Growing Leaders: Testing Learning Modules that Foster Belongingness and Growth Mindsets about Leadership among Adolescents

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Abstract
Adolescence is a period of identity formation, and in particular a time for the development of beliefs regarding who can be a leader. Given that such beliefs are informed by what adolescents see and what those around them believe, adolescents who are part of racial minority groups are more likely to form opinions that they are less able to lead relative to adolescents who are part of majority groups. With our research, we designed learning modules that we delivered during interactive workshops led by research team members from underrepresented groups. In these modules, we discussed systemic racism, programs created to combat inequality, the increasing representation of Black and Hispanic people and women in various high-status positions, and ways to foster and benefit from a growth mindset, for middle and high school students. Results suggested the learning modules increased feelings of belongingness in leadership after the workshop for underrepresented Black and Hispanic adolescents in addition to White and Asian adolescents. We also showed significant increases in beliefs that one can grow leadership abilities for all adolescents; this effect was larger for White and Asian adolescents. We discuss the implications for mitigating the perpetuation of underrepresentation in leadership.

Keywords: Leadership, Race, Minority, Beliefs, Intervention

Adolescence is a period of identity discovery. Middle and high school-aged children strive to make sense of complex social hierarchies that impact their everyday life, an endeavor made more challenging by the fact that many aspects of social hierarchy are ambiguous, including the types of people that make for effective and valued leaders. However, despite the uncertainty of what effective leadership actually entails, adolescents are highly attentive to existing hierarchies and the types of people who occupy positions of status [1]. Unfortunately, the demographics of current leadership do not reflect the people they serve. For instance, though 51% of America is female, only 26% of Senators and 18% of state governors are female [2, 3]. None of the forty-five American presidents have been women or Hispanic, and only one has been a Black man. As a result of these and other examples of underrepresentation, the demographics of current leadership serve as a basis for adolescents' limiting beliefs about future leadership possibilities. Indeed, when choosing a student council leader, regardless of age and gender, White, Black, and Hispanic students indicated greater support for the canonical White male candidate, rather the Black or Hispanic male or female, or White female candidates [4].

That adolescents rely on observations of the current social conditions to infer who deserves to be in positions of power means that members of lower status groups may consider themselves a less likely leader or less capable of becoming one. Indeed, for members of lower status groups, observing social hierarchies and feeling that one occupies a subordinate position reduces personal efficacy and impacts representations of who warrants high status positions. For instance, most minority adolescents, in one study of children in inner city schools, did not believe that their success was related to their efforts and did not believe they could adapt to overcome challenges [5]. Likewise, minority adolescents reported that it was an uphill battle to develop goals that moved beyond occupying lower power roles in society [6].

Despite all of this, adolescence is also a period of uncertainty and transition, producing sets of beliefs that are remarkably variable. Adolescents' beliefs about characteristics of effective leaders fluctuate far more than adults' relatively stable conceptions of hierarchy and leadership [7, 8]. For example, though adolescents' political beliefs strengthened and became more defined during the 1980 Presidential campaign season, the strength of their convictions shifted a year later [9]. Adolescents' beliefs about who can best lead are affected by a multitude of factors, including the

beliefs of others around them, whereas those of children and adults are not influenced as much [10]. The malleability of beliefs during this time suggests that it in fact might be a viable period in development to attempt to shape beliefs about leadership.

With this research, we designed a series of learning modules that we delivered to racial majority and underrepresented minority adolescents. We aimed to increase beliefs in their belongingness in leadership roles in addition to increasing beliefs that one can grow their own leadership ability. Belongingness and belief in ability in different academic disciplines or careers paths shapes the careers students in middle and high school ultimately choose to enter. For instance, high school students who felt like they did not belong in a field where they were a gender minority were less likely to express interest in that field [11].

In designing our content, we drew from Dweck's Growth Mindset theory to facilitate the feelings of belonging and growth abilities [12]. We designed content to challenge stereotypes of leadership in America in order to instill positive regard for each student's own leadership potential. Through interactive learning modules, we used various techniques to counter the negative messages created by a lack of representation in leadership in order to cultivate personal beliefs that leadership can be held by a more diverse group, one that includes themselves.

Belongingness in Leadership
Adolescence is a period in which youth are identifying the positions to which they are invited or for which they are suited. They also withdraw efforts from domains that they believe are not for people like them [13]. These assessments of belongingness give rise to even more fundamental beliefs about personal ability to achieve in that those who do not feel like they belong, go on to believe they could not possibly perform well [14].

However, interventions aimed at fostering feelings of belongingness mitigate these outcomes. For instance, an intervention focused on fostering social connection among mental health professionals reduced burnout and attrition [15]. Similarly, an intervention targeting social belongingness among Black and Hispanic male 7th graders reduced the number of discipline citations they received throughout middle and high school by 65% and because disciplinary action is linked to attrition, reducing participation in the disciplinary system may have an indirect effect on retention rates [16, 17]. Together, this work suggests fostering belongingness can promote retention in social spaces for those otherwise likely to withdraw from them; we test whether leadership is one such social space in which belongingness can be fostered.

Growth Mindset
We also targeted beliefs that leadership ability can grow. Individuals who hold such beliefs understand the plasticity of personal attributes, that through effort one can improve their ability, and that exposure to novel, challenging tasks will cultivate competencies [18]. Conversely, individuals who do not believe attributes develop over time—those with a fixed mindset—believe

in the innate or unchangeable nature of one's abilities. Someone with a fixed mindset attributes mistakes to a lack of natural skill and attributes success to inherent strengths. As a result, individuals who hold stronger growth rather than fixed mindsets believe in their own ability to overcome obstacles and engage in actions that facilitate positive outcomes related to their personal goals; in contrast, those with stronger fixed rather than growth mindsets, withdraw effort from challenging tasks and display less resilience [19-21]. Importantly, the mindset that individuals hold is malleable; it is possible to teach individuals as young as seven years old about neuroplasticity and to foster a growth mindset [22]. As a result, we believed that messaging targeting the capacity for change and growth would complement and inspire belongingness in leadership.

Overview
We designed learning modules to foster feelings of belongingness in leadership and beliefs that leadership can be developed among underrepresented racial minority adolescents and compared the effects against White and Asian majority adolescents. In our content, we aimed to challenge stereotypic knowledge that positions of power are held exclusively by people from limited demographic backgrounds. We tried instead to enhance students' beliefs in their own potential to be leaders regardless of their background, while simultaneously acknowledging the historical practices that would confer present day obstacles on members of minority groups. We offered concrete strategies individuals can implement; we also offered information on programs that institutions, companies, and organizations have implemented to combat these historical practices. These messages were delivered by underrepresented peers. We administered a pre- and post-test survey to measure the effectiveness of our modules on feelings of belongingness and capacity to grow leadership abilities.

We aimed to create content that would strengthen feelings of belongingness and growth mindset for Black and Hispanic students in addition to White and Asian students from pre to post-test scores. However, it is also possible that adolescents have internalized social stereotypes and tropes indicating that leadership belongs in the hands of those who already hold it, in other words, majority group members. Indeed, by adolescence, youth are aware of race-based power differences, including their country's history of marginalization of certain demographics by others [23]. A single-session workshop aimed to empower personal beliefs in leadership capability for racial minorities may prove ineffective to overcome this cultural knowledge which they may have internalized. It is also possible that our educational content, which included modules on the history of systemic racism and an acknowledgement of the present-day underrepresentation of diverse leadership across fields, could decrease leadership beliefs among minorities relative to majority group members. Though we predicted that our learning modules would increase belongingness and growth mindset, we acknowledge the possibility that modules may not facilitate belongingness and growth equally or at all for all racial demographics.

Methods
Participants

We held several interactive workshops for small (~20) to large (~120) groups of participants (*n*=237 middle and high school students, 66 male, 138 female) from six different summer programs hosted at New York University. Students were entering grades 7 through 12 (7th grade = 15, 8th grade = 43, 9th grade = 44, 10th grade = 21, 11th grade = 33, 12th grade = 49) and their ages ranged from 11 to 18 years old (*M* = 14.64, *SD* = 1.72). Of our participants, 66 identified as Black, 42 identified as Latinx, 39 identified as Asian, 9 identified as White, 42 identified as biracial or multiracial, and 9 identified as another race. We categorized students into one of two groups: underrepresented minority (Black, Latinx, multi or biracial Black-Latinx) or non-underrepresented (White, Asian, multi or biracial White-Asian). Each workshop lasted approximately 90 minutes and included multiple interactive modules.

Pre and Post Test Measures

After introducing the research team by name, but before engaging in any activities, participants completed a six-item survey. Three items measured the sense of belongingness participants felt in leadership ("I feel that I belong as a leader;" "I feel a connection to leadership;" "Leadership is an important part of my identity and who I am as a person"). They reported reactions on a 5-point Likert scale where higher numbers represented greater belongingness (1 = strongly disagree, 5 = strongly agree).

Three additional items measured participants' beliefs that they could grow their leadership ability ("You have a certain leadership ability and you can't really do much to change it;" "Your leadership ability is something about you that you can't change very much;" "You can learn new things, but you can't really change your basic leadership ability"). They reported reactions on a 6 point Likert Scale, where higher numbers represented more of a growth mindset (1 = strongly agree, 6 = strongly disagree) [12,24]. We repeated the survey at the end of all workshop activities to assess individuals' change scores.

Learning Modules

All participants experienced the following modules: Awareness of Systemic Racism, Institutional Initiatives Improving Higher Education and the Workplace, Exemplars of Changes, Growth Mindset, A Personal Narrative on Growth Mindset, and Shifting Visual Perceptions.

Awareness of Systemic Racism: We began by discussing structural barriers to leadership positions for people of color. We sought to acknowledge the unique set of challenges that some groups experience as a result of institutionalized practices that are antagonistic to their own personal efforts. Evidence suggests that bringing awareness of the fact that systemic racism disproportionately affects Black and Hispanic students depersonalizes setbacks, challenges, and failures that students may experience and offers an external explanation of racism for the added challenges experienced by members of some demographic groups [25]. Participants watched an animation that defined systemic racism and outlined specific examples of how the United States' history of racial discrimination deprives Black people of opportunities such as high-quality housing in desired neighborhoods, access to premier educational institutions, and wealth [26]. In the video, the life of a young, Black boy is contrasted against that of a young White boy, offering social policies and laws that contributed to their different life experiences. It described the origins of "redlining" and its impact on access to education and the development of family wealth for these two characters, in addition to discriminatory college acceptance practices. After watching, students discussed with the group their knowledge of systemic racism and the ways in which they have observed or experienced it.

Institutional Initiatives Improving Higher Education and the Workplace: Because discussion of historic and continued discriminatory practices could reduce participants' feelings of personal efficacy to surmount these obstacles, we sought to offer evidence of organizational programming that aimed to counter these effects. We discussed current programs designed to assuage historic injustices. One Black and one Latinx female research team member described their personal affiliation with state and nationwide programs that offer opportunities to counteract a history of laws and actions which privileged some and discriminated against others. They described New York University's Opportunity Programs: The Arthur Eve Higher Education Opportunity Program and the Collegiate Science Technology Entry Program. The former is a state-sponsored program that offers college students financial support throughout their college career, as well as academic and personal counseling assistance to ease the matriculation process for students. The latter is a state-funded program that serves to increase the number of students from underrepresented groups who are pursuing a licensed profession or a career in Science, Technology, Engineering, and Mathematics [27]. Both programs serve New York State residents who, because of financial or academic circumstances, have reduced access to higher education [27].

Next, a Middle-Eastern female researcher described programs counteracting systemic racism and discrimination in the workplace, including the formation of affinity groups among staff, mentorship opportunities, and sponsorship engagements with students and young professionals. For example, BlackRock awards a scholarship to student leaders from underrepresented groups, also giving them a position in the company's summer internship program. We ended by stating that though these kinds of initiatives will not erase decades of systematic racism, they do represent incremental changes to equalize access to opportunity.

Exemplars of Change: Participants then engaged in an interactive activity led by a South Asian, female researcher meant to bring awareness to personal biases and break stereotypical views of what constitutes a successful professional. Respondents viewed two photos at one time. We asked which of the two people was actually an astronaut, filmmaker, mathematician, professor, scientist, or senator. The pairs included headshots depicting a

stereotypical and non-stereotypical exemplar of that category. For instance, when asked who was an astronaut, participants saw an image of a White male (Tucker Carlson) and an image of a White female (Anna Lee Fisher), both being interviewed on camera. When asked who the professor was, participants saw a headshot of a White male (Bernie Madoff) and a Black male (Dr. James Hill). When asked who the computer scientist was, participants saw an image of an Asian male (Ken Jeong) and a White female (Dr. Katie Bouman). In each scenario, students discovered that the non-stereotypical person was the representative of that career. Students then learned about each targets' career accomplishments. The researcher acknowledged that students might have selected the wrong person, and that might seem like a biased or stereotypical choice. We highlighted that this may reflect shared cultural knowledge rather than personal biases. The researcher concluded the activity by explaining that the cultural knowledge and stereotypes regarding who holds leadership positions are outdated, and that women and people of color are more likely today than in the past to hold high status, high power positions.

To offer evidence of the shifting demographic trends in powerful and high status fields, participants then viewed collections of images representing the ethnically diverse leaders across sectors. Participants saw eight images of female astronauts, including many women of color, who are flight ready and could command a space shuttle mission. They saw the five and six highest paid Asian and Hispanic actors and actresses in Hollywood. Additionally, they saw a graphic explaining that non-White representation in lead roles on television has increased 400% from 2011 to 2017 [28]. These images and data intended to serve as evidence of cultural shifts that undermine the legitimacy of the stereotypes regarding the physical characteristics of leaders and to communicate a shift in contemporary trends.

Growth Mindset: Participants watched a video depicting a high-power, well-respected minority exemplar, former first lady Michelle Obama. In this video, Mrs. Obama addressed a group of young students, delivering the message, "No one is born smart. No one is born knowing how to read or do math." She continued by describing the impact of hard work and effort [29].

We then presented participants with a two-minute video describing neuroplasticity and growth mindset [30]. This animated clip offered a concise and engaging introduction of the physiological process of "growing smarter" in language that was accessible to both middle and high school students. The video compared the brain to a muscle, describing how it becomes stronger after being used and challenged. The video encouraged students to use the right skills to enhance learning, emphasizing that "working smarter" by using effective strategies and asking for help is just as important as working hard.

A Personal Narrative on Growth Mindset: We supplemented these video clips with personal narratives from research team members, as personal narratives engage listeners by fostering intimate connections [31]. A Latina researcher described her

experience studying Biomolecular Sciences in Engineering on the premedical track, and how she adopted a growth mindset when facing a challenge. Specifically, she described that she struggled in her computer programming classes, felt like an imposter, and considered dropping the class. She described the juxtaposition of her identity against the majority identity-male students with relatively more coding experience. But she set a goal to create the code to 3D print a model of a neuron. She sought assistance from her professor, visited office hours, found additional learning resources, and dedicated extra time to study and practice. She passed her class, wrote the code, and generated a 3D printed neuron, which she presented to the participants in the workshop.

Shifting Visual Perceptions: We ended by giving each student a pair of glasses with one red lens and one cyan lens. Participants wore the glasses and viewed images made by laying one translucent blue image on top of a similarly translucent red image. The stimuli included Beyoncé's face overlaid by Jay-Z's, an apple imposed on an orange, and an Adidas shoe over a mansion. A White, female researcher explained that wearing the glasses while viewing the images induces an experience of binocular rivalry where only one of the two images can be consciously experienced at a time, and after several seconds, the image fades out and the other is consciously experienced. Moreover, it is possible to intentionally shift one's perception in this demonstration. We used this message to introduce the metaphoric conclusion that it is also possible to conscientiously shift perceptions of what leaders look like and those perceptions can include the self. The researcher ended with the statement that the power to see a different perspective lies within individuals' own minds; it is possible to challenge an initial perception and see the world in a different way.

Additional Modules
One group of participants ($n = 39$ female) received an additional module, the Situational Cues in our Environments module following Exemplars of Change. Members of this group all held an interest in pursuing careers in STEM and computer programming. The module was directly relevant to their summer program whereas it was not connected to the mission of the other summer groups.

Situational Cues in our Environments: Participants saw images depicting two workspaces. One depicted a modern, gender-neutral workspace, with plants and art. The other depicted a masculine workspace that included Star Wars posters and empty soda can towers. We asked the participants which space they thought would be a better place for them to work. We modeled this hypothetical consideration off of research that found that the gendered natured of environments affects women's interest in entering that workplace [32]. We also asked which of two people they wanted to talk with about career possibilities. One wore a t-shirt with a message about coding while another wore a t-shirt with no words. We summarized research for the participants that we modeled this hypothetical consideration off of, in which women expressed less interest in computer science when speaking to people wearing shirts with code-relevant text [33, 34]. We ended the module by highlighting that

people make big decisions about what classes to take, what field to study in college, or what job to take because of things like the posters they see on the walls of those rooms or the t-shirts advisors wear. Understanding the varying sources that perpetuate stereotypes and discrimination is an important step to dismantling, and making sense of, the restrictions students personally feel.

Data available at https://osf.io/tnfsa/.

Results
Belongingness in Leadership
We designed a linear mixed model to measure changes in feelings of belongingness in leadership. To account for nonindependence in judgments, we conducted the model using the MIXED procedure in SPSS, and calculated degrees of freedom using a Satterthwaite correction [35]. Additionally, we included a random intercept of participant [36]. We modeled belongingness as a function of timing of the questions, either before (pre-test = +1) or after (post-test = -1) the workshop in addition to participant race (Underrepresented Minority: Black, Hispanic, or Black/Hispanic multiracial = 1, Non-minority or Non-underrepresented: White and Asian = -1) in a two-level cross-classified model. We included, as fixed effects, time, participant race, and belongingness survey question, as well as the interaction between participant race and time.

There was no effect of the specific belongingness survey item, $b = 0.025$, $SE = 0.022$, $t(1012) = 1.164$, $p = .245$, 95% CI[-0.017, 0.067]. There was no main effect of participant's underrepresented racial status on feelings of belonging, $b = 0.013$, $SE = .057$, $t(201) = 0.231$, $p = .817$, 95% CI[-.099, .125]. However, there was a main effect of time, $b = -0.136$, $SE = 0.019$, $t(1012) = -7.028$, $p < .001$, 95% CI[-0.174, -0.098], indicating that all participants reported stronger feelings of belonging in leadership after the workshop compared to before.

The interaction between underrepresented racial status and time on belongingness in leadership was not significant, $b = 0.029$, $SE = 0.019$, $t(1012) = 1.487$, $p = .137$, 95% CI[-0.009, 0.067]. Black and Hispanic students reported change scores from pre to post-test that did not differ significantly from White and Asian pre- and post-test scores (see Table 1).

Table 1: Mean (SD) Belongingness Ratings as a Function of Time and Participant Race.

	Timing	
	Before Workshop	After Workshop
All	3.48 (0.99)	3.71 (0.95)
Black and Hispanic	3.54 (0.98)	3.76 (0.09)
White and Asian	3.45 (0.92)	3.79 (0.83)

Growth Mindset and Leadership Ability
We ran the same model described above and replaced the dependent variable with the growth mindset measures. There was no main effect of growth mindset survey item, $b = 0.042$, $SE = 0.031$, $t(1006.357) = 1.370$, $p = .171$, 95% CI[-0.018, 0.102]. We again found a main effect of time, $b = -0.221$, $SE = 0.028$, $t(1006.46)=-$

7.978, $p < .001$, 95% CI[-0.275, -0.166], indicating that all students demonstrated a stronger growth mindset about leadership ability after the workshop than before. There was a main effect of underrepresented racial status, $b = -0.246$, $SE = 0.087$, $t(201.244) = -2.815$, $p = .005$, 95% CI[-0.418, -0.074]. However, this main effect was qualified by a significant interaction between underrepresented racial status and time, $b = 0.128$, $SE = 0.028$, $t(1006.457) = 4.639$, $p < .001$, 95% CI[0.074, 0.183]. We probed the simple effects within each racial group. Time significantly increased growth mindset for Asian and White students, $b = -0.348$, $SE = 0.046$, $t(1006.525) = -7.483$, $p < .001$, 95% CI[-0.440, -0.257]. It also increased growth mindset among Black and Hispanic students, $b = -0.092$, $SE = 0.030$, $t(1006.290) = -3.103$, $p = .002$, 95% CI[-0.151, -0.034]. However, the workshop was more effective for White and Asian than underrepresented minority students (see Table 2).

Table 2: Mean (SD) Growth Mindset Endorsement as A Function of Time and Participant Race.

	Timing	
	Before Workshop	After Workshop
All	3.90 (1.39)	4.26 (1.45)
Black and Hispanic	3.87 (1.42)	4.05 (1.48)
White and Asian	4.11 (1.29)	4.81 (1.10)

Discussion
Society lacks racial representation in educational, corporate, political, and other leadership settings. The benefits of leadership, including power, influence, and financial status, are thus conferred upon a limited demographic subset of the population. As a result, decisions are made that impact all individuals but reflect the opinion and experience of a relatively homogenous demographic. Members of minority groups have relatively little opportunity to shape the decisions that affect their own and others' lives.

The goal of this research was to test whether workshops could shape the beliefs of adolescents; we designed programming that might foster beliefs that one belongs in leadership and can grow their leadership abilities. We implemented this program within groups of underrepresented minority, White, and Asian adolescents. The techniques used acknowledged the current state of the representational disparity, and included an honest presentation of true historical practices and current trends while simultaneously presenting evidence, anecdotes, and guides for how to thwart the current systems. While evidence suggests that adolescents find themselves mobilized with such system rejecting framing, and though we predicted the learning modules would embolden the beliefs of personal leadership efficacy, we explored a possible side effect [37]. It was possible that underrepresented youth in particular would report weaker feelings of belonging and growth potential after such realistic depictions of current leadership. We found that the learning modules, in fact, increased belongingness in leadership for underrepresented adolescents in addition to White and Asian adolescents equally. We also found that the learning modules increased the growth mindset for all participants, though the facilitation effect was larger for White and Asian than Black and Hispanic youth.

Consequences for Creating Role Models

By studying adolescent leadership development, science might better understand the problem of underrepresentation in adult leadership. Our learning modules intended to increase the belief among all adolescents that they can be leaders, and in particular for underrepresented adolescents who may struggle to attain status and power and who may feel less deserving of being in those roles [38]. In encouraging minority adolescents' beliefs about the ability to develop leader-status, we increase the odds that they act in ways to take on those roles as adolescents and even later in life. Leadership in youth predicts adult career and power development. Indeed, students who held leadership positions in student organizations showed better career development and involvement in cultural planning [39]. Adolescent leaders were more likely to hold managerial positions and earn higher wages as adults [40]. Male adolescents who were team captains and club presidents during high school, for instance, earned almost 7% higher wages a decade after high school graduation compared to males who were only team and club members. If certain demographics show weaker feelings of belongingness in leadership or weaker beliefs in ability to grow leadership capacities as adolescents, they may be less likely to pursue or remain engaged in leadership development opportunities at later stages of life.

Demographic differences in multiple points of the leadership pipeline process might further perpetuate representational problems in leadership roles. If for these and other reasons minority group members drop out of the leadership development pipeline, there will be fewer adult minority leaders who could serve as role models for the next generation of youth who are looking up and assessing whether people in high status, high power positions look like them. Role models can act as a "social vaccine," inoculating individuals from damaging stereotypes and protecting against the harmful ramifications of participating in fields that are described by stereotypes that include negative depictions of certain demographics [41]. Specifically, exposure to successful peer role models in a high-achievement context enhances the positive attitudes, perceived self-efficacy, and motivation of aspiring individuals. For instance, women who are exposed to successful women in positions of leadership to whom they consider themselves similar, experience reduced self-stereotyping [42]. Moreover, exposure to female leaders who were deserving of their successes improved young women's performance on qualitative reasoning sections of the GRE [43]. Exposure to exemplary members of one's social group can provide a sense of belongingness, connection, and identification, in addition to increasing skill sets, especially among members of groups associated with negative stereotypes in those performance domains. By working to bolster the beliefs in ability to grow and belong in leadership among minority youth, we might increase the odds of engaging in leadership activities early on, which might snowball into greater diversification of adult leadership, and diversify the representation of possible role models in leadership for the next generation.

Implications for Diverse Business Sectors

There are stark social consequences of racial bias in retention in leadership. Within specific sectors, representational problems in leadership means biased access to resources and societal power. For instance, STEM careers are financially lucrative and socially powerful. Regeneron Pharmaceuticals, led by CEO Leonard Schleifer, a scientist of Pharmacology and Neurology, for example, uses innovative, science-driven practices to revolutionize the development of drugs and medicine. In the last ten years, Regeneron's stock has increased in value 20 times over, and Schleifer's net worth stands at $2.3 billion. Thermo Fisher Scientific, a leading scientific technology and instrument development company, partners with a variety of other STEM-related businesses to ensure research utilizes the most innovative technologies. Thermo Fisher Scientific, a top Fortune 500 company, employs almost 70,00 scientists and has averaged over 21% return to investors over a 10-year period. And although STEM fields are projected to outpace the creation of jobs in any other occupational sector by 75%, thereby providing opportunities for leadership in this sector, racial minorities are more likely to drop out of these fields than are racial majority group members [44]. In fact, only 30% of Hispanic, Black, and Native American students who receive degrees in STEM go on to hold occupations in these fields. In other words, 70% of individuals trained in these areas abandon them after graduation [45]. These projections imply that minorities will become even less likely to hold leadership positions in this growth industry relative to majority group members.

Such underrepresentation of minorities is not unique to STEM fields. Only 24% of PhD economists in government positions and 21% of faculty in economics in high education are racial minorities [46]. According to the National Association of Law Placement, racial minorities make up only 6.6% of equity partners at multi-tier law firms [47]. Only 22% of members of the United States Congress are racial minorities [48]. Finding means to support adolescents' beliefs that they can serve as leaders, and grow their potential to act in this capacity, at a developmental stage where they are considering career paths and internalizing existing social hierarchies, is critical to mitigating not only the representational imbalance that exists across so many facets of society today but also in the future.

Additional Messages to Empower Youth

While we designed our programming to both acknowledge the current day consequences of historical practices that discriminate against certain demographics but also offer psychological tools for responding to these obstacles, we can imagine other forms of messaging that might similarly motivate adolescents to take action against this form of representational bias. For instance, programming might make salient the incongruency between current day consequences of historical practices and their own value system of egalitarianism. Adolescents understand inequality and support the pursuit of equality believing they can create structural change, and recognize efforts for change others make [49,50]. Moreover, they attempt to emulate such behaviors and traits to promote equality themselves [50]. Bryan and colleagues

for instance improved middle schoolers' eating habits by emphasizing the incompatibility between students' unhealthy choices and their personal values [51]. When they learned that that their food choices may reflect the results of biased, deceptive, and manipulative marketing from big business, and learned that the members of the food industry engage in hypocritical behavior (avoiding consumption of their own unhealthy products), adolescents' reported greater negativity about junk food and consumed less of it. Adapting this framework, it may be possible to construe personal leadership development as a means to fight social injustice and inspire stronger endorsement of growth mindset and belongingness among adolescents.

Limitations
We recognize that our workshop is limited in its possible impact. Because our intervention was administered in one session rather than several over time, the scope of its impact may be relatively weaker, though other one-time interventions with youth have shown long-lasting effects [52]. For example, in a one-time intervention, when 7th grade Black and Latino boys read personal accounts from older boys explaining their struggle to find a sense of belongingness as normal and reduced with time, those boys received fewer discipline citations throughout high school [16]. Further, one-time interventions that feature deep engagement with the content, as well as interactions with similar peers, produce long-lasting effects [16]. Though our workshop featured both deep engagement and stories from similar peers, which may lead to long-term consequences, we did not assess the permanence of the shifts in beliefs our intervention produced.

Because we knew in advance that our interactions with the participants would be restricted to a single encounter, we sought to find ways to maintain the accessibility of our workshop content. In an attempt to further encourage the longevity of our workshop's effects, we gave students bracelets with the phrase "be a leader" printed on one side and "NYU" on the other. Because physical objects are one of the strongest cues for memory, we intended for this bracelet to serve as a reminder of the workshop message after the session ended [53]. We acknowledge though that interventions are especially impactful when teachers, who students interact with daily, believe in students' potential to succeed [54]. Finding ways to maintain message accessibility through repeated exposure to the content in addition to messaging from teachers may maximally shift and sustain beliefs in personal leadership ability [55-74].

Conclusion
The Census Bureau estimates that by 2060, Black and Hispanic people will comprise over 46.5% of the total population within the United States. As two of the fastest growing groups in America, young students of these demographics sit posed to constitute a large faction of the next generation of leaders in our country. We aimed to design content to foster their beliefs that they can in fact assume these roles. We found evidence for messaging that effectively bolsters belongingness and growth potential for all adolescents, and particularly members of society marginalized from leadership roles. In doing so, we take one step towards equalizing access to opportunity for all.

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