixed mindsets. By clarifying for whom organizational growth mindsets are beneficial and in what manner, the current work provides theoretical and practical insight into the psychological dynamics of organizational growth mindsets.

Public Significance Statement

When organizations communicate the belief that skills and abilities can be improved (organizational growth mindsets), it can have a powerful effect on people's experiences. Although the present work suggests that organizational growth mindsets are broadly beneficial to people's sense of belonging and interest, it also demonstrates that who benefits most from them depends on people's personally endorsed mindset beliefs. Specifically, people report greater belonging and interest in joining organizations when their personal growth mindset beliefs match the growth mindset beliefs of the organization. Given the widespread interest in implementing organizational growth mindsets as interventions, it is critical to understand whether, when, and for whom they confer these benefits.

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Laura E. Wallace https://orcid.org/0000-0002-2298-7569

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Correspondence concerning this article should be addressed to Laura E. Wallace, Department of Behavioral Science, The University of Chicago Booth School of Business, 5807 S. Woodlawn Avenue, Chicago, IL 60637, United States. Email: wallacel0726@gmail.com

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Beliefs about the extent to which skills and abilities are more malleable versus not—that is, more growth versus fixed mindsets—influence people's psychological experiences and outcomes (Blackwell et al., 2007; Dweck & Master, 2009; Dweck & Yeager, 2019; Nussbaum & Dweck, 2008; Rattan et al., 2015; Yeager et al., 2016). Although research has traditionally focused on people's personal endorsement of these beliefs, a growing literature reveals that organizations—through their policies, practices, norms, and leadership messages—can also communicate and be seen as endorsing the idea that abilities are relatively fixed or malleable (e.g., Canning, Murphy, et al., 2020; Emerson & Murphy, 2015; Heslin et al., 2018; Murphy & Dweck, 2010). For example, Canning, Murphy, et al. (2020) found that Fortune 500 Companies' mission statements varied in the extent to which they espoused fixed versus growth mindset beliefs. Similarly, in educational contexts, when instructors suggest everyone can learn and when they offer opportunities for feedback, this creates a growth mindset culture in the classroom—a space in which the malleability of traits and skills are perceived by students and shape their motivation and performance (Kroeper, Fried, et al., 2022; Kroeper, Muenks, et al., 2022; Murphy et al., 2021).

Critically, these organizational mindsets can influence consequential outcomes. Research suggests, for example, that students report more engagement and motivation to do their best work in growth mindset classrooms (Canning et al., 2019; Muenks et al., 2020), and that employees report higher satisfaction and commitment in growth mindset organizations (Canning, Murphy, et al., 2020; Fuesting et al., 2019). People are more interested in joining more growth versus fixed organizations, and once in them, report greater belonging (Emerson & Murphy, 2015; LaCosse et al., 2020; Muenks et al., 2020; Murphy & Dweck, 2010; Rattan et al., 2018). Furthermore, people seem to perform better in growth mindset organizations. For example, when professors—who shape the classroom environment—endorse and are perceived by students to endorse more growth mindset beliefs, students in these professors' classrooms (and especially those from traditionally underrepresented groups) earn higher grades (Canning et al., 2019; Muenks et al., 2020). Thus, the extant work suggests that organizational mindsets have powerful effects on people's experiences in those settings, above and beyond the effects of personal mindset beliefs (individual-level beliefs about the malleability of a given attribute).

Given this work, there is growing recognition of the potential of organizational mindsets to serve as targets of intervention to promote positive outcomes in companies, schools, and other organizations (Murphy & Reeves, 2019). Traditional mindset interventions require changing the beliefs of many individuals and then maintaining those newly formed growth mindsets across time and context, a task that can be quite challenging. Interventions targeting organizational mindsets instead shift organizational policies, practices, and leadership messages that communicate what is valued by the organization. In contrast to personal mindset interventions, organizational mindset interventions may be easier to scale and provide more "bang-for-the-buck" insofar as they are more sustainable and do not rely on shifting any single individual's personal mindset. Previous research has suggested that organizational mindsets can act as powerful social norms (Canning, Murphy, et al., 2020; Canning et al., 2019; Fuesting et al., 2019; LaCosse et al., 2020; Muenks et al., 2020), which may shape people's behavior in adaptive ways through both psychological and social mechanisms. However, heeding the warnings of other intervention scientists (Bryan et al., 2021), we note that the impact of any intervention likely differs systematically across individuals and contexts. To understand the impact that any intervention may have, scientists and practitioners alike must understand who might benefit the most from the intervention. It is this critical question that we tackle in the current research, focusing on how people's personal mindset beliefs might determine the size of the effect of organizational mindsets on belonging and interest in joining.

Belonging and Interest in Joining

We focus on the salubrious effects that organizational mindsets have on feelings of belonging and interest in joining (Bian et al., 2018; Emerson & Murphy, 2015; LaCosse et al., 2020; Muenks et al., 2020; Murphy & Dweck, 2010; Rattan et al., 2018). Belonging is a sense that one will be supported and valued by others in a social context (Baumeister & Leary, 1995). Prior work indicates that belonging is a predictor of and precursor to important outcomes, including interest in joining a group or organization, well-being, physical health, and performance (Bian et al., 2018; Boucher et al., 2017; Cheryan et al., 2009; Cheryan & Plaut, 2010; Fritz & Lyubomirsky, 2018; Jackson et al., 2019; LaCosse et al., 2020; Muenks et al., 2020; Murphy et al., 2020, 2007; Murphy & Zirkel, 2015; Walton & Cohen, 2007, 2011). For example, one reason for the gender-gap in math may be that women experience a lower sense of belonging: when they experience higher levels of belonging in math, they are more interested in pursuing a career in math and get better math grades (Rattan et al., 2012).

Given this prior work demonstrating the effects of belonging on interest in joining, we additionally examine the effects on interest, both independently and mediated through belonging. Interest in joining organizations has been the subject of much study, as some group-based disparities result from environmental cues disproportionately reducing interest among members of historically excluded groups (e.g., Cheryan & Plaut, 2010). Furthermore, it is of practical interest to organizations to understand how their practices and messages influence people's interest in joining them.

Prior work has identified that organizational growth mindsets enhance belonging and interest by creating social environments wherein setbacks and challenges are seen as opportunities for growth and improvement rather than reflecting the absence of some skill or critical characteristic (LaCosse et al., 2020; Muenks et al., 2020; Murphy & Reeves, 2019). By contrast, organizational fixed mindsets create a sense that "some people have it, and some people don't," activating concerns for everyone about whether one belongs to the chosen few (LaCosse et al., 2020; Muenks et al., 2020; Murphy & Reeves, 2019). This feature of fixed organizations may also evoke concerns that others in the organization will be competitive, engage in unethical behavior, and discourage people from taking risks that may ultimately pay off—an endeavor that requires

vulnerability (Canning, Murphy, et al., 2020). Members of these fixed organizations also report less organizational trust and commitment. Thus, whereas organizational growth mindsets create safe environments in which members can make mistakes and still be welcomed, organizational fixed mindsets create more threatening environments characterized by constant concerns about whether one is part of the "chosen few."

Beyond the Main Effect

To date, research examining the impact of organizational mindsets on belonging and interest has largely focused on documenting the "main effect" of these mindsets, with less attention focused on factors that might enhance or diminish this effect. There is some evidence that organizational growth mindsets have a particularly large impact on feelings of belonging among those who are most at risk of feeling marginalized. For example, LaCosse et al. (2020) found that although organizational growth versus fixed mindsets in science, technology, engineering, and mathematics (STEM) classrooms enhanced belonging among all students, this effect was much larger among female students—that is, those who are traditionally stigmatized in such educational contexts. In the present research, however, we move beyond demographics and focus on psychological factors that may shape people's sense of belonging and interest in growth versus fixed organizations. Specifically, we explore the extent to which individuals' personal endorsement of growth versus fixed mindsets impacts how they respond to organizational growth versus fixed mindsets. In much of the research reviewed above, the effects of organizational mindsets have been documented above and beyond any effects of personal mindsets (an exploration of statistical main effects). However, researchers to date have overlooked the possibility that personal mindset beliefs might determine the effects of organizational mindsets (an exploration of a statistical interaction). The current research addresses this oversight.

Matching Mindsets

The social psychological literature is replete with examples of people preferring social contexts that match their own personal characteristics in some way. Decades of research repeatedly demonstrate that people are attracted to those who agree with them (Byrne, 1997). Other work has shown that when people's psychological features match their cultural context, they experience higher self-esteem and subjective well-being (Fulmer et al., 2010), and can even live longer (Ebert et al., 2020; Wallace et al., 2019). Additionally, a vast literature on person–environment fit in organizational psychology suggests that a match between a person and their environment along a number of dimensions can have profound consequences for job satisfaction, well-being, and performance (for recent reviews, see Sekiguchi & Yang, 2021; Van Vianen, 2018).

These matching effects may be multiply determined, with different mechanisms operating under different conditions (Teeny et al., 2021). Being in an environment that matches one's own belief system may create a sense of validation, feeling that one has the correct beliefs (Byrne, 1997; Fulmer et al., 2010). People may also anticipate that they will be socially rewarded for having the commonly endorsed beliefs (Gebauer et al., 2017). Because people tend to view themselves positively, they may also assume that other people and environments that match them on one dimension may share other positive qualities (Kaplan & Anderson, 1973; Montoya & Horton, 2013). These matching environments may also create a sense of "fit" or "fluency" (Labroo & Lee, 2018) or the sense that there are more affordances to achieve ones' goals (Higgins, 2000; Rege et al., 2020; Yeager et al., 2022). Thus, environments whose beliefs coincide with people's own beliefs seem to make people feel better about themselves, feel better about the environment, and/or provide more opportunities and rewards for enacting their desired goals and behaviors.

In this article, we focus on whether and in what way the impact of organizational growth mindsets on belonging and interest may be moderated by matching (vs. mismatching) personally endorsed mindsets. Collectively, the work reviewed above might suggest a matching hypothesis—that organizational growth mindsets have their strongest impact among those who personally endorse matching growth mindset beliefs. We note that unlike research on the impact of organizational mindsets, there is only limited (and mixed) evidence for the effects of personal mindsets on belonging and interest. Although a couple of papers suggest that personal mindsets can bolster belonging (Deiglmayr et al., 2019; Williams et al., 2021), other work does not support this relation (LaCosse et al., 2020; Muenks et al., 2020; Rattan et al., 2018). Similarly, there is some evidence for an effect of personal mindset beliefs on interest in joining a field (Burnette et al., 2020), but other research does not support this (LaCosse et al., 2020; Muenks et al., 2020). Therefore, we were unsure whether there would be a main effect of personal mindsets on belonging and organizational interest. It is nevertheless possible that people's personal mindsets could influence whether and how much organizational mindsets boost belonging and interest.

A "pure" matching hypothesis might suggest that both fixed and growth organizational mindsets should have benefits among those with matching fixed and growth personal mindsets, respectively, resulting in an X-shaped cross-over interaction. However, given the robust effects of organizational mindsets on belonging and interest in previous work, it may be more likely that we would observe an asymmetrical, L-shaped interaction, in which growth mindset organizations would particularly benefit people with more growth mindsets beliefs, but there would be little difference between fixed and growth organizations among people with more fixed mindsets beliefs. People with more fixed mindsets may potentially enjoy a feeling of validation or fit from being in a fixed mindset organization that shares their views. However, as noted earlier, these same organizations also create a sense that "some people have it, and some people don't," activating concerns about whether one belongs to the chosen few (LaCosse et al., 2020; Muenks et al., 2020; Murphy & Reeves, 2019). These concerns may counter any benefits that people with more fixed mindset beliefs may obtain from being in an environment that matches their own beliefs, resulting in little difference in belonging between fixed and growth organizations. This would parallel other work, which at times has found asymmetrical matching patterns (Ebert et al., 2020; Fulmer et al., 2010), such as more extraverted people particularly benefitting from being in a more extraverted environment, but more introverted people not necessarily benefitting from being in a more introverted environment. Thus, although growth organizations might generally increase belonging and interest by fostering psychological safety, matching versus mismatching mindsets might additionally enhance belonging and interest above and beyond this effect.

The few examinations of personal mindsets in tandem with organizational mindsets to date have focused on achievement rather than belonging as an outcome. Schmidt et al. (2015) and Yeager et al. (2022) found that a growth mindset intervention aimed at shifting students' personally held mindset beliefs helped students achieve higher math grades, but only when their instructors endorsed growth mindset beliefs. Similarly, Yeager et al. (2019) found that students earned higher grades after receiving a growth mindset intervention, but only when students perceived that their peers viewed challenge-seeking as normative, which is a contextual norm consistent with a growth mindset. Although these prior findings are informative for identifying when direct-to-student growth mindset interventions may be effective, it is unclear whether the same "matching" effect would be found when examining people's preexisting personal mindset beliefs (i.e., mindset beliefs absent intervention) and whether these effects on grades would extend to people's experiences of belonging and interest. Nevertheless, they provide some preliminary evidence that people may benefit most from organizational mindsets that match their own personal mindsets, particularly when people with more growth mindsets are in growth organizations.

Mismatching Mindsets

Whereas the matching hypothesis posits that growth mindset organizations should primarily benefit people who personally endorse more growth mindset beliefs, an alternative is that growth mindset organizations would primarily benefit people who endorse more fixed mindset beliefs. Some prior work has theorized that personal growth mindset beliefs act as a buffer against threatening environmental cues (Good et al., 2012), one of which may be organizational messages endorsing fixed mindsets. Believing that one's skills and abilities are malleable may buffer people from debilitating concerns that fixed organizational mindsets potentiate, such as whether one is among the "chosen few." On the other hand, people who personally endorse more fixed mindset beliefs may be particularly likely to benefit from an organization that encourages a different type of thinking. For example, growth mindset organizations might alleviate concerns about being one of the "chosen few" that an individuals' fixed mindset beliefs might activate. Thus, we might posit an alternative mismatching hypothesis whereby organizational growth mindsets particularly benefit individuals who personally endorse more fixed mindset beliefs.

The Present Research

Overview of Studies

Across different contexts and methodological approaches, we examine whether the effects of organizational mindsets differ across people who naturally endorse more fixed versus growth mindset beliefs (absent intervention), and if so, whether we observe a pattern consistent with the matching or mismatching hypothesis. Studies 1 and 2 are controlled online experiments in which we manipulated the organizational mindset of a consulting company and a volunteer group, respectively. Study 3 replicated these studies in a classroom context, manipulating students' perceptions of a professor's mindset—professors play a key role in instantiating institutional beliefs and values in higher education. All three experiments examined two critical outcome variables: belonging and interest in joining the organizational environment. Prior research has suggested that although these outcomes are distinct, a heightened sense of belonging can increase interest in joining both organizations and classrooms (Bian et al., 2018; Boucher et al., 2017; Cheryan et al., 2009; Cheryan & Plaut, 2010; Jackson et al., 2019; LaCosse et al., 2020; Muenks et al., 2020; Murphy et al., 2007, 2020; Murphy & Zirkel, 2015; Walton & Cohen, 2007, 2011). Study 4 is a field study in which we assessed undergraduate students' perceptions of the mindsets of their actual professors and assessed in vivo experiences. Not only does Study 4 provide a test of ecological validity of the effects of matching versus mismatching personal and organizational mindsets on belonging, but it also provides an opportunity to explore grades as a behavioral outcome. We also present two direct replications of Study 1 and two direct replications of Study 2 in the online supplemental materials. Across all these studies, we focus on mindsets of intelligence, as beliefs about the mutability of intelligence are highly relevant to many organizational and educational contexts; intelligence is likely viewed as an asset in many organizations and classrooms. Thus, beliefs about the ability to improve it should be highly influential, as evidenced in prior work (Canning, LaCosse, et al., 2020; Canning et al., 2019; Canning, Murphy, et al., 2020; Murphy & Reeves, 2019). Understanding whether organizational mindsets of intelligence are moderated by personal mindsets of intelligence thus seemed like a reasonable starting place to examine potential personal and organizational mindset interactions.

Transparency in Researcher Decisions

This paper is the product of two research teams who began working on these questions independently. We combined research efforts after all data were collected by both teams. As a result, we had on occasion divergent measures and preregistered data-analytic decisions. To combine our studies into a single report, we employed a consistent set of data-analytic decisions, even though this meant deviating at times from the preregistrations we submitted prior to collaboration. Study 3 was not preregistered.

In Studies 1 and 2, we deviated from the preregistration in three ways. First, we had preregistered that we would examine simple effects of organizational mindsets at scale points two and six of personal mindsets; we instead present results at ± 1 *SD* consistent with the preregistration of Study 4 (we report the original preregistered analyses in the online supplemental materials, which support the same conclusions). Second, we preregistered an additional hypothesis about meta-cognitive influences on the matching effect. This hypothesis was relevant to a different set of research questions than the ones presented in this article and is thus not discussed further. Third, we had preregistered interest in joining as the primary outcome. We report this analysis, but we also report analyses using belonging as a primary outcome given that this is the one variable that was assessed across all four data sets that comprise this article (Study 4 did not assess interest).

In Study 4, we deviated from the preregistration in two ways. First, we preregistered analyses on a number of outcomes beyond belonging and grades, and we preregistered an examination of belonging as a part of an index of evaluative concerns. We chose to focus on belonging given its relevance to our hypotheses and because it was the one variable common across all the data sets that we had to test them. Second, we preregistered our multilevel modeling

analyses using standardized continuous predictor variables and had not included "courses" as a higher-level variable. We later realized, however, that it would be more appropriate to group-mean-centered continuous predictors as the results using standardized predictors would erroneously include variance from higher levels (Nezlek, 2011) and that we should account for variance from courses by nesting students within courses.

Decisions about exclusions were always made consistently with the preregistrations for each specific study. Thus, deviations from our preregistrations do not represent attempts at using researcher degrees of freedom to obtain significant results, but rather attempts to conduct uniform analyses across studies and to employ the most appropriate statistical techniques. We report how we determined our sample size, all data exclusions, and all manipulations. We report all measures for Studies 1–3. Study 4 was a large field study; in the online supplemental materials, we report all course-relevant outcomes measured at the same time as the predictors and outcomes reported in the text (a complete codebook is available upon request). For transparency, the online supplemental materials also report results for all course-relevant outcomes measured at the same time as the predictors and outcomes reported in the text for Study 4 and all outcomes measured and not reported in the text for Studies 1–3. Belonging and interest, however, are our primary focus in the main text as these are the variables that we can test across the multiple data sets that comprise this paper—and thus represent findings that can be most stringently tested for replicability. We attempted to maximize power by using measures that correspond with the consensus "gold standard" for relevant literature and by employing large sample sizes determined based on power analyses using effect sizes observed in prior work. All research materials and detailed information (e.g., specific statistics used) about all power analyses are available in the online supplemental materials. Data and analysis code for the experimental studies, analysis code for the field study, as well as preregistrations for Studies 1, 2, and 4, are available at the following link: https://osf.io/p54tq/?view_only=a846c7e4ff4b4f2298ee28c299a03128. Data for the field study are available upon request consistent with Institutional Review Board (IRB) requirements.

Research Ethics Statement

Ohio State University's IRB approved Studies 1 and 2 (and Studies S1a and b and S2a and b in the online supplemental materials; Protocol 2018B0395, "Individual and Organizational Lay Theories"). The IRB of Indiana University approved Studies 3 (Protocol 1408863535, "Human Perception and Psychological Functioning") and 4 (Protocol 1412028299, "College Experiences Study").

Study 1

Study 1 provides an initial test of whether personal mindsets might determine the effect of organizational mindsets, and if they do, whether they do so in a manner consistent with the matching or mismatching hypothesis. To test this question, we ran an experiment in which we randomly assigned participants to encounter a consulting company that espoused more fixed versus growth mindset beliefs. This controlled experiment allowed us to isolate the effects of organizational mindsets on how people anticipate belonging and interest in joining an organization as a function of personal mindset beliefs.

Method

Participants

To estimate an effect size for power calculations, we obtained the observed standardized simple two-way interaction coefficient of interest at the time of data collection across all the data we had collected at that time (i.e., the studies reported in the online supplemental materials). We used R code from Lane et al. (2016) to conduct power simulations. The power analysis suggested that $N = 850$ would yield 82% power to detect the effect of interest at the time of data collection. As such, we posted for 850 participants who were U.S. citizens and current residents on CloudResearch (Litman et al., 2017).

Of the 960 people who accessed the study, we excluded 20 who did not consent to participate and 79 who did not provide any data. Using our preregistered exclusion criteria, we then excluded six people who did not indicate that they had read the passages (i.e., "Did you actually read the passages?"; yes or no response options) and 22 people who did not select "3" when instructed, "We understand that most people take these studies seriously, did you take this survey seriously? Click 3 if you took this survey seriously"; 1–5 as response options. Finally, we manually coded open-ended responses to two Winograd questions (Bender, 2015; Levesque, 2012) and excluded 37 participants who either answered both questions incorrectly or provided an answer for at least one question that did not correspond to one of the response options. The Winograd questions were, "Sam felt crushed when her longtime rival Suzie revealed that she was the winner of the competition. Who was the winner of the competition?" [response options: Sam & Suzie; correct answer: Suzie] and "Joe tried to call Paul on the phone, but he wasn't available. Who wasn't available?" [response options: Joe & Paul; correct answer: Paul]. This left 796 participants for analyses. When asked, "What is your gender?" and given "male" and "female" response options, 432 responded male, 363 responded female, and one did not choose either. Participants were asked with an open-ended textbox, "How old are you?" $M_{age} = 39.96$, $SD_{age} = 12.48$. Due to experimenter oversight, race was not assessed in Study 1. The study took approximately 10 min to complete, and participants were compensated $1.00 for their participation.

Materials and Procedure

Following the consent form, three validated items from Dweck's (1999) mindset measure assessed participants' personal mindset beliefs about intelligence (e.g., "You have a certain amount of intelligence, and you can't really do much to change it"; $\alpha = .95$). Responses were made on a scale ranging from 1 (*strongly agree*) to 7 (*strongly disagree*). We then informed participants that MCM Consulting was opening offices across the country and was surveying people's impressions of their company. The organization was described as offering generous pay and vacation time, as well as flexibility about where and when employees work. As a manipulation of organizational mindsets, participants were then randomly assigned to read a company mission statement in which the company espoused fixed or growth mindset beliefs about intelligence. For example, the mission statement of the growth organization stated, "Our commitment to creating an atmosphere that fosters a love for

learning, passion, creativity, and resourcefulness is at the heart of everything we do," whereas the mission statement for the fixed organization stated, "Our commitment to creating an atmosphere of 'bests'—the best instincts, the best ideas, the best people—is at the heart of everything we do." After reading the passage, participants completed a four-item manipulation check about their perceptions of the company's mindset (e.g., "MCM Consulting seems to believe that people have a certain amount of intelligence, and they can't really do much to change it"; 1 = *strongly agree*, 7 = *strongly disagree*; Emerson & Murphy, 2015; $\alpha = .91$). Participants then reported their anticipated belonging and interest in joining the organization using measures adapted from Muenks et al. (2020). Anticipated belonging was measured with five items, such as, "How much would you feel like you 'fit in' in this organization?" (1 = *not at all*, 7 = *extremely*; $\alpha = .91$), and interest in joining the organization was measured with three items such as, "How interested would you be in working at a place like MCM Consulting?" (1 = *not at all*, 7 = *extremely*; $\alpha = .96$). After completing the measures, participants reported their demographics, were debriefed, and thanked for participating in the study.

Results

Analysis Plan

Table 1 reports descriptive statistics and correlations among measures.[1] First, we conducted a *t* test to examine the effect of our manipulation on our manipulation check (i.e., perceptions of MCM Consulting's mindset). Next, we regressed our outcomes of interest (belonging and interest) on centered personal mindsets, the organizational mindset condition (−1 = fixed, 1 = growth), and their interaction. We examined simple effects among participants who personally endorsed more growth mindset beliefs (+1 *SD*) and more fixed mindset beliefs (−1 *SD*).

Manipulation Check

As intended, participants in the organizational growth mindset condition ($M = 5.27$, 95% CI [5.12, 5.42], $SD = 1.54$) perceived the company to endorse more growth mindset beliefs than did those in the organizational fixed mindset condition ($M = 3.59$, [3.43, 3.75], $SD = 1.65$), $t(794) = 14.89$, $p < .001$, $d = 1.06$, [0.91, 1.20].

Primary Analyses

Belonging. On average, participants' personal mindsets did not predict their anticipated belonging, $b = 0.02$, 95% CI [−0.03, 0.08], $SE = 0.03$, $t(792) = 0.75$, $p = .451$, $r = .03$. Participants anticipated significantly more belonging in the growth rather than the fixed organization, $b = 0.48$, 95% CI [0.39, 0.58], $SE = 0.05$, $t(792) = 10.11$, $p < .001$, $r = .34$. However, this main effect of organizational mindset was significantly qualified by participants' personal mindset beliefs, $b = 0.18$, 95% CI [0.12, 0.23], $SE = 0.03$, $t(792) = 6.43$, $p < .001$, $r = .22$. Participants who personally endorsed more growth mindset beliefs anticipated greater belonging in the growth (vs. fixed) mindset organization, $b = 0.79$, 95% CI [0.66, 0.92], $SE = 0.07$, $t(792) = 11.70$, $p < .001$, $r = .38$. Participants who personally endorsed more fixed mindset beliefs also reported more belonging in the growth (vs. fixed) organization; however, the effect was over four times smaller, $b = 0.18$, 95% CI [0.04, 0.31], $SE = 0.07$, $t(792) = 2.60$, $p = .009$, $r = .09$ (see Figure 1A).

Interest in Joining. Participants' personal mindset beliefs did not predict overall interest in joining the consulting company, $b = 0.02$, 95% CI [−0.04, 0.08], $SE = 0.03$, $t(792) = 0.72$, $p = .473$, $r = .03$. However, on average, participants were more interested in joining the growth (rather than the fixed) mindset organization, $b = 0.46$, 95% CI [0.35, 0.57], $SE = 0.05$, $t(792) = 8.55$, $p < .001$, $r = .29$. Critically, this effect of organizational mindset was significantly qualified by participants' personal mindset beliefs, $b = 0.17$, 95% CI [0.11, 0.23], $SE = 0.03$, $t(792) = 5.36$, $p < .001$, $r = .19$. Although participants who personally endorsed more growth mindset beliefs demonstrated a strong preference for the growth organization, $b = 0.75$, 95% CI [0.60, 0.90], $SE = 0.08$, $t(792) = 9.85$, $p < .001$, $r = .33$, this preference was attenuated among participants who personally endorsed more fixed mindset beliefs, $b = 0.17$, [0.02, 0.32], $SE = 0.08$, $t(792) = 2.25$, $p = .025$, $r = .08$ (see Figure 1B).[2]

Mediation of Effect of Mindset Match on Interest Through Belonging. Seeking to replicate past research highlighting the benefits of social belonging for enhancing interest in joining an organization (Bian et al., 2018; Boucher et al., 2017; Cheryan et al., 2009; Muenks et al., 2020; Murphy & Zirkel, 2015; Murphy et al., 2007, 2020; Walton & Cohen, 2007), we explored whether the effect of a match between personal and organizational mindset beliefs on interest in joining the organization would be mediated through belonging using Hayes's PROCESS Model 8 (Hayes, 2013; Figure 2). When interest was regressed on belonging, personal mindsets, organizational mindsets, and the interaction between personal and organizational mindsets, belonging was significantly associated with interest, $b = 0.90$, 95% CI [0.85, 0.95], $SE = 0.02$, $t(791) = 37.31$, $p < .001$, $r = .80$. This resulted in a significant index of moderated mediation, $b = 0.16$, 95% CI [0.11, 0.21], $SE = 0.03$, with a small indirect effect among participants endorsing more fixed beliefs, $b = 0.16$, [0.05, 0.27], $SE = 0.06$, and a larger indirect effect among participants endorsing more growth beliefs, $b = 0.71$, [0.58, 0.85], $SE = 0.07$.

[1] We conducted an exploratory factor analysis to examine whether belonging and interest loaded on different factors, as the high correlation between the two may raise questions about their separability. This analysis did not support a single factor and instead suggested that a two-factor solution was a better fit for the data, see the online supplemental materials for details.

[2] Note that as in previous research, people skew toward having more growth mindsets in this study ($M = 4.26$ on a 7-point scale). This means that people with more fixed mindsets (−1 *SD* or 2.55 on the mindset scale) do not endorse their fixed beliefs to the same extreme as people with growth mindsets endorse their growth beliefs (+1 *SD* or 5.97 on the mindset scale). Analyses using ±1 *SD* to probe interactions allow researchers to characterize the distribution at which people naturally fall in their relative endorsement of fixed versus growth mindsets. An alternative analysis might instead probe this interaction by operationalizing fixed and growth mindsets based on participants' level of agreement or disagreement with the items. That is, we could conduct analogous analyses focused on a mean score where mean = 2 represents people who clearly endorse fixed beliefs (based on the response scale options) versus mean = 6 represents people who clearly endorse growth beliefs. When we do this, people who endorse more fixed beliefs no longer demonstrate significantly more interest in the growth organization, $b = 0.08$, 95% CI [−0.10, 0.25], $t(792) = 0.88$, $p = .379$ in Study 1 and actually prefer the fixed organization in Study 2, $b = -0.22$, [−0.44, −0.00], $t(789) = -1.97$, $p = .050$.

Table 1
Study 1 Descriptive Statistics and Correlations

Measure	*M*	95% CI	*SD*	Range	α	1	2	3
1. Personal mindset beliefs	4.26	[4.14, 4.38]	1.71	1–7	.95			
2. Perceived organizational mindset (manipulation check)	4.44	[4.31, 4.57]	1.80	1–7	.91	.12**		
3. Belonging	4.98	[4.89, 5.09]	1.46	1–7	.91	.01	.40***	
4. Interest in joining	5.06	[4.95, 5.18]	1.61	1–7	.96	.01	.33***	.82***

Note. CI = confidence interval.
** $p < .01$. *** $p < .001$.

Discussion

Study 1 replicated prior work suggesting that organizational growth mindsets, on average, can powerfully boost people's interest in joining the organization and belonging (e.g., Canning, Murphy, et al., 2020; Emerson & Murphy, 2015; Heslin et al., 2018; Murphy & Dweck, 2010). These findings once again highlight the power of these organizationally endorsed mindsets to influence individuals' psychological experiences. New to this work, Study 1 provided initial evidence of a matching effect of personal and organizational growth mindsets on belonging and interest in joining. That is, although organizational growth mindsets generally increased people's anticipated belonging and interest in joining, these organizational mindsets had a significantly greater impact among respondents who already personally endorsed more growth mindset beliefs. This study also provided some evidence that this mindset matching effect is asymmetric and "L" shaped—those who personally endorsed more fixed mindset beliefs did not anticipate the same benefits when the organization endorsed a matching fixed mindset. Finally, the current findings replicate prior work suggesting that increasing feelings of belonging may boost interest in joining organizations (Bian et al., 2018; Boucher et al., 2017; Cheryan et al., 2009; Muenks et al., 2020; Murphy & Zirkel, 2015; Murphy et al., 2007, 2020; Walton & Cohen, 2007).[3]

Study 2

In Study 2, we replicated Study 1 with a different manipulation of organizational mindset to address potential concerns about construct validity and generalizability. In this study, participants were asked to imagine that they were considering volunteering with a tutoring organization and read the minutes from one of the organization's meetings.

Method

Participants

We calculated power as in Study 1, but cumulatively updated with the results of Study 1 to estimate the observed effect size of interest at the time of data collection. This power analysis suggested that across infinite samples, $N = 800$ would yield 92% power to detect the standardized coefficient of the primary simple two-way interaction term of interest at the time the study was run, $\beta = -.11$. As such, we posted study opportunities for 800 participants who were U.S. citizens on Prolific.

Out of the 895 people who accessed the study, we excluded 38 who did not consent to participate and 56 who did not complete the study. Using our preregistered exclusion criteria with the same items as Study 1, we excluded three participants who did not indicate that they had read the meeting minutes and three participants who did not select "3" when instructed to do so. Finally, we excluded participants who incorrectly responded to the Winograd questions as described in Study 1. This left 793 participants for analyses. When asked, "What is your gender?" with multiple-choice response options "male" or "female," 379 responded male, and 414 responded female. Participants were asked "How old are you?" with an open textbox, $M_{age} = 37.24$, $SD_{age} = 13.93$. Due to experimenter oversight, race was not assessed in Study 2. The study took approximately 15 min to complete, and participants were compensated with $1.63 for their participation.

Materials and Procedure

Study 2 was similar to Study 1 with the following exceptions. First, rather than read about a consulting firm, participants read about the XYZ Organization—a nonprofit tutoring organization for which participants were asked to imagine that they wanted to volunteer. Second, rather than read a statement about the organization's philosophy, they read the minutes from a meeting where members of the organization discussed adopting a tutoring philosophy that was either consistent with a growth mindset ("the goal of our tutoring should be to find material that will help people increase their abilities") or a fixed mindset ("the goal of our tutoring should be to identify people's skills and provide tutoring tasks that match these skills;" materials sourced from Murphy & Dweck, 2010). Finally, we were concerned that the inconsistent direction of scale points across measures in the previous study may have created confusion for participants. In the present study, we consistently labeled the scale points for all measures (personal mindset, $\alpha = .91$; perceived organizational mindset, $\alpha = .96$; belonging, $\alpha = .93$; and interest in joining the organization—measured with a single item) such that lower numbers indicated more agreement. For ease of interpretation, however, prior to analyses, we coded the scales to be consistent with Study 1.

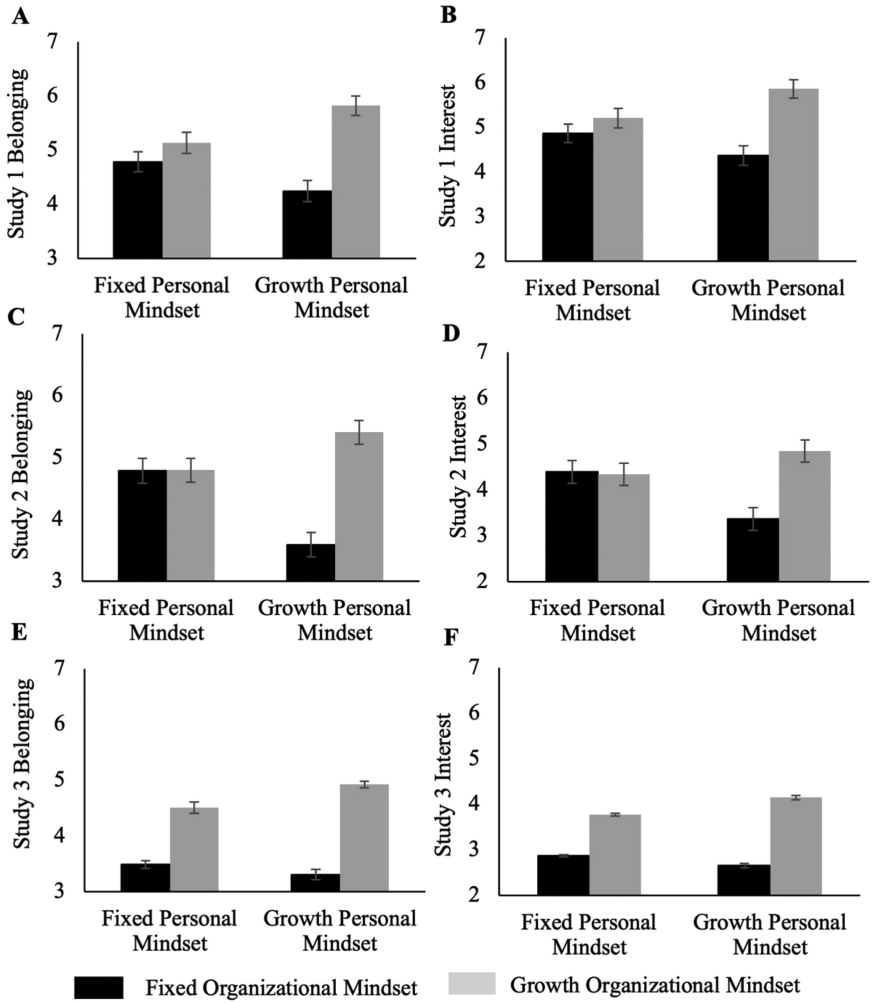
Results

Descriptive statistics and correlations are available in Table 2.

[3] Readers may wonder whether there was support for the reverse mediation path, with interest mediating the effect on belonging. Analyses of moderated mediation testing this possibility revealed some support in Study 1, $b = 0.12$, 95% CI [0.07, 0.17], $SE = 0.02$, and Study 2, $b = 0.12$, [0.06, 0.16], $SE = 0.02$. We note, however, that the strengths of these associations were smaller than those testing the original mediation paths. Reverse mediation was not supported in Study 3, $b = 0.10$, 95% CI [−0.00, 0.20], $SE = 0.05$. These weak and inconsistent effects accord with past research suggesting that belonging is a pre-cursor to interest rather than vice-versa.

Figure 1

Studies 1–3 Organizational Mindset Condition Differences in Belonging and Interest by Personal Mindsets



Note. Error bars represent 95% CIs. Personal mindsets are graphed at ±1 *SD*. CI = confidence interval.

Analysis Plan

We followed the same analysis plan as in Study 1.

Manipulation Check

As intended, participants in the organizational growth mindset condition ($M = 5.92$, 95% CI [5.79, 6.05], $SD = 1.38$) perceived the tutoring organization to endorse significantly more growth mindset beliefs than did those in the organizational fixed mindset condition ($M = 2.60$, [2.45, 2.75], $SD = 1.59$), $t(791) = 31.49$, $p < .001$, $d = 2.23$, [2.06, 2.41].

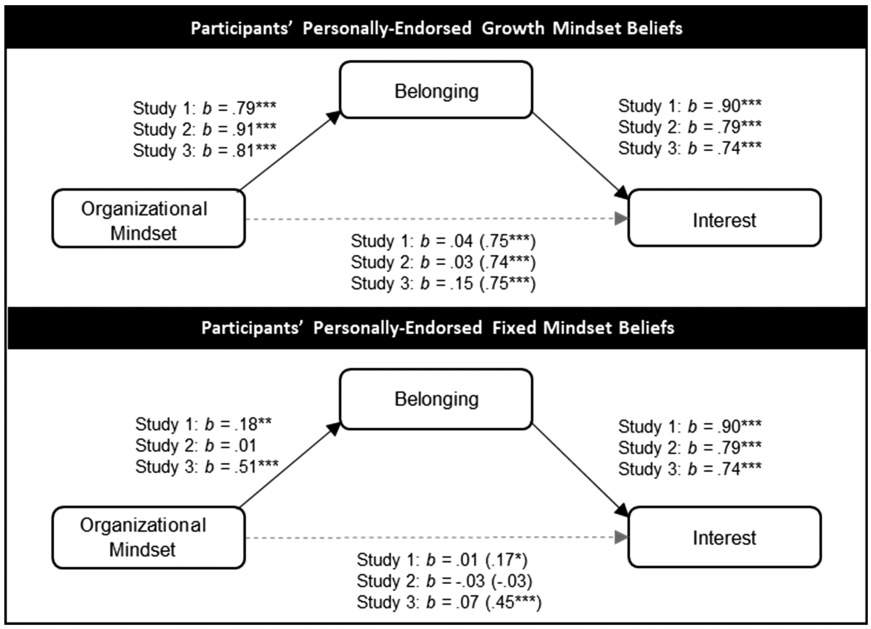
Primary Analyses

Belonging. On average, participants who personally endorsed more fixed mindset beliefs anticipated significantly more belonging than those who endorsed more growth mindset beliefs, $b = -0.09$, 95% CI [−0.15, −0.03], $SE = 0.03$, $t(789) = -2.92$, $p = .004$, $r = -.10$. Replicating past work (Murphy & Dweck, 2010), participants also anticipated significantly more belonging in the growth rather than the fixed organization, $b = 0.46$, 95% CI [0.36, 0.55], $SE = 0.05$, $t(789) = 9.24$, $p < .001$, $r = .31$. However, this effect of organizational mindset was significantly qualified by participants' personal mindsets, $b = 0.28$, 95% CI [0.22, 0.33], $SE = 0.03$, $t(789) = 9.07$, $p < .001$, $r = .31$. Participants with more growth mindsets anticipated significantly greater belonging in the growth versus fixed organization, $b = 0.91$, 95% CI [0.77, 1.05], $SE = 0.07$, $t(789) = 12.95$, $p < .001$, $r = .42$, whereas participants with more fixed mindsets did not differ in their anticipated belonging in the two organizations, $b = 0.01$, [−0.13, 0.14], $SE = 0.07$, $t(789) = 0.08$, $p = .939$, $r = .00$ (see Figure 1C).

Interest in Joining. On average, participants who personally endorsed more fixed (vs. growth) mindset beliefs were more interested in volunteering at the organization, $b = -0.08$, 95% CI [−0.15, 0.00],

Figure 2

Effect of Organizational Mindset on Interest Mediated Through Belonging Among Participants Endorsing More Fixed (−1 SD) Versus Growth (+1 SD) Beliefs in Studies 1–3



Note. Total effects are in parentheses. Consistent with testing Model 8 in Hayes's PROCESS, the *b*-path is estimated across all data rather than at ±1 *SD* of personal mindsets.
* $p < .05$. ** $p < .01$. *** $p < .001$.

$SE = 0.04$, $t(789) = -2.09$, $p = .037$, $r = -.07$. However, consistent with previous work (Murphy & Dweck, 2010), participants were significantly more interested in joining the growth versus fixed organization on average, $b = 0.36$, 95% CI [0.24, 0.48], $SE = 0.06$, $t(789) = 5.78$, $p < .001$, $r = .20$. Most importantly, the effect of organizational mindset was significantly qualified by participants' personal mindset beliefs, $b = 0.23$, 95% CI [0.16, 0.31], $SE = 0.04$, $t(789) = 6.16$, $p < .001$, $r = .21$. Participants with more growth mindsets reported significantly greater interest in the growth versus the fixed organization, $b = 0.74$, 95% CI [0.57, 0.91], $SE = 0.09$, $t(789) = 8.44$, $p < .001$, $r = .29$. However, participants with more fixed mindsets demonstrated no significant difference in preference between the two organizations, $b = -0.03$, 95% CI [−0.20, 0.15], $SE = 0.09$, $t(789) = -0.30$, $p = .767$, $r = -.01$ (see Figure 1D).

Mediation of Effect of Mindset Match on Interest Through Belonging. As in Study 1, to replicate past research on the positive effects of belonging on interest (Bian et al., 2018; Boucher et al., 2017; Cheryan et al., 2009; Muenks et al., 2020; Murphy & Zirkel, 2015; Murphy et al., 2007, 2020; Walton & Cohen, 2007), we explored whether the effect of matching personal and organizational mindset beliefs on interest would be mediated through belonging using Hayes's PROCESS Model 8 (Hayes, 2013). When interest was regressed on belonging, personal mindsets, organizational mindsets, and the interaction between personal and organizational mindsets, belonging was significantly associated with interest, $b = 0.79$, 95% CI [0.72, 0.86], $SE = 0.03$, $t(788) = 22.72$, $p < .001$, $r = .63$. This resulted in a significant index of moderated mediation, $b = 0.22$, 95% CI [0.16, 0.28], $SE = 0.03$, with no significant indirect effect among participants endorsing more fixed beliefs, $b = 0.00$, [−0.11, 0.11], $SE = 0.06$ (because there was no effect of organizational mindset among these participants), but a significant indirect effect among participants endorsing more growth beliefs, $b = 0.71$, [0.58, 0.86], $SE = 0.07$.

Discussion

Study 2 replicated both the overall main effect of organizational growth mindsets on interest and belonging, as well as the asymmetrical matching pattern from Study 1. That is, although organizational

Table 2

Study 2 Descriptive Statistics and Correlations

Measure	*M*	95% CI	*SD*	Range	α	1	2	3
1. Personal mindset beliefs	4.48	[4.37, 4.59]	1.64	1–7	.91			
2. Perceived organizational mindset (manipulation check)	4.30	[4.15, 4.45]	2.23	1–7	.96	−.01		
3. Belonging	4.65	[4.55, 4.75]	1.54	1–7	.93	−.07*	.40***	
4. Interest in joining	4.24	[4.12, 4.36]	1.82	1–7	—	−.06	.28***	.67***

Note. CI = confidence interval.
* $p < .01$. *** $p < .001$.

growth mindsets generally enhanced both belonging and interest on average, participants who personally endorsed more growth mindsets were the ones who evidenced the strongest effects. These results again highlight both the general power of organizational mindsets to shape people's experiences of organizations, and the power of matching these mindsets to the individuals' own personal beliefs. As with Study 1, this study also adds to a growing literature suggesting that belonging may play an important role in interest in joining organizations (Bian et al., 2018; Boucher et al., 2017; Cheryan et al., 2009; Muenks et al., 2020; Murphy & Zirkel, 2015; Murphy et al., 2007, 2020; Walton & Cohen, 2007).

Study 3

Study 3 extended the previous studies by examining organizational mindsets in the classroom context. Specifically, Study 3 examined students' perceptions of their professors' mindsets. In their authoritative roles, professors have a powerful influence on how students perceive the classroom environment (Murphy & Reeves, 2019). It is for this reason that some previous studies have used students' perceptions of professors' mindsets as an indicator of perceived organizational mindsets (LaCosse et al., 2020; Muenks et al., 2020). As in Studies 1 and 2, we examined whether matching student–professor growth mindsets were associated with increased belonging and interest in taking a course taught by the professor.

Method

Participants

Prolific was used to collect 330 responses from eligible participants (people over age 18 who were in the United States). The current study was originally collected for an alternative purpose, but we chose to include it when we realized we could use it to test the current hypotheses. We determined sample size through an a priori power analysis with power of .95, alpha of .05, four groups, two covariates, a numerator degrees of freedom of two, and an effect size of $d = .49$, an effect size and analysis determined based on prior work testing hypotheses of interest at the time of data collection. The results of the analysis suggested a sample size of $N = 261$. To allow for exploratory analyses and to account for exclusions due to inattention, we collected additional participants. Eight participants who did not consent and 59 participants who failed an attention check (i.e., "I think I am paying attention, so I'll select somewhat disagree" (correct answer is 3 = *somewhat disagree*; response options: 1 = *strongly disagree*, 2 = *disagree*, 3 =*somewhat disagree*, 4 = *neither disagree nor agree*, 5 = *somewhat agree*, 6 = *agree*, 7 = *strongly agree*) were excluded from analyses. Thus, our final sample size was 263 participants. When given the prompt, "gender" with *male* and *female* as options, 154 participants identified as male, 105 participants identified as female, and four participants did not respond to the prompt. Participants were asked, "What is your race/ethnicity (please check all that apply)?" with the following options: White (e.g., Caucasian, European American, Anglo), African American/Black, Pacific Islander (e.g., Hawaii, Guam, Samoa), Indian Subcontinent (e.g., India, Pakistan, Sri Lanka, Bangladesh), Middle Eastern (e.g., Egypt, Turkey, U.A.E.), East Asian (e.g., Japan, China, Korea), Southeast Asian (e.g., Indonesia, Thailand, Vietnam, Philippines), Hispanic American/Latino(a)/Chicano(a), Native American (e.g., Cherokee, Choctaw, Inuit, Navajo), and Other. Participants self-identified as White ($n = 218$), African American/Black ($n = 12$), Pacific Islander ($n = 1$), Indian Subcontinent ($n = 5$), Middle Eastern ($n = 8$), East Asian ($n = 5$), Southeast Asian ($n = 8$), Hispanic/Latino(a)/Chicano(a) ($n = 8$), or Other/Mixed Race ($n = 3$). Participants were 23.81 years old on average ($SD = 5.62$; "What is your age?").

Design and Procedure

Participants were invited to engage in an online study evaluating college courses. They read a brief course description of a college Calculus course and were told that they would be watching a short video clip ostensibly filmed on the first day of class. We created these videos such that the same actor, an older White male, read several sections of his syllabus that communicated fixed versus growth mindset beliefs. For example, in the fixed mindset condition, the professor emphasized that, "you either know the concepts and have the skills, or you don't;" while in the growth mindset condition, the professor emphasized that, "assignments are designed to help you improve your skills throughout the semester" (see the online supplemental materials for the full course descriptions and video scripts).

Following the video, students responded to six items on a 6-point scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*) that assessed their perceptions of the professor's mindset beliefs ("Professor Hall seems to believe that people have a certain amount of intelligence, and they can't really do much to change it"; $\alpha = .93$). They also reported the extent to which they anticipated feeling a sense of belonging in the professor's class on four items (e.g., "How accepted would you feel during this class?"; $\alpha = .88$; 1 = *not at all* to 7 = *very much*).

Additionally, three items assessed students' interest in taking a course taught by the professor (e.g., "How interested would you be in taking a class taught by Professor Hall?"; $\alpha = .95$; 1 = *not at all* to 6 = *extremely*). Finally, participants completed a measure of their personal mindset beliefs with four items adapted from Dweck (1999; e.g., "In general, I believe that people have a certain amount of intelligence, and they can't really do much to change it"; $\alpha = .86$; 1 = *strongly disagree* to 6 = *strongly agree*). Prior to analyses the personal and perceived professor mindset items were flipped so that higher numbers indicated a more growth mindset. Participants also reported demographic information.

Results

Descriptive statistics and correlations are available in Table 3.

Analysis Plan

We followed nearly the same analysis plan as in Studies 1 and 2. As the personal mindset measure came after the professor mindset manipulation in this study, we additionally examined whether there was an effect of the professor mindset manipulation on participants' personal mindsets.

Manipulation Check

An independent-samples t test confirmed the effectiveness of the professor mindset manipulation, $t(261) = 13.20$, $p < .001$, $d = 1.63$, 95% CI [1.35, 1.91]. Those in the growth ($M = 4.68$, $SD = 0.85$) relative to fixed mindset condition ($M = 3.14$, $SD = 1.03$) perceived the professor to endorse more growth mindset beliefs.

Table 3
Study 3 Descriptive Statistics and Correlations

Measure	*M*	95% CI	*SD*	Range	α	1	2	3
1. Personal mindset beliefs	4.24	[4.11, 4.36]	1.02	1–6	.86			
2. Perceived professor mindset (manipulation check)	3.91	[3.75, 4.06]	1.22	1–6	.93	.08		
3. Belonging	4.05	[3.89, 4.21]	1.30	1–7	.88	.02	.60***	
4. Interest in taking the course	3.36	[3.20, 3.52]	1.34	1–6	.95	.01	.63***	.77***

Note. CI = confidence interval.
*** $p < .001$.

Effect of Professor Mindset Manipulation on Personal Mindsets

Despite personal mindsets being measured after the manipulation of the professor's mindset in this study, an independent-samples *t* test demonstrated that there was not a significant effect of the professor's espoused mindset on participants' personal mindsets, $t(261) = -0.74$, $p = .459$, $d = -.09$, 95% CI [−0.33, 0.15], supporting the appropriateness of treating the professor mindset manipulation and participants' personal mindsets as independent predictors.

Primary Analyses

Belonging. On average, participants' personal mindsets did not significantly predict their anticipated belonging in the course, $b = 0.06$, 95% CI [−0.08, 0.19], $SE = 0.07$, $t(259) = 0.85$, $p = .396$, $r = .05$. Replicating Studies 1 and 2, participants anticipated significantly more belonging in the growth rather than the fixed professor's classroom, $b = 0.66$, 95% CI [0.52, 0.79], $SE = 0.07$, $t(259) = 9.51$, $p < .001$, $r = .51$. Critically, this effect was significantly qualified by participants' personal mindsets, $b = 0.15$, 95% CI [0.01, 0.28], $SE = 0.07$, $t(259) = 2.15$, $p = .033$, $r = .13$. Participants with more growth mindsets anticipated significantly greater belonging in the growth versus fixed professor's classroom, $b = 0.81$, 95% CI [0.61, 1.00], $SE = 0.10$, $t(259) = 8.24$, $p < .001$, $r = .46$. Participants endorsing more fixed mindsets also anticipated significantly greater belonging in the growth versus fixed professor's classroom, but the difference was smaller, $b = 0.51$, 95% CI [0.32, 0.70], $SE = 0.10$, $t(259) = 5.20$, $p < .001$, $r = .31$ (see Figure 1E).

Interest in Taking the Course. On average, participants' personal mindset beliefs did not significantly predict their interest in taking the professor's course, $b = 0.04$, 95% CI [−0.10, 0.18], $SE = 0.07$, $t(259) = 0.56$, $p = .573$, $r = .03$. However, consistent with Studies 1 and 2, participants on average were significantly more interested in taking a course taught by the professor espousing growth mindset beliefs, $b = 0.60$, 95% CI [0.45, 0.74], $SE = 0.07$, $t(259) = 8.16$, $p < .001$, $r = .45$. Most importantly, the effect of professor mindset was significantly qualified by participants' personal mindset beliefs, $b = 0.15$, 95% CI [0.00, 0.29], $SE = 0.07$, $t(259) = 2.02$, $p = .045$, $r = .12$. Participants endorsing more growth mindsets reported significantly greater interest in the growth versus the fixed professor's course, $b = 0.75$, 95% CI [0.54, 0.95], $SE = 0.10$, $t(259) = 7.20$, $p < .001$, $r = .41$, as did participants with more fixed mindsets, $b = 0.45$, [0.25, 0.66], $SE = 0.10$, $t(259) = 4.34$, $p < .001$, $r = .26$. However, the effect was notably almost twice as large among students endorsing more growth mindsets (see Figure 1F).

Mediation of Effect of Mindset Match on Interest Through Belonging. As in the previous two studies, on the basis of past research highlighting the benefits of belonging on organizational interest, we conducted mediation analyses to explore belonging as a mediator for the effect of matching personal and organizational mindsets on interest. When interest was regressed on belonging, personal mindsets, organizational mindsets, and the interaction between personal and organizational mindsets, belonging was significantly associated with interest, $b = 0.74$, 95% CI [0.65, 0.84], $SE = 0.05$, $t(258) = 15.73$, $p < .001$, $r = .70$. This resulted in a significant index of moderated mediation, $b = 0.11$, 95% CI [0.01, 0.21], $SE = 0.05$, with a small indirect effect among participants endorsing more fixed beliefs, $b = 0.38$, [0.25, 0.54], $SE = 0.07$, but a larger indirect effect among participants endorsing more growth beliefs, $b = 0.60$, [0.43, 0.78], $SE = 0.09$.

Discussion

The results of Study 3 replicated Studies 1 and 2 using a different organizational context: the classroom. Consistent with the previous studies, we found robust effects of organizational mindsets: classrooms with professors who espoused growth mindsets promoted a greater sense of anticipated belonging and greater interest in taking the course among students. Again, the impact of these organizational mindsets differed as a function of students' personal mindset beliefs. Specifically, relative to those who personally endorsed more fixed beliefs, individuals who personally endorsed more growth mindset beliefs anticipated greater belonging and interest in the growth organization. Collectively, Studies 1–3 provide consistent evidence for a matching effect, and specifically one that is asymmetric in which participants who endorse a more growth mindset demonstrate a matching effect, but participants who endorse a more fixed mindset do not.[4]

[4] Studies 3 and 4 contained measures of participant race. During the review process, a question was raised about whether the mindset matching effect is moderated by underrepresented racial minority status (URM = Black, Hispanic, Latino(a), Chicano(a), and Native American; non-URM = White, East Asian, and Southeast Asian). To examine this possibility, we re-analyzed Studies 3 and 4, with the addition of URM-status as a predictor, along with its two- and three-way interactions with personal and organizational mindsets when predicting interest and belonging. There was no three-way interaction between URM-status, personal mindsets, and organizational mindsets on belonging, $b = 0.07$, 95% CI [−0.37, 0.51], $p = .761$, and interest, $b = -0.12$, [−0.59, 0.36], $p = .633$, in Study 3, nor on belonging, $\gamma = 0.01$, [−0.13, 0.16], $p = .861$, and grades, $\gamma = 0.01$, [−0.09, 0.11], $p = .841$, in Study 4. These findings do not support the suggestion that mindset matching differentially impacts URM and non-URM students. This conclusion must, however, be tempered by the observation that a limitation of both studies is the relatively smaller number of URM students (S3 is 86.3% non-URM and S4 is 83.3% non-URM), which may impact the statistical power of these analyses.

Study 4

Study 4 serves as a field test of the positive effects of matching personal and organizational growth mindsets on belonging by examining the psychological experiences of undergraduate students within their classroom environments. Study 4 also extends the results of Studies 1–3 by assessing in vivo experiences of belonging to examine students' actual in-class experiences of belonging rather than their anticipated belonging. Study 4, moreover, assessed students' course grades. This allowed us to explore for the first time what effects matching versus mismatching organizational and personal mindsets might have on performance outcomes.

Analyses used data from a larger project examining students' experiences in their STEM courses. There are two existing publications using portions of this dataset to test different hypotheses other than those reported here (Canning, LaCosse, et al., 2020; Muenks et al., 2020); neither examined the role of personal mindsets in the experience of fixed and growth mindset classrooms.

Method

Participants

Nine hundred and thirty-nine undergraduate students over the age of 18 from 48 introductory-level STEM courses at a large public university completed an initial survey via email. We excluded participants who did not complete any experience sampling surveys, and therefore did not report belonging ($n = 54$) or who were missing course grades ($n = 67$). We also excluded participants who were missing values for covariates ($n_{gender} = 5$, $n_{URM} = 1$, $n_{SAT} = 8$). Thus, our final sample consisted of 814 students from 46 STEM courses. When prompted with, "please indicate your sex," 280 participants checked *female*, and 534 participants checked *male*. When asked, "what is your age," we found that participants were 18.56 years old on average. Participants were also asked, "what is your race/ethnicity (please check all that apply)?" with the following options: White/European American, Black/African American, Pacific Islander, Asian/Asian American, Hispanic/Latino, Native American, and Other (please specify). Participants self-identified as White ($n = 585$), Asian ($n = 71$), Black ($n = 29$), Hispanic ($n = 35$), Other/mixed race ($n = 94$).

Materials and Procedure

After the add-drop deadline and approximately 2–4 weeks into the semester, students completed a survey that contained a two-item measure of students' personal mindset beliefs, similar to those employed in Studies 1 and 2 (e.g., "You have a certain amount of intelligence, and you can't really do much to change it," $r = .81$). Participants also reported their perceptions of the mindset of the professor from whose course they were recruited with a similar two-item measure (e.g., "The professor in this class seems to believe that students have a certain amount of intelligence, and they really can't do much to change it," $r = .73$). Responses to both personal and perceived instructor mindset items were measured on a scale ranging from 1 (*strongly agree*) to 6 (*strongly disagree*). Next, during a 2-week period approximately 6–7 weeks into the semester, students received text messages after class that provided a link to experience sampling methodology (ESM) surveys which they could complete on their smartphones. ESM surveys assessed belonging ($\alpha = .95$) using the same five-item measures as previous studies (e.g., "How much did you feel that you 'fit in' during this class?"; 0 = *not at all* to 7 = *extremely*). At the end of the semester, the institution provided students' grades in the course and their SAT scores. Course grades were coded using the institution's grade point average (GPA) scale (A = 4.0, A− = 3.7, B+ = 3.3, B = 3.0, B− = 2.7, C+ = 2.3, C = 2.0, C− = 1.7, D+ = 1.3, D = 1.0, D− = 0.7, F = 0).

Results

Descriptive statistics and correlations can be found in Table 4 and a full summary of results can be found in Table 5.

Analysis Plan

Given the nested structure of the data, we used multilevel modeling. We also controlled for student gender, underrepresented minority status (URM) status, and SAT scores.

Belonging Model. Because participants' experience sampling assessments of belonging were nested within students and students were nested within courses, the analysis predicting belonging used a three-level model with ESM assessments at Level 1, students at Level 2, and courses at Level 3. Predictor variables and covariates were entered at Level 2. Thus, students' personal mindsets, their perceptions of their instructors' mindsets, and their interaction (all Level 2 variables) predicted ESM belonging, with the number of ESM observations, student gender, student URM status, and student SAT scores entered as covariates.

Grades Model. Because students' course grades were only nested within courses, this analysis used a two-level model (students at Level 1 and courses at Level 2) with predictor variables and covariates entered at Level 1. Thus, students' personal mindsets, their perceptions of their instructors' mindsets, and their interaction (all Level 1 variables) predicted course grades, with student gender, student URM status, and student SAT scores entered as covariates at Level 1.

Across analyses examining both belonging and grades, continuous predictor variables were entered at the level of the student and group-mean centered within each course. Moreover, simple effects of perceived professor mindsets were examined at ± 1 within-level *SD* from the mean of students' personal mindset beliefs. We first examined models with random slopes and found that no random effect was significant at the $p < .20$ level, so we only examined models with fixed slopes. The significance or interpretation of the fixed effects did not change with the inclusion of random slopes. Full multilevel model equations and results without covariates for analyses can be found in the online supplemental materials.

Before running our primary analyses, we calculated the intraclass correlation coefficient (ICC) for each outcome variable. Because we used a three-level model for belonging, we were able to calculate the ICC at both the individual and course levels. Results indicated that 3% of the variance in belonging was between courses and 69% of the variance was between students. Thirteen percent of the variance in students' course grades was between courses.

Primary Results

ESM Belonging. On average, both students' personal growth mindset beliefs, $\gamma = 0.19$, 95% CI [0.12, 0.26], $SE = 0.04$,

Table 4
Study 4 Descriptive Statistics and Correlations

Measure	*M*	95% CI	*SD*	α	Range	1	2	3	4	5
1. Personal mindset beliefs	4.34	[4.26, 4.43]	1.29	.89	1–6	—				
2. Perceived professor mindset	4.61	[4.52, 4.69]	1.21	.84	1–6	.33***	—			
3. ESM belonging	5.26	[5.17, 5.35]	1.25	.95	0–7	.25***	.26***	—		
4. Course grade	3.19	[3.13, 3.26]	0.91	—	0.0–4.0	−.05	.07	.20***	—	
5. SAT	1,235.07	[1,224.96, 1,245.87]	157.20	—	400–1,600	−.13***	.05	.09*	.34***	—
6. Number of ESM Obs.	17.75	[17.32, 18.17]	6.07	—	1–42	.01	.08*	.02	.13***	.07*

Note. Higher mindset scores indicate more growth mindset beliefs on both mindset measures. CI = confidence interval; ESM = experience sampling methodology; Obs. = observations.
* $p < .05$. *** $p < .001$.

$t(762) = 5.34$, $p < .001$, $r = .19$, and their perceptions of their professors' growth mindset beliefs were associated with greater belonging, $\gamma = 0.22$, [0.14, 0.29], $SE = 0.04$, $t(761) = 5.86$, $p < .001$, $r = .21$. These main effects were qualified by a significant interaction, $\gamma = 0.07$, 95% CI [0.01, 0.12], $SE = 0.03$, $t(817) = 2.44$, $p = .015$, $r = .09$. Students with more growth, $\gamma = 0.30$, 95% CI [0.20, 0.40], $SE = 0.05$, $t(780) = 5.77$, $p < .001$, $r = .20$, and more fixed mindsets, $\gamma = 0.13$, [0.03, 0.22], $SE = 0.05$, $t(800) = 2.57$, $p = .010$, $r = .09$, reported significantly greater belonging in class when they perceived their professor to endorse more growth (vs. fixed) mindset beliefs, but the effect was twice as large among students who endorsed more growth mindset beliefs (see Figure 3A).

Course Grade. On average, neither students' personal mindset, $\gamma = -0.03$, 95% CI [−0.08, 0.01], $SE = 0.02$, $t(758) = -1.48$, $p = .141$, $r = -.05$, nor their perceptions of their professors' mindsets, $\gamma = 0.04$, [−0.01, 0.08], $SE = 0.02$, $t(758) = 1.54$, $p = .124$, $r = .06$, significantly predicted course grades. However, there was a significant interaction between students' personal mindsets and their perceptions of their professors' mindsets, $\gamma = -0.04$, 95% CI [−0.08, −0.01], $SE = 0.02$, $t(775) = -2.16$, $p = .032$, $r = -.08$. Among students who personally endorsed more growth mindset beliefs, there was no effect of perceived professor mindset on their grades, $\gamma = -0.01$, 95% CI [−0.08, 0.05], $SE = 0.04$, $t(767) = -0.38$, $p = .708$, $r = -.01$. However, students who personally endorsed more fixed mindset beliefs performed better when they perceived their professor as endorsing more growth mindset beliefs, $\gamma = 0.09$, 95% CI [0.02, 0.15], $SE = 0.03$, $t(766) = 2.69$, $p = .007$, $r = .10$ (see Figure 3B). If one conceptualizes organizational mindsets as a contextual growth mindset intervention, this mismatching effect would mirror findings of direct-to-student personal mindset interventions (e.g., Yeager et al., 2016). These show that students with fixed mindsets benefit most in terms of their grades—a possibility we discuss further in the Study 4 discussion and the General Discussion.

Mediation of Effect of Mindset Match on Grades Through Belonging. Past research has demonstrated that enhancing belonging can boost students' grades (Murphy & Zirkel, 2015; Murphy et al., 2020; Walton & Cohen, 2007, 2011). To explore whether this relationship was also evident in the current data set, we conducted a mediation analysis testing whether the enhanced belonging resulting from perceiving one's professor as endorsing more growth mindset beliefs was associated with higher grades at the individual level (Figure 4). As reported above, perceiving one's professor as endorsing a growth mindset only increased grades among students endorsing more fixed—but not growth—mindsets. However, consistent with the possibility that variables may mediate effects absent a total effect (Rucker et al., 2011), we examined this indirect effect through belonging among students endorsing both fixed and growth mindset beliefs. We used the same conceptual moderated mediation model employed in the prior studies, this time using the mediation package in R (Tingley et al., 2014) to conduct this multilevel moderated mediation analysis. Because each student had multiple belonging ratings, but only one course rating, we averaged the belonging ratings for each student prior to analyses. In the moderated mediation model, personal and organizational mindsets, and their interaction (along with all covariates included in prior models) predicted belonging, which in turn predicted course grades. As we

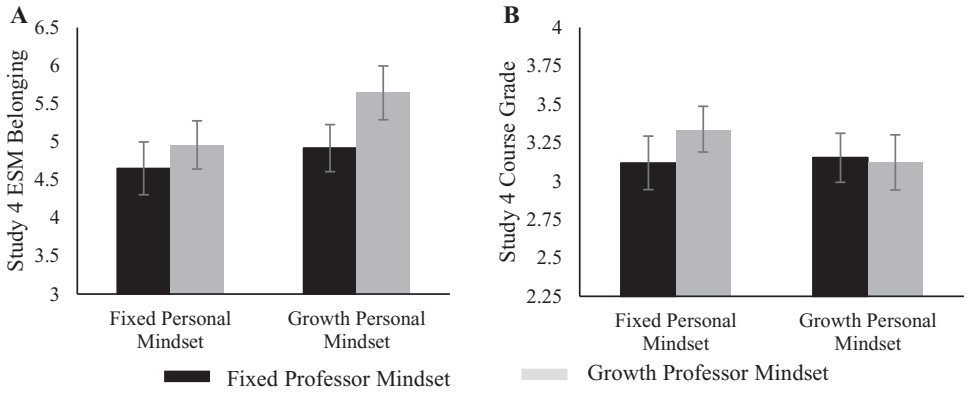
Table 5
Study 4 Summary of Multilevel Modeling Results

Predictor variable	ESM belonging				Course grade			
	γ (*SE*)	95% CI	*t*	*p*	γ (*SE*)	95% CI	*t*	*p*
Personal mindset beliefs	0.19 (0.04)	[0.12, 0.26]	5.34	<.001	−0.03 (0.02)	[−0.08, 0.01]	−1.48	.141
Perceived professor mindset	0.22 (0.04)	[0.14, 0.29]	5.86	<.001	0.04 (0.02)	[−0.01, 0.08]	1.54	.124
Personal by perceived professor mindset interaction	0.07 (0.03)	[0.01, 0.12]	2.44	.015	−0.04 (0.02)	[−0.08, −0.01]	−2.16	.032
Gender	−0.06 (0.09)	[−0.23, 0.12]	−0.65	.516	0.00 (0.06)	[−0.12, 0.12]	0.03	.974
URM	−0.30 (0.11)	[−0.53, −0.08]	−2.66	.008	−0.11 (0.07)	[−0.26, 0.04]	−1.41	.160
Number of ESM observations	0.00 (0.01)	[−0.01, 0.02]	0.44	.659	—	—	—	—
SAT scores	0.00 (0.00)	[0.00, 0.00]	3.04	.002	0.00 (0.00)	[0.00, 0.00]	11.22	<.001

Note. Each outcome variable was tested separately. Continuous variables were group-mean centered within courses. Gender was coded −.5 = male; .5 = female, and URM was coded −.5 = non-URM; .5 = URM. CI = confidence interval; URM = underrepresented minority status; ESM = experience sampling methodology.

Figure 3

Study 4 Interaction Between Personal Mindset Beliefs and Perceived Professor Mindsets on Belonging and Course Grades



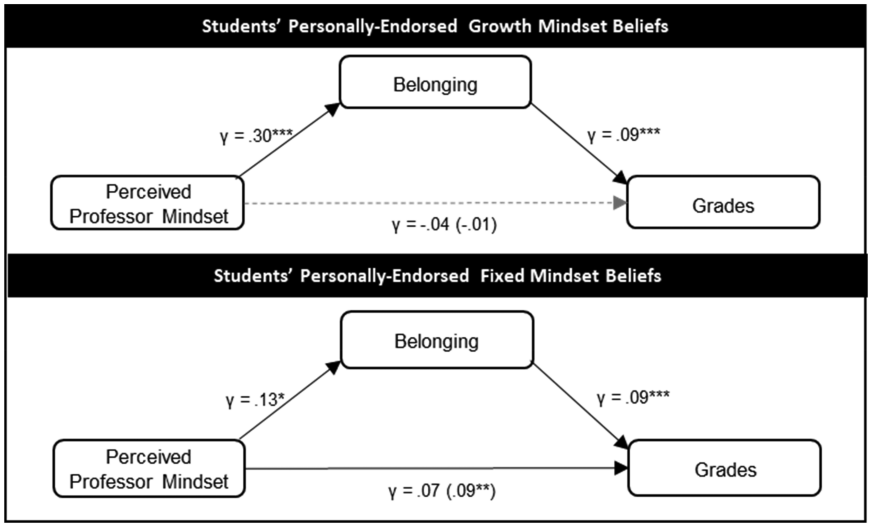
Note. Error bars represent 95% CIs. Personal and perceived professor mindsets are graphed at ±1 *SD*. CI = confidence interval; ESM = experience sampling methodology.

would expect from previous belonging literature (Murphy & Zirkel, 2015; Murphy et al., 2020; Walton & Cohen, 2007, 2011), belonging was significantly associated with course grades, $\gamma = 0.09$, 95% CI [0.05, 0.14], $SE = 0.02$, $t(792) = 3.99$, $p < .001$, $r = .14$, and the indirect effect of perceived instructor mindset on grades through belonging was statistically significant among students who personally endorsed more fixed mindset beliefs, $\gamma = 0.03$, 95% [0.004, 0.060], $p = .016$, and students who personally endorsed more growth mindset beliefs, $\gamma = 0.07$, 95% [0.031, 0.110], $p < .001$. The mediation package in R does not produce an overall index of moderated mediation. We note descriptively, however, that the indirect effects for students who personally endorse more fixed and growth mindset beliefs are similar in size, suggesting no meaningful difference in the degree to which belonging serves as a mediator of the effect of perceived professor mindset on students' grades.

It is interesting to note that even after controlling for the influence of belonging on students' grades, the interaction between personal and organizational mindsets on grades remained significant, $\gamma = -0.04$, 95% CI [−0.07, −0.01], $SE = 0.02$, $t(772) = -2.08$,

Figure 4

Effect of Perceived Instructor Mindset on Course Grades Mediated Through Belonging Among Participants Endorsing More Fixed (−1 SD) Versus Growth (+1 SD) Beliefs in Study 4



Note. Total effects are in parentheses. Consistent with testing Model 8 in Hayes's PROCESS, the *b*-path is estimated across all data rather than at ±1 *SD* of personal mindsets.
* $p < .05$. ** $p < .01$. *** $p < .001$.

$p = .038$, $r = -.07$. In other words, although we replicate past research documenting the association between belonging and performance (Murphy & Zirkel, 2015; Murphy et al., 2020; Walton & Cohen, 2007, 2011), and the indirect effect of perceived faculty mindset on students' grades through belonging (e.g., Muenks et al., 2020), belonging itself does not seem to account for the mismatching pattern observed on grades in this study. Indeed, the lack of an effect of perceived professor mindset on grades among students with more growth mindsets suggests that some unidentified variable may be suppressing the effect of perceived professor mindset on grades—an interesting question for future research. Taken together, these results suggest that while sense of belonging is a significant mediator of students' grades, there are likely additional mechanisms by which organizational mindsets influence students' performance.

Discussion

Study 4 replicated the results of Studies 1–3 in a field context. This study replicated prior literature demonstrating the benefits of organizational growth mindsets on belonging (e.g., LaCosse et al., 2020; Muenks et al., 2020; Rattan et al., 2018). More importantly, although all students' belonging benefited from professors who were perceived to endorse more growth mindset beliefs, we once again observed an asymmetric matching, "L"-shaped, pattern: students who personally endorsed more growth mindset beliefs benefited twice as much from these growth mindset classroom environments than students who personally endorsed more fixed mindset beliefs. This once again emphasizes that the benefits of growth mindset environments for students' sense of belonging are not equal across individuals.

This study also allowed for a preliminary exploration of the effects of matching or mismatching personal and organizational mindsets on students' grades. Highlighting the importance of identifying heterogeneity in effects of growth mindsets on grades (e.g., Yeager et al., 2022), neither personal nor perceived professor mindsets had a significant independent effect on grades in this study. The interaction of these factors, however, revealed a mismatching pattern. Specifically, students who personally endorsed more fixed mindset beliefs earned significantly higher grades when they perceived their professors as endorsing mismatching growth mindset beliefs—beliefs that contrasted with their own. Surprisingly, the grades of students who personally endorsed more growth mindsets did not seem to directly benefit from matching growth mindset professors. That said, mediation analyses revealed that the enhanced belonging that students with both fixed and growth mindset beliefs experienced in growth mindset classroom contexts was associated with higher grades averaged across fixed and growth mindset students. When students perceived their instructor to endorse more growth (vs. fixed) mindset beliefs, they experienced greater feelings of belonging in class, and this in turn was associated with greater performance in that professor's class at the end of the term.

It is interesting that across all four studies, participants' sense of belonging shows a *matching* pattern, such that participants who personally endorsed a growth mindset benefitted to a larger extent from being in a growth mindset context. However, grades showed a *mismatching* pattern such that students endorsing more fixed mindsets benefited to a larger extent than did students endorsing more growth mindsets from a growth mindset classroom context. While we hesitate to draw strong conclusions from these preliminary results, it is possible that the growth mindset practices of professors who endorse more growth mindset beliefs are more novel and beneficial to fixed (relative to growth) mindset students. A large body of research suggests that students who personally endorse more growth mindset beliefs engage in more productive academic behaviors such as persisting through challenges, taking intellectual risks by attempting more difficult problems, and seeking help when they struggle compared to their fixed mindset peers (Dweck & Leggett, 1988; Yeager et al., 2019). At the same time, research suggests that growth mindset faculty engage in different teaching practices than do fixed mindset faculty—including encouraging students to redo work and correct mistakes for credit, destigmatizing mistakes in classroom interactions, and encouraging students to take intellectual risks by trying more difficult problems and raising their hand to ask questions (Kroeper, Fried, et al., 2022; Murphy et al., 2021). Thus, it may not be surprising that more fixed mindset students benefit directly (and indirectly) from growth mindset contexts, though our results suggest a smaller boost to their sense of belonging than their growth mindset peers whose personal beliefs match those of their growth mindset instructors. Growth mindset students appear to benefit more psychologically from the match of growth mindset contexts. Future research replicating and further exploring these questions is warranted to assess these possibilities.

Analysis of Cumulative Evidence: Effect of Mindset Matching on Belonging and Interest

When evaluating evidence for an effect, it can be challenging to comprehend the cumulative strength of evidence based on a study-by-study evaluation of the individual findings. In what follows, we analyze the strength of evidence for the effects of mindset matching on belonging and interest in joining organizations.

We conducted two mini-meta-analyses to examine interactive effects of personal and organizational mindsets on the outcomes measured across studies (belonging and interest in joining; Fabrigar & Wegener, 2016; Goh et al., 2016; Wallace et al., 2020). These analyses also incorporated data from the four studies reported in the online supplemental materials. To be clear and transparent, this meta-analysis does not exclude any studies showing a null or negative effect of mindset matching on belonging or interest. Indeed, in a testament to the replicability and robustness of these effects, Study S1b reported in the online supplemental materials is the only study that we have conducted that did not significantly demonstrate the mindset matching effect (and that effect is in the predicted direction). Details and additional results of these meta-analyses are reported in the online supplemental materials. Critically, these analyses demonstrated significant meta-analytic effects of mindset matching on belonging, $r = .19$, $p < .001$, and interest, $r = .15$, $p < .001$. Thus, even including our "weakest" studies, these meta-analyses provided strong cumulative empirical support for the mindset matching effect.[5] Moreover, we present additional

[5] Some may wonder about the meta-analytic power of the entire set of studies. Although we recognize the limitations of post hoc power analyses, we used Quintana (2017)'s R-code to estimate post hoc power for our meta-analysis. This analysis suggested that our meta-analyses had 99.99% power to detect the mindset matching effect on interest and belonging.

analyses in the online supplemental materials that attest to the strength, robustness, and replicability of our effects, reporting results from the Wegener et al. (2022) shiny app, a failsafe N analysis (Rosenberg, 2005), and a *p*-curve analysis (Simonsohn et al., 2014). In brief, analyses from the Wegener et al. (2022) app revealed a Bayes Factor >150 for the effect of mindset matching on interest and belonging, indicating strong support for our primary hypotheses compared to the null hypothesis. The failsafe N analysis suggested that 123+ studies averaging a null effect would have to be added to the current set of studies for our target *p* value to be >.05, and the *p*-curve analysis indicated the presence of evidential value. In sum, we do not believe that there should be any question about the replicability and reliability of these effects: the evidence we present is very strong.

General Discussion

Across three online experimental studies and one field study, we replicated prior work demonstrating a robust positive effect of organizational growth mindsets on both belonging and interest in joining organizations (Canning, Murphy, et al., 2020; Emerson & Murphy, 2015; Han & Stieha, 2020; Murphy & Dweck, 2010; Murphy & Reeves, 2019). Consistent with theory and past empirical findings (Bian et al., 2018; Boucher et al., 2017; Cheryan et al., 2009; Murphy & Zirkel, 2015; Murphy et al., 2020; Walton & Cohen, 2007, 2011), the benefits of organizational mindsets on interest were mediated by feelings of belonging. These findings highlight the power that organizational growth mindsets can have on people's experiences. Although the present work suggests that organizational growth mindsets are broadly beneficial to people's sense of belonging and interest, they also critically indicate that who benefits most depends on people's personally endorsed mindset beliefs. Specifically, the current studies suggest that whether people's personal mindsets match versus mismatch the organization's mindset plays a critical role.

Across the experimental and field studies, we found evidence for a *matching* pattern on belonging and interest in joining organizations: organizations that espoused more growth mindset beliefs increased feelings of belonging and interest in joining to a greater extent among those who personally endorsed more growth relative to fixed mindsets. Of note, this matching effect was asymmetric: individuals with more fixed mindsets did not benefit from being in a fixed mindset organization in the same way that individuals with more growth mindsets benefited from being in a growth mindset organization. Our multimethod approach demonstrates these matching effects both prospectively and *in vivo*.

We also explored the implications of matching versus mismatching personal and organizational mindsets on performance in our field study. Here, we found preliminary evidence of a *mismatching* effect. Specifically, students with more fixed mindsets achieved higher course grades when their professors were perceived as endorsing contrasting growth mindsets. This effect was also asymmetric: students with more growth rather than fixed mindsets did not experience a similar performance boost when their professors were perceived as endorsing contrasting fixed mindsets. We hesitate to draw strong conclusions from this single empirical demonstration. We speculate, however, that students who personally endorse more fixed mindset beliefs may especially benefit from growth mindset classrooms because growth mindset instructors engage in teaching practices (e.g., destigmatizing mistakes, encouraging help-seeking; Kroeper, Fried, et al., 2022; Kroeper, Muenks, et al., 2022) that may appear novel and contrast with fixed mindset students' typical academic orientations. These same practices may be less novel or unexpected to growth mindset students as they are consistent with their growth mindset meaning systems (e.g., Dweck & Molden, 2017). Moreover, if we conceptualize a growth mindset instructor as a contextual intervention for students, it would not be surprising to see that fixed mindset students benefit more from such an intervention as this is the pattern observed in other direct-to-student mindset interventions (e.g., Paunesku et al., 2015). As these findings are preliminary, there is certainly need for future research to replicate and extend this performance finding before drawing strong conclusions. These findings may suggest, however, that personal mindsets may determine not only for whom organizational growth mindsets are beneficial, but also on what outcomes.

Implications

Clarifying for Whom Growth Organizations Are Beneficial

These findings replicate a growing literature demonstrating the potential of organizational mindsets to benefit people's psychological and motivational outcomes (e.g., Canning, Murphy, et al., 2020; Emerson & Murphy, 2015; Han & Stieha, 2020; Murphy & Dweck, 2010; Murphy & Reeves, 2019). However, much of this work suggests that growth mindset organizations are generally beneficial for all parties. Moreover, when past work focused on specific individuals, it highlighted the benefits of growth organizations for negatively stereotyped groups (e.g., Canning et al., 2019; Emerson & Murphy, 2015). By contrast, we highlight the systematic role that personal mindsets have in influencing who benefits from organizational growth mindsets. By identifying for whom this occurs, we reveal an important source of heterogeneity in organizational growth mindset effects: the naturally occurring distribution of people's personal mindsets in a given setting. In organizations in which personal mindsets skew toward growth, there may be large effects of growth organizational mindsets on belonging and interest. Other the other hand, in organizations in which personal mindsets skew toward fixed, there may be reduced psychological benefits of organizations espousing growth mindset beliefs. Thus, understanding what influences a change in organizational mindset might have for members of that organization may depend critically on the variables that we have identified in the present work, with important implications for policy and intervention.

Considering When Mismatches Might Be Beneficial

More broadly, whereas much research on matching person and organizational characteristics has highlighted the benefits of a match (for recent reviews, see Sekiguchi & Yang, 2021; Van Vianen, 2018), in the current work, we provide initial evidence for a case in which a mismatch is particularly beneficial. Although rare, other work has documented benefits of mismatches. For example, there are times when nonreligious people appear to live longer in highly religious versus less religious environments (Wallace et al., 2019). This may occur because these individuals adopt beneficial health behaviors from their religious counterparts in the same way that people with fixed mindsets may adopt behaviors beneficial for improving their grades from being in a growth mindset environment. By contributing to this small but growing literature, the present work cautions

researchers and practitioners alike from assuming that matching versus mismatching environments and beliefs always results in positive outcomes.

Efficacy of Organizational Growth Mindsets as Targets of Intervention

This work represents one of the first to systematically investigate the interplay between organizational versus personal mindsets on psychological outcomes. One might observe that whereas the beneficial effect of organizational mindsets on belonging and interest in joining organizations was robust and reliable across studies, the beneficial effects of personal mindsets were more inconsistent. These results echo previous findings in the literature: unlike organizational growth mindsets, personal growth mindsets have not consistently been linked to increased belonging and interest: whereas some studies find support for these links (Burnette et al., 2020; Deiglmayr et al., 2019; Williams et al., 2021), others do not (LaCosse et al., 2020; Rattan et al., 2018). Importantly, the current work suggests one reason for these inconsistencies may be that personal growth mindsets should primarily increase belonging in more growth environments. There may also be other reasons for a lack of an overall main effect of personal mindsets on belonging in the current work. Prior work suggests that personal mindsets can influence perceptions of the organization's mindset, which then influences belonging (Williams et al., 2021). In Studies 1–3, we clearly manipulated organizational mindsets; personal mindsets may have more of an effect when the organizational mindset of an environment is ambiguous (as in Study 4, in which we do find an effect of personal mindsets on belonging). We also focused on mindsets of intelligence, but it could be that mindsets about other characteristics and traits (e.g., leadership mindsets) may be more likely to predict belonging.

The inconsistent effects of personal growth mindsets on belonging in no way undermines arguments advanced by others of the benefits of these mindsets (e.g., Blackwell et al., 2007; Dweck & Master, 2009; Dweck & Yeager, 2019; Nussbaum & Dweck, 2008; Rattan et al., 2015; Yeager et al., 2016). Instead, if anything, our work supports the more general argument that rather than examine whether personal mindsets have beneficial outcomes, it is more fruitful to examine when they do (e.g., Yeager et al., 2019, 2022; Yeager & Dweck, 2020). Indeed, consistent with recent research, personal growth mindsets indeed had positive benefits for interest and belonging when the local environment supported these mindsets (e.g., Yeager et al., 2022)—that is, when personal and organizational mindsets matched, those who endorsed more growth versus fixed mindsets experienced greater increases in belonging and interest.

The robust and reliable positive effects of organizational growth mindsets on belonging and interest in joining organizations add to a growing literature that suggests that they may be a particularly effective way to promote positive changes in organizations and classrooms. Previous research suggests that organizational mindsets can act as powerful social norms (Canning et al., 2019; Canning, Murphy, et al., 2020; Fuesting et al., 2019; LaCosse et al., 2020; Muenks et al., 2020), which may shape people's behavior in adaptive ways through both psychological and social mechanisms. Although more work is necessary to understand whether and how organizational mindsets impact personal mindset beliefs and outcomes, the present work advances intervention science efforts by addressing the questions of when and among whom we might expect such organizational mindsets to be particularly effective in enacting positive change.

Limitations and Future Directions

Mechanisms Through Which Matching Effects Occur

Although we provide extensive evidence for the matching effects on belonging and interest in joining organizations, respectively, more work is needed to explore underlying mechanisms. Consistent with past research (Bian et al., 2018; Boucher et al., 2017; Cheryan et al., 2009; Muenks et al., 2020; Murphy & Zirkel, 2015; Murphy et al., 2007, 2020; Walton & Cohen, 2007), we demonstrated that belonging plays a key role in people's interest in joining organizations. Nevertheless, how matching versus mismatching organizational and individual mindsets enhances belonging is still an open question. Indeed, this question mirrors those about matching effects in other research domains (Montoya & Horton, 2013). We suspect that the documented mindset matching effects reflect the operation of different processes at different times (Teeny et al., 2021). Past work has proposed that matching may occur by creating a feeling of validation (Byrne, 1997; Fulmer et al., 2010) or fit (Higgins, 2000; Labroo & Lee, 2018). People may also be rewarded and/or anticipate they will be rewarded for endorsing the dominant views in an environment (Gebauer et al., 2017), as well as find that the environment provides plentiful affordances to enact their desired behaviors and goals (Higgins, 2000; Rege et al., 2020). We suspect all these processes may play a role in the current findings, particularly with respect to growth mindsets. Unpacking these possibilities should be a goal of future research.

We also observed asymmetric matching: compared to benefits of matching growth organizational and personal mindsets, more fixed organizations did not provide the same boost to those who personally endorsed more fixed mindsets. We speculate that this asymmetry may occur because although organizational fixed mindsets may create a feeling of fit or validation for individuals with matching personal fixed mindsets, this benefit may be undermined by insecurities about not being "one of the chosen few" that organizational fixed mindsets engender. Thus, for individuals with more fixed mindsets, the exclusivity of fixed mindset organizational cultures may negate any benefits of matching. Future work should explore this possibility further.

Constraints on Generalizability

In this article, we focused on belonging and interest in joining organizations as primary outcomes; we might further speculate that these matching effects may extend to other psychological variables. Indeed, analyses presented in the online supplemental materials suggest that similar matching patterns are observed on some psychological variables (e.g., stress), but not others (e.g., expected course performance). It will be important for future work to identify which outcomes are influenced by matching and to generate theoretical models with which to predict such findings *a priori*.

Although our findings appeared to generalize across online experimental studies with adults and field studies in classrooms with college students across a number of institutions, we recognize that all data were collected in the United States, limiting our ability to generalize to other contexts. Furthermore, our samples were predominantly Western, Educated, Industrialized, Rich, and Democratic,

limiting the extent to which we can generalize our findings to other, more diverse, cultural populations. Furthermore, these effects may differ among people with chronic concerns about being negatively stereotyped or belonging in predominantly White contexts (e.g., traditionally underrepresented racial minorities). An analysis of Studies 3 and 4 suggested that there was no moderation by URM status (footnote 4), but these samples were predominantly non-URM so future work should examine this question in more balanced samples.

We also focused our examination on mindsets about intelligence, as these had been the focus of most prior work on mindsets: prior work had demonstrated that intelligence mindsets have consequences for a wide range of organizations and classrooms. Left unclear is whether the type of mindset needs to be relevant to the dominant task of the organization for these matching effects to occur. For example, in some organizations, networking, leadership, and negotiation abilities may be more relevant than intelligence per se, and prior work has documented effects of mindsets about these skills (Hoyt et al., 2012; Kray & Haselhuhn, 2007; Kuwabara et al., 2020). Future work could examine whether these mindset matching effects extend to mindsets about other attributes.

Finally, there may be other features of organizational contexts or of people's beliefs that limit the generalizability of these findings that we have yet to document or discover.

Summary

By clarifying for whom organizational growth mindsets are beneficial and in what manner, the current work contributes to mindset theory and provides practical insight into the consequences of implementing organizational growth mindsets. This work contributes to a growing literature that highlights the importance of understanding contextual and individual difference factors that moderate the impact of both personal and organizational mindsets (Yeager & Dweck, 2020), and encourages researchers to ask when rather than whether these mindsets promote positive outcomes. We believe that such work is critical for researchers and practitioners alike as mindsets are leveraged for the greater good.

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