The Veteran, the Myth, the Legend: Preparing for Engineering Curriculum and Career

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Despite historically high enrollments and curricular impacts, student veterans continue to be an understudied and under-resourced population on campus. Of concern, is the lack of research on stereotypes about student veterans and the impact of these stereotypes on student veterans themselves. Since the 1940s, GI Bill-supported student veteran enrollments have contributed to the diversity of students, perspectives, and ultimately, the kinds of programs offered at universities and colleges across the country. While student veteran populations have varied over time, the highest student veteran enrollments occurred in the decade following the Post 9/11 GI Bill. The US Department of Veteran Affairs estimates that over 1 million veterans and family members have used these benefits to attend college.

Student veterans continue to face myths, stereotypes, and bias on campus and in employment despite their growing presence on college campuses and the value they contribute to the classroom and their post-graduation employers. Myths about student veterans are persistent among the public and while not intentionally malicious, can impact student veteran learning outcomes and transition experiences [1].

The research reported in this paper investigates stereotypes of student veterans by using a counter-balanced survey with two populations: student veterans and non-veteran student peers. Questions from this survey sought agreement or disagreement regarding nine known student veteran stereotypes. Preliminary results from mixed model logistic analyses indicate that some of these myths are believed by non-veteran students. Additionally, study results show that student veterans themselves have internalized some of these negative perceptions. This report concludes with recommendations to better support student veterans inside the classroom and during early-career experiences.

Overview

Myths about active duty service men and women are promulgated in media, movies, and popular culture. In these news items, stories of challenge, mental illness, and violence are often highlighted [2]. Additionally, negative attention can drive increased negative behavioral phenomena, a process described best as the 'contagion effect.' The contagion effect is the phenomenon whereby a high-profile act of violence can result in many more threats and acts of violence [3]. Contagion analyses of social media trends show that increased news stories of veteran suicides, for example, are associated with overall increases in suicide attempts and ideation [4].

Not surprisingly, some veterans have internalized these popular culture tropes. In a 2016 Veterans Well-Being Survey performed by Edelman Intelligence [5] a highly respected global market research firm, only 34% of veterans report that they believe veterans are an asset in the workplace. Only 37% of veterans report that it is important to view veterans as assets in industry.

While negative stereotypes of veteran mental health are reinforced in popular culture and the entertainment industry, a recent Gallup study showed that veterans demonstrated significantly

increased emotional resilience in comparison with civilian peers [6]. In spite of the clear value-add veterans bring to non-military domains, 62% of veterans report being frustrated with industry perceptions of their skillset, value, and strengths. While student veterans may feel like they need to prove themselves in an industry context, they also carry some of this self-conscious awareness of their 'marked status' into their transitions into higher education.

Research has shown that the existence of stereotypes in higher education can have negative repercussions. The promulgation of stereotypes about student veterans can result in educational practices and pedagogies that do more harm than good and result in "homogenization, gross generalizations, and inappropriate initiatives by higher education professionals" [7]. Essentially, many higher education program directors have little experience with student veterans and their educational need profile. Added to this, faculty are just as likely as other non-veterans to unknowingly perpetuate stereotypes and assumptions toward student veterans. As an example of the danger of treating student veterans as a monolith, research shows that stereotypes can lead to the initiation of "one size fits all" programs that fail to discern the differences between subpopulations of military-connected students [7]. Even ally programs, such as Green Zone training, have the potential to perpetuate harmful stereotypes about student veterans [8]. Evidence suggests that student veterans experience negative consequences from stereotypes about their experiences, strengths and weaknesses, and capability of succeeding in higher education [9-10].

Common Myths

There are eleven common myths or stereotypes undermining public and civilian perceptions of veterans [11]. The survey employed for this current study included all eleven items except for the question about generational bias, captured in item (4) below.

(1) Veterans suffer disproportionately from PTSD.
(2) Due to combat induced PTS, veterans are a liability and can break at any moment.
(3) Veterans get Traumatic Brain Injuries (TBIs) in combat and are permanently damaged.
(4) Veteran behavioral health challenges are specific to this generation.
(5) Most veterans are not well educated.
(6) Veterans do not possess relevant civilian job skills.
(7) Veterans are no more productive than any other candidate.
(8) Veterans are conditioned to follow orders and lack initiative.
(9) Veterans and their families are insular and won't contribute in the community.
(10) Veterans can navigate their way through any challenge.
(11) Veterans expect the same level of responsibility and compensation as they enjoyed when they left the service.

These myths of veteran status, abilities, and tendencies are well established to be false. For example, veterans are no more susceptible to PTSD than the average person, and civilian PTSD rates are underreported [12]. A systematic review and meta-analysis study showed no difference in PTSD occurrence between veteran and non-veteran populations [13]. TBIs are common in the civilian community with over 1.7 million reported in the civilian community. Mild TBIs produce no long-term health effects [14], however, early detection is key [15]. Further, modern veterans are the most historically educated cohort and exceed national norms in education and

intelligence. Veterans are as likely or more likely to pursue post-secondary education than non-veterans, with, for example, about 40% of Army veterans pursuing GI Bill education benefits according to a study by the Brookings Institute [16]. Veteran job experience is remarkably transferrable with members displaying knowledge of key vocational tasks, time management, and team coordination more so than non-veteran peers of the same age. Additionally, veterans are found to maintain equal or better work productivity than non-veteran peers [17]. Similarly, this task execution style is not at all passive, and instead, veteran task-completion is supported by personal initiative, aligned with a supervisor's intent and stated directives [17].

Methods

During fall semester 2022, 139 students participated in a survey of positive and negative beliefs concerning veterans and military service. These participants included a mix of veteran and non-veteran students, including 9 active duty engineering students; 7 engineering student veterans; and 123 non-veteran engineering students, taken from an R1 research institution and an M2 senior military institution. The final survey included 22 items, balanced to ensure inter-item reliability. Participants were asked to rate the degree to which they agreed with a series of statements that targeted the eleven veteran myths discussed in the previous section. All common myths were targeted, including biases about veterans' likelihood of having dermal art, having undergone deployments, and displaying 'rigid thinking,' which were uncovered in a previous study of this population [17]. Likert-scaled responses ranged from 1 – strongly disagree; 2 – disagree; 3 – agree; 4 – strongly agree. Researchers employed a 4-interval scale to discourage pure neutral responses.

Table 1 matches veteran myths with survey item numbers for both veteran and civilian assertions, showing implicit semantic priming for veteran- and civilian-coded statements. Implicit semantic priming is a cognitive processing mechanism whereby words whose meanings are highly associated with other concepts will be processed quickly, with participants reporting a higher degree of understanding or a stronger association with other related concepts [18]. The upshot of this is that semantic priming tasks tend to reveal latent assumptions that participants carry for a particular topic, resulting in stronger opinions about what that concept reportedly means. Note that some survey items target veteran myths for which there is no civilian equivalent because the myth comments on something specific to deployment or military service. Myths 2 and 11 have no negative civilian-focused equivalent as they focus on features or results of military service.

Table 1: Veteran Myths and Coded Survey Items.

Myth	Veteran Item #	Veteran-coded	Civilian Item #	Civilian-coded
1, 2, 3	1	Veterans are more likely to suffer from PTSD than civilians.	13	Civilians are less likely to suffer from PTSD than veterans.
5	2	Veterans are less likely to be educated than civilians.	14	Civilians are more likely to be educated than veterans.
6	3	Veterans are less likely to have relevant job skills.	15	Civilians are more likely to have relevant job skills than veterans.
7	4	Veterans are generally more organized than civilian employees.	16	Civilians are generally less organized than veteran employees.
8	5	Veterans employees are more likely to follow orders than to take initiative on their own.	17	Civilians are more likely to take initiative on their own than to follow orders.
9	6	Veterans and their families are less likely to participate in community and social events.	18	Civilians and their families are more likely to participate in community and social events.
10	7	Veterans are less likely to need help or advice than civilian employees.	19	Civilians generally need more help and guidance than veteran employees.
11	8	Veterans expect perks from employers because of their service status.	--	*No corollary*
2	9	Most veterans serve in combat or combat roles.	--	*No corollary*
E&R 2020	10	Veterans are more likely to have tattoos or dermal art, which may be inappropriate for some employment roles.	20	Civilians are less likely to have tattoos or dermal art.
E&R 2020	11	Veterans are more likely to be diverse or members of underrepresented groups.	21	Civilians are less likely to be diverse or members of underrepresented groups.
8	12	Veterans are less likely to be rigid thinkers than other employees.	22	Civilians are more likely to be rigid thinkers than veteran employees.

Results

Participants were grouped into two cohorts: one with military experience — Active-Duty Students and Student Veterans (ADV; n=16) and one cohort without military experience — Civilians, who were comprised of cadet students and non-cadet students (Civ; n=123). ADVs

were comprised of active-duty students and student veterans. Active-duty and student veteran sub-groups within the ADV category have had very different military and educational trajectories. This difference in trajectories and challenges supports previous findings that identified the mistake in treating ADVs as a monolith. For example, active-duty students are typically academically high-powered students who have been offered dedicated time to complete an engineering degree prior to their next assignment or deployment. In contrast, veteran students are typically older, have completed an enlisted commitment with the military, and are using the Post-9/11 GI Bill to retrain for a civilian workforce [19]. For the purpose of this study, we wanted to be able to see where ADV responses agreed—and where there were departures from the Civ responses. Cadet students were attending a smaller teaching-focused M2 school, characterized by high exposure to ADVs and military standards for behavior. The non-cadet students were attending an R1 institution with comparatively fewer opportunities for exposure to ADVs and military culture.

Based on this sample size, no significant differences were found between these two military service subgroups that would merit a bimodal distribution analysis. Similarly, while cadet and non-cadet survey responses varied respective to each other, the sample size was too small to draw conclusions of significance. Cadet and non-cadet students also varied with regard to their progression in the engineering curriculum, with non-cadet students who were almost all first-year engineering students, and cadet students who were mostly sophomores and juniors. For these reasons, we reserve a deeper investigation of these sub-groups' perceptions of military service for future investigation.

ADVs and Civilian students were surprisingly similar in their agreement across survey items, as shown in Figures 1-2. Additionally, the paired survey items were highly coherent, indicating trustworthy responses across survey items for both cohorts. Key findings include both ADVs and Civilian students agreeing that "veterans were more likely than civilians to suffer from PTSD;" and "veterans are more likely than civilians to be organized." Some disagreement between ADVs and Civilian students is apparent in response to the following statements: "(11) veterans are more likely to be diverse than civilians;" and "(9) most veterans serve in combat roles." Figures 1 and 2 below chart both cohorts' disagreement and agreement along the y-axis, translating the original 4-point Likert scale to one centered at zero, with the y-axis mapping -2 and -1 to Likert-scaled 1 and 2, respectively, and 1 and 2 to Likert-scaled 3 and 4, respectively.

Another analysis of the data on the original answer scale revealed several differences worth noting (Figures 3 and 4). The following discussion focuses on averages between student groups that were larger than 0.33 and provided a visible difference on the charts. The civilian student sample size was n = 123 and the ADV sample size was n = 16. The perception of veterans suffering from PTSD more than civilians (survey item 1) provided the highest rating differential for civilians as compared to all other questions in the survey (average 3.46 compared to 3.13 from ADV). Even though many students interacted and worked with the ADVs in class, they still felt they were PTSD-prone. For item 5, ADVs were neutral (2.13) on veterans being more likely to follow orders than take initiative. Their civilian student counterparts slightly agreed (2.59) on this question as they observed them in class. The largest disagreement between the two groups was on item 9 regarding most veterans serving in combat. Civilians were nearly neutral (1.91) while ADVs disagreed (1.31). Civilian students were split on whether ADVs deployed and

conducted combat missions. The ADVs knew many more military-connected members who had never deployed than their civilian student counterparts. In Figure 4, item 15 concerns civilians having relevant job skills. Civilian students were neutral on this item (2.15) compared to a slightly more negative perception from the ADVs (1.80). ADVs are a little more seasoned in job skills, have prepared resumes, participated in promotion boards, etc. ADVs know their leadership, time management, and other professional skills are relevant in the workforce while their civilian counterparts are still equating relevance to technical skill sets [15].

One area where ADVs had a more positive impression than the civilian students was with item 12, which affirmed that "veterans are less likely to be rigid thinkers." While the phrasing of this item was awkward, "less likely" was used in a comparison statement to civilians because it affirmed a finding found in a previous study [17]. Civilian students were neutral (1.93) while the ADVs felt they were more creative problem solvers (2.31). One limitation in addition to the small sample size of ADVs (n = 16) is that the questions referred to the ADVs as veterans. The active duty students may or may identify themselves as veterans since they are still on active duty and answered these questions through this filter. Again, this is a source of future investigation.

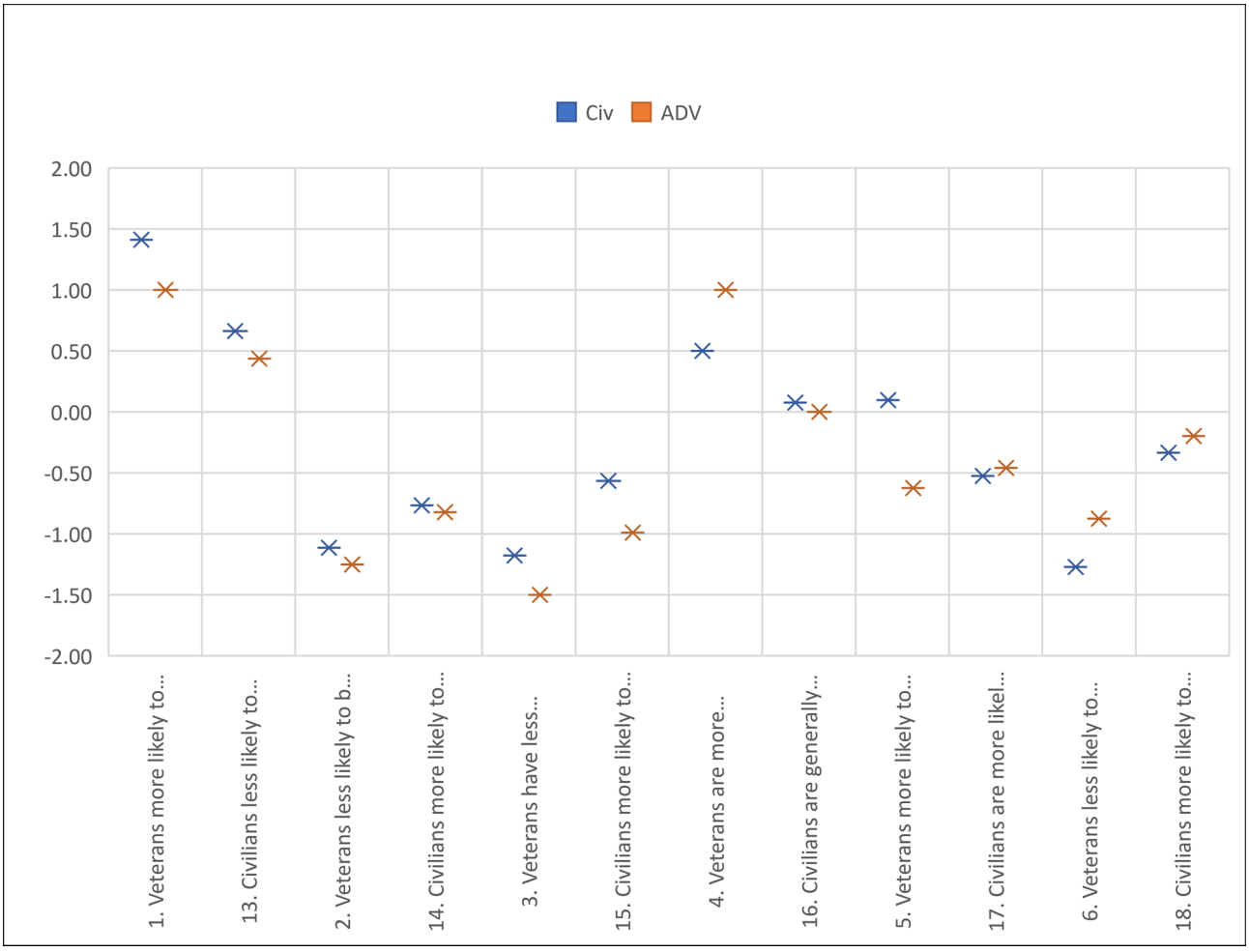

Figure 1: Matched Veteran and Civilian Survey Items, 1/2

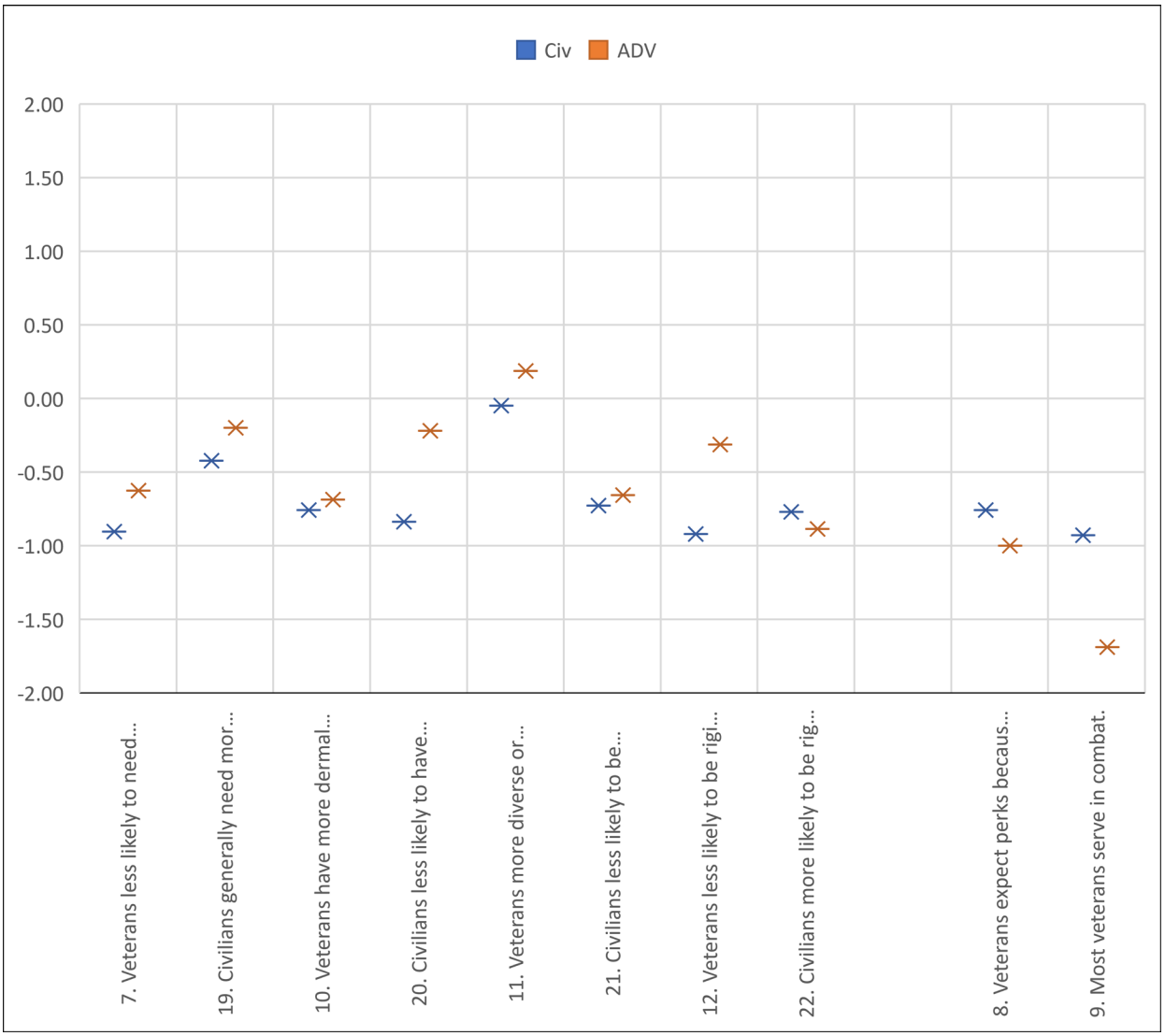

Figure 2: Matched Veteran and Civilian Survey Items, 2/2

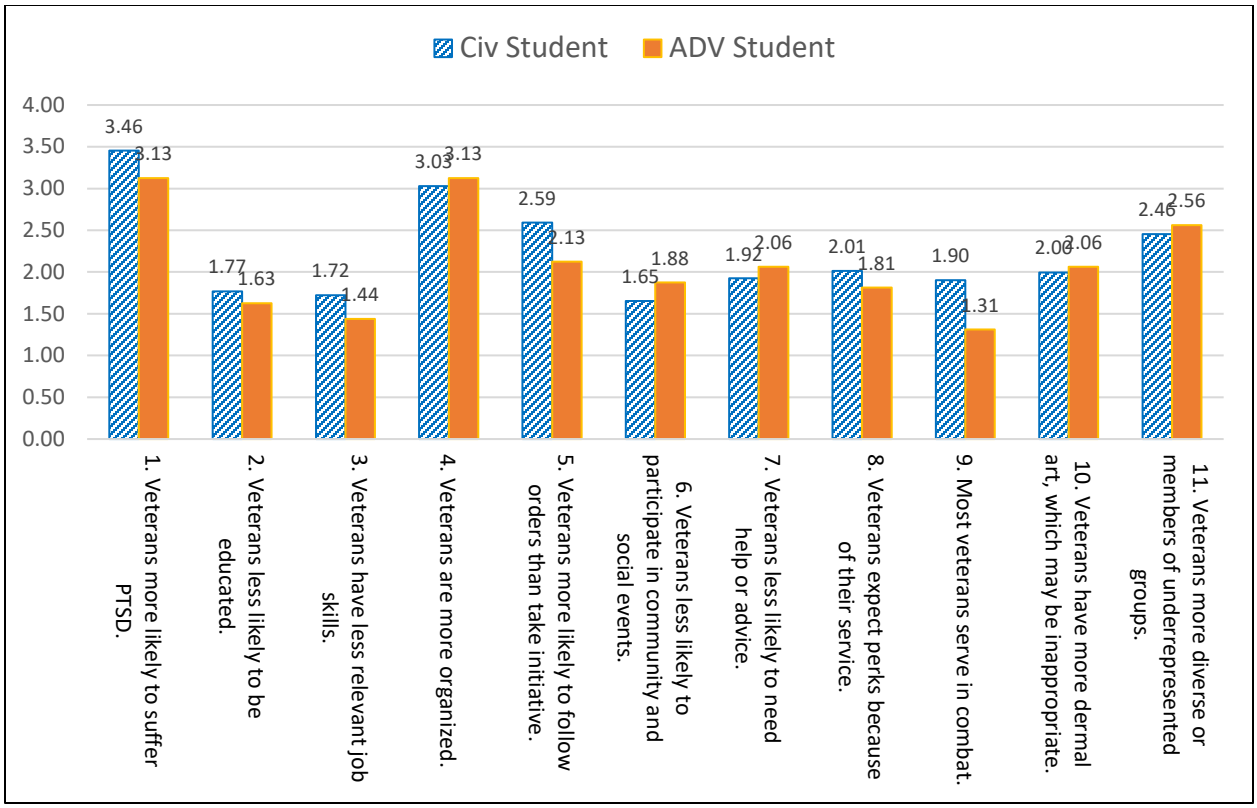

Figure 3: Student Veteran-Focused Questions

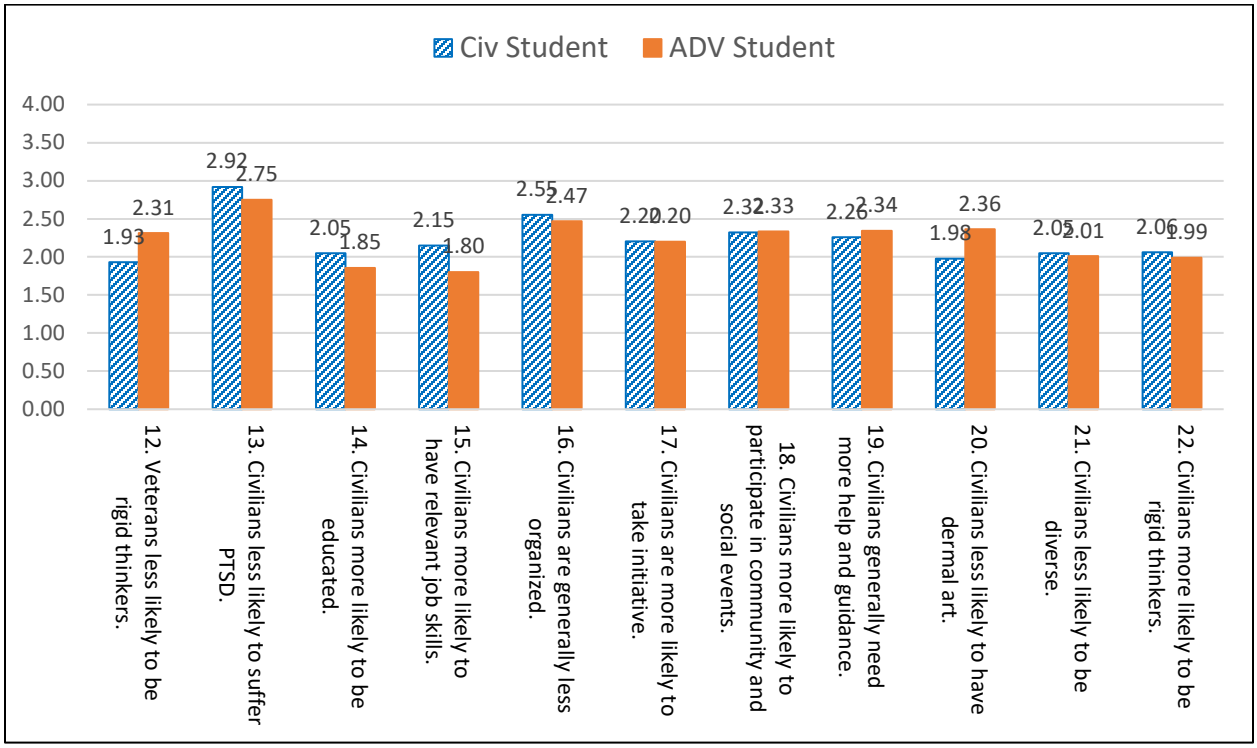

Figure 4: Civilian Student-Focused Questions

Summary Discussion

Myths and perceptions about student veterans exist and they can have negative consequences for student veterans and non-student veterans, alike. However, this study does not determine to what extent the negative perceptions impede ADV performance, self-efficacy, and persistence to complete their engineering degrees. A majority of the civilian students in this survey were sophomores who had been in the classroom with the ADVs for more than a year. The survey did show where there was good agreement between ADVs and other students in many areas, but there are still misperceptions that may hinder the ADVs' sense of belonging in institutions of higher learning. We know that belonging is key to academic persistence in STEM and a social outcome that is affirmed in many diversity, equity, and inclusion initiatives in higher education [20]. These misperceptions for both ADV and civilian student populations suggest that something beyond immediate lived experience is informing these biases—likely, popular culture.

Hollywood, a so-called 'third force' in strategic communications [20], produces entertainment that while largely supported by the Pentagon, promotes inaccuracies, myths, and stereotypes about veterans [21]. Added to this, most individuals believe they are immune to stereotyping and myths and that other people are more vulnerable, a phenomenon known as the Third Person Phenomenon (TPP) [22]. Results of our sampling of traditional students, cadets, veterans, and active duty students suggest both positive and negative veteran myths are robust, and have been internalized by the veterans themselves. Widely shared positive perception myths that veterans have enhanced organization skills are not validated by research, and may prevent ADVs from receiving important academic support and advising in the classroom. Negative perception myths such as the perceived likelihood of PTSD among ADVs similarly may create barriers and increased social distance between ADVs and civilians in the classroom.

Despite historically high enrollments, student veterans and active duty continue to face stereotypes and biases on college campuses from their non-student-veteran peers. Some of these biases are internalized by the student veterans and active duty military personnel, such as the perception that veterans are more likely to experience PTSD or TBIs than their civilian counterparts. Student veteran stereotypes can negatively impact student veterans' higher education experiences, and literature indicates faculty can unknowingly retain these stereotypes. In our study, both active duty and student veterans' survey responses aligned and did not merit a two-cohort distribution analysis. Similarly, cadet and civilian students reported similar responses, so we categorized their responses together. The presence or absence of prior military service impacted respondents' views regarding the prevalence of combat experience among veterans, and the likelihood of veterans being 'rigid thinkers' and 'creative problem solvers.' Respondents with prior military experience reported positive views of veterans' non-rigid thinking and creative problem-solving skills. This study recommends enhanced mentoring and individuated academic planning for ADVs, conducted by academic professionals trained in Green Zone allyship and aware of campus and local resources, as well as campus staff and faculty who are veterans themselves and willing to be a resource.

Educators, regardless of their civilian or military backgrounds, all want to serve the needs of student veterans. Understanding the perceptual challenges that ADV students may face improves our abilities as faculty to advocate for and advise them. Faculty are also better positioned to educate other students and faculty, and empowered to create more inclusive learning spaces and

lesson designs. In order to best meet ADVs' academic needs, additional faculty and advising staff training and education needs to be made accessible across campuses, ensuring increased awareness of pervasive veteran myths. Additionally, enhanced, iterative, Green Zone training on campuses, in a context that explicitly incorporates knowledge about the existence and potential harm of stereotypes, could be an important resource to include in diversity, equity, and inclusion initiatives—as well as departmental curricular design forums—as we seek to create classroom experiences where everyone feels like they belong in our classrooms.

Future Work

Best practices for meeting the needs of our active duty and student veteran engineering students have to include getting to know them socially, professionally, and in a mentoring capacity. As this research shows, ADVs perceive greater diversity within their group than civilians do. Recruitment and retention plans in engineering for ADVs then must include 1:1, trained academic advising, individuated academic planning, professional mentoring, and result in a needs-based assessment for that student as an individual, not as a member of a monolith 'veteran' category. Facilitating social connection, collaborating, and mentoring experiences inside and outside of the classroom can also serve to lessen social distance and increase a sense of belonging; provide opportunity for ADVs to model professional skills for traditional students; and thereby also expand civilian faculty and students' understanding and rapport with ADVs, perhaps weakening some of those ingrained biases in the process. As Diversity, Equity, Inclusion, and Belonging efforts are formalized, implemented, and assessed in higher education, active duty and military student veterans will benefit from our shared challenge and opportunity to really 'see' the individuals in our classrooms, their gifts and diverse experiences, thereby enriching engineering education.

Future work in this area will focus on revising the survey tool for conciseness and ease-of-use, expanding the non-cadet student response rate, as well as ADV sample size. These preliminary findings suggest there may be hidden diversity that is correlated with curricular progression through the major, and degree of exposure to military culture and/or service members.

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