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Weight training (WT) has been consistently shown to improve muscular ability among women, better preparing them to meet the demands of modern military service and overcome certain physiological challenges. Unfortunately, current training methods do not prioritize WT in most military populations, and women typically participate in WT at rates 20-30% lower than their male peers. The purpose of this study was to identify factors that influence WT participation among cadet women enrolled at a senior military college (SMC) to inform future programming, curriculum, facilities, or policies. First, a survey was administered to cadet women ($n = 92$) to characterize their WT participation and perceptions. Then, cadet women ($n = 11$) were interviewed to explore their perspectives on barriers, facilitators, and strategies for participation. Although WT is not often featured in twice per week institute-led physical training, 77% of cadet women reported participating in WT at least 2 days/wk and 49% reported ≥ 3 days/wk. Athletes and women who planned to pursue military service after graduation reported higher rates of WT. Analysis of the interviews illuminated three themes: building reputation, “it’s on multiple fronts,” and “having to adapt.” WT was valued to support military readiness and build reputation in a male-dominated sphere emphasizing physicality. Cadet women’s perceived competence and strength were tied to reputation concerns. Time and space constraints included high academic course loads and extracurricular responsibilities associated with SMCs, coupled with limited facilities and equipment. Based on the views of cadet women in this study and low reported enrollment of women in current WT offerings, it is recommended that the institution provide additional educational resources and opportunities (e.g., workshops or women-only courses) as early as possible in a cadetship.

WEIGHT TRAINING PRACTICES AND PERSPECTIVES
AMONG CADET WOMEN AT A SENIOR
MILITARY COLLEGE

by

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CHAPTER I: PROJECT OVERVIEW

For women in military settings, participation in weight training (WT) has the potential to positively impact health, military preparedness, and their essential, ever-growing contributions to the armed forces (Sauers & Scofield, 2014; U.S. Army, 2020). WT is a form of resistance training that involves the contraction of muscles against an external resistance (i.e., beyond body weight) and traditionally takes place in gym settings using weighted or resistive implements (e.g., barbells, dumbbells, machines, resistance bands; Haff & Triplett, 2016). This form of exercise is recommended for all adults due to its robust and wide-ranging health impacts that especially benefit women (DHHS, 2018). WT also provides a means for women to meet the requirements of certain physically demanding occupations, including various military roles (Sauers & Scofield, 2014). Physical programs that prioritize WT are shown to consistently improve muscular ability and military performance among women (Harman et al., 1997; Knapik et al., 2012; Kraemer et al., 2001), better preparing them to overcome select sex-specific physiological challenges (i.e., smaller stature and reduced upper-body strength/power compared to males; Courtright et al., 2013).

Despite the benefits of WT, conventional military training methods (i.e., training large groups in field settings with limited equipment) do not facilitate WT for the average service member (Nindl, 2015; Szivak et al., 2015) due to logistical challenges, which often puts the onus on the individual to perform WT on their own time in addition to mandatory physical training (Anderson et al., 2017). Women in civilian and military populations participate in WT significantly less than their male peers (CDC, 2020; Meadows et al., 2018). Participation disparities in civilian populations are explained in part by greater perceived barriers to and/or fewer perceived facilitators of WT experienced by women (Harne & Bixby, 2005; Hurley et al.,

2018; Peters et al., 2019). Whether these or other situationally unique perspectives exist within the military environment warrants further investigation.

College may be an opportune time for women to begin WT. Young adulthood is a critical phase to optimize the physiological adaptations of WT (Lambert et al., 2020) and is characterized by lifestyle changes that carry over to adulthood (Kwan et al., 2012; Nelson et al., 2009). Senior military colleges (SMCs) provide a unique environment likely to impact exercise behaviors of college-age students. Cadet undergraduates are exposed to military training and a challenging physical program alongside higher education (West Jr., 1996). SMCs offer a direct path to future military leadership, as most cadets, including women, will commission across the U.S. Army, Navy, Coast Guard, Marine Corps, Air Force, or Space Force branches. A clearer understanding of cadet women's current WT practices and whether/how this setting may influence those practices has important implications for both their physical readiness for future military service and a healthy civilian life.

Review of Relevant Literature

From a health perspective, cadet women stand to benefit from WT regardless of commissioning plans. Physiologically, WT is shown to increase muscle mass, strength (Hagstrom et al., 2020), and bone mineral density (Layne & Nelson, 1999). These adaptations support the ability to perform functional tasks (ACSM, 2017) and prevent/delay the onset of osteoporosis, a disease progression more common among women (Alswat, 2017). Other physiological benefits include reduced body fat, resting blood pressure, and improved metabolism, all of which reduce risk for chronic disease development over the lifetime (Westcott, 2012). Psychologically and socially, WT is also shown to improve women's body

image (Ahmed et al., 2002), self-esteem (Melnick & Mookerjee, 1991), and feelings towards other women (Craig & Liberti, 2007).

For SMC women who commission, these adaptations provide further benefits for military preparedness. Female active-duty service members currently comprise a small (i.e., ~17%) but vital contribution to the total U.S. Armed Forces (Anderson et al., 2017; DoD, 2019). Thus, it is critical to ensure that women are physically capable of meeting occupational demands, a need heightened by women gaining eligibility to serve in combat roles (Dempsey & Panetta, 2013) and modern challenges recruiting service members due to lack of fitness (CDC, 2022). Service demands vary considerably by branch, job assignment, and environment, ranging from relatively sedentary to near-constant arduous physical labor (Tharion et al., 2005). But in general, the ability to develop/sustain muscular fitness is critical to many military occupations (Anderson et al., 2017; Nindl, 2015), and is assessed in some capacity by physical fitness tests for each branch (Smith, 2020; U.S. Air Force, 2020; U.S. Army, 2021; U.S. Marine Corps, 2021).

Female cadets and service members often face greater challenges in meeting testing standards and sustaining the workloads characteristic of more demanding military roles due to certain physiological challenges. On average, females have a smaller body size and less muscular strength/power than males – traits directly associated with the ability to overcome relative and absolute loads (Courtright et al., 2013; Knapik & Reynolds, 2010; Kraemer et al., 2001). These challenges are not adequately addressed by conventional military training practices, which are often field-based and typically limited to aerobic conditioning (e.g., distance running) and muscular endurance movements (e.g., body weight exercises only; Drain et al., 2015; Westphal et al., 1995). Such practices do not provide a sufficient stimulus to support meaningful strength development for women (Drain et al., 2015). Conversely, weight room-based interventions that

employ WT using heavy loads on ≥ 3 days/wk are shown to elicit substantial increases to muscular size and strength/power among women, meaningfully improving their performances in military testing/tasks over the long-term (i.e., ≥ 6 mos.; Harman et al., 1997; Knapik et al., 2012; Kraemer et al., 2001, 2004). This demonstrates the specific importance of WT for military women to support their military readiness and overall health.

Factors Influencing WT Participation Among Female Cadets

As noted, most current military physical training programs are field-based and thus, do not necessarily encourage participation in WT (Kraemer & Szivak, 2012; Nindl et al., 2016). These conventional practices are reinforced by ease of implementation, traditions, and the focus of most military testing batteries on aerobic/muscular endurance (Smith, 2020; U.S. Air Force, 2020; U.S. Marine Corps, 2021). Modern initiatives that place greater emphasis on formal WT have been met with opposition due to logistical challenges (Palin & Hartman, 2021). Most successful WT interventions use large teams of support staff to administer safe/individualized training to small groups (Kelly et al., 2013). By comparison, most military training regimens, including those used at SMCs, provide programming for large groups at sites often lacking the resources/facilities to oversee weight room-based training (Steinhauer, 2021; Withrow, 2016).

Until training programs for military populations can reasonably facilitate WT, the onus shifts to individuals. While little is known about the factors that influence WT participation in military settings, many researchers have investigated this relationship in traditional college settings. Relevant factors exist on intrapersonal (i.e., personal attributes, experiences), interpersonal (i.e., sociocultural environment), or structural levels (i.e., built environment) and can either impede or enhance one's ability to engage in physical activity behaviors (Thomas et

al., 2019). Identifying factors that influence cadet women's ability to WT is key to develop targeted strategies to promote future participation.

Intrapersonal Factors

Perceived *lack of time* has been a consistent and highly rated barrier to general exercise participation in mixed-gender samples of college students (Hilger-Kolb et al., 2020; Thomas et al., 2019; Wilson et al., 2021) and military personnel (Sigrist et al., 2005). Among college-aged civilian women, the perception that WT specifically requires great time and effort is a frequently cited challenge to participation (Harne & Bixby, 2005; Hurley et al., 2018). While few, if any, studies have examined the perceptions of the military community concerning WT, it is possible that perceived time constraints could be compounded given the relative lack of expediency of WT compared to other forms of exercise within the constrained schedules typical of most military environments (Harman et al., 1997).

The considerable *skill required for WT* is also a documented challenge to participation (Bryan & Rocheleau, 2002; Poiss et al., 2004). Women are more often novice users of WT equipment and report lower perceived competence with WT movements (Salvatore & Marecek, 2010; Wilson et al., 2021). Support services (e.g., instruction on equipment use/technique) appear to be helpful to increase comfort, skills, and competence with WT (Gao & Xiang, 2008). Likewise, educational resources emphasizing the importance of WT to health promotion have the capacity to modify values and beliefs surrounding WT, which can facilitate behavior adoption (Cuy Castellanos et al., 2020; Gao & Xiang, 2008).

Interpersonal Factors

Gender stereotypes may serve as a barrier for women in both civilian and military spheres. Western (and white) standards of femininity suggest that women should be “firm but

shapely, fit but sexy, strong but thin” (Markula, 1995, p. 424). As a result, more women may participate in aerobic- or flexibility-based training compared to WT because the latter promotes a muscular build that is incongruent with female gender norms (Salvatore & Marecek, 2010; Thomas et al., 2019). Among women who do lift, fears of looking “too big” remain a concern and may lead women to intentionally limit their training loads/volume to not surpass a perceived upper threshold of muscularity (Dworkin, 2001; Shurley et al., 2020; Zach & Adiv, 2016). However, women more experienced with WT, such as athletes, appear more apt to negotiate their simultaneous femininity and muscularity (Roth & Knapp, 2017). Women in military settings have also reported feeling less pressure to maintain a “feminine” physique and instead focused on physical training generally, if not WT explicitly, as a means to support performance (Brownson, 2014; Silva, 2008).

Another relevant interpersonal factor is *evaluation concerns*, which refer to the worry of being assessed or ostracized in gym settings. Civilian women consistently report feeling “silly” or uncoordinated, watched by others (Harne & Bixby, 2005), and sometimes judged/sexualized in weight room settings (Fisher et al., 2018; Salvatore & Marecek, 2010; Wilson et al., 2021; Wilson et al., 2020). These perceptions were heightened due to more men than women occupying these spaces (Peters et al., 2019). Given the characteristic male dominance and highly evaluative nature of the military more generally (Evans & Robinson, 2020), it is possible that evaluation concerns may be an even more salient perceived barrier to WT in this context.

Societal stereotypes also uniquely intersect with *military culture*, which often posits that military norms/values are ideally and stereotypically masculine (Do & Samuels, 2021; Kimmel, 2000). Military women often experience bias concerning their physical abilities, with male peers perceiving them as less capable (Do et al., 2013; Matheson & Lyle, 2017; Trobaugh, 2018).

When held by leaders, this bias can result in lower expectations, quality of training, and limited support for requested additional training for women (Trobaugh, 2018). This intersection poses a complex inner conflict for military women, which may either promote or discourage WT participation. For instance, this perception could possibly motivate women to adopt WT to negotiate their own pathway to the “masculine warrior” to gain the respect of their male peers (Brownson, 2014; Silva, 2008). Conversely, this narrative could lower their self-esteem and perceived abilities for failing to live up to an unattainable standard of masculinity (Lewis, 2020).

Similarly, certain military *organizational elements* may facilitate positive exercise behaviors, including its hierarchical structure and mandatory physical training (Harrison et al., 2000; Wynd & Ryan-Wenger, 2004). As social class systems (i.e., a four-year hierarchy with rank) common among SMCs play a prominent role in the cadet experience, the WT behaviors of upperclassmen could also be highly influential to the younger cadets they mentor.

Lastly, *social support* is also documented to influence WT participation. Male and female college students prefer participating in WT with others rather than alone (Burke et al., 2006). Women in particular report that the social connections afforded by group exercise training can be a salient facilitator for continued gym use (Peters et al., 2019; Wilson et al., 2021). Among military personnel, peer socialization is also shown to promote exercise behaviors (Wynd & Ryan-Wenger, 2004). It is possible that the unique social bonds formed throughout a cadetship could similarly promote WT behaviors among cadet women.

Structural Factors

The *physical gym structure* has also been shown to impact WT comfort and convenience. Most women prefer gym spaces that are less crowded and possess less direct sight lines (Wilson et al., 2021). Some civilian women express interest in a women-only WT area (Fisher et al.,

2018; Hurley et al., 2018; Wilson et al., 2021), however others feel this reinforces aforementioned stereotypes (Coen et al., 2018). Equipment scaling and accessibility are also challenges for women in weight rooms (Ford et al., 2023; Turnock, 2021). The experiences and preferences of cadet women about facilities may provide additional insights.

Purpose and Research Questions

Many factors influence WT participation in populations that surround, and sometimes overlap with, military women – a population with a distinct need for WT to support their health, well-being, and occupational effectiveness. However, the specific perspectives of women regarding WT in the unique sociocultural context of an SMC have yet to be considered. The purpose of this study was to identify factors that influence WT participation among cadet women at an SMC to inform future institutional changes by addressing the following research questions:

1. To what extent do cadet women at an SMC participate in WT?
2. What factors impact cadet women’s WT participation in this setting?
3. How can SMC’s support WT participation among cadet women?

Methods

This study used mixed methods to develop a composite understanding of cadet women’s experiences surrounding WT (Creswell, 2013a, 2015; Patton, 2015). In the first phase, descriptive survey data were collected to characterize women’s WT habits and perceptions. In the second phase, their perspectives were explored in greater depth through interviews to provide a more nuanced understanding of factors unique to this population/context that influence participation in WT (Creswell & Plano Clark, 2011). Data were integrated to identify relevant issues and provide culturally appropriate recommendations.

Participants and Procedures

Participants included cadet women enrolled at an SMC who were at least 18 years old. Participant demographics for both phases are presented alongside available population demographics in Appendix D. Notably, cadet women comprise just 13% of the cadet population at the SMC and a large proportion of those women are NCAA athletes (48%) and intending future military service (79%). Survey participants ($n = 92$; $M_{\text{age}} = 19.5 \pm 1.4$ years) primarily identified as white (73%), intended to serve in the military post-graduation (74%), and were former or current NCAA athletes (68%). Representation across class years was relatively even. By comparison, the interview participants ($n = 11$; $M_{\text{age}} = 19.8 \pm 1.0$ years) were slightly more diverse in terms of race and ethnicity (55% white), included fewer NCAA athletes (36%), more upperclassmen, and a larger percentage planning for future military service (91%).

Following Institutional Review Board (IRB) approval, participants were recruited via direct email, word of mouth, and through on-campus groups that contained high female membership (e.g., NCAA/club teams, ROTC, clubs, and band). An email message was distributed to all cadet women containing a link to an online survey. An on-site event accompanied the initial email distribution to promote interest. Those who elected to participate provided informed consent online prior to beginning the survey. At the end of the survey, respondents were invited to participate in a follow-up interview. Given high interest, interview participants were selected randomly. Interviews were conducted until no new salient information emerged relative to the research questions. Individual semi-structured interviews lasting 40-55 minutes were conducted in-person in a private conference room on campus. Volunteers provided informed consent and responded to a few general demographic questions prior to interview. All interview participants received a \$25 Amazon gift card.

Measures

Primary measures consisted of a survey and individual interviews. The survey featured demographics and items assessing WT behaviors and perceptions, while interviews included questions about contextual factors that influenced WT behaviors.

Phase 1: Survey

Senior cadets ($n = 2$) reviewed survey items for clarity and accuracy to enhance the validity of the survey within this specific context (Willis & Artino, 2013; Wolcott & Lobczowski, 2021). The finalized survey instrument is in Appendix A.

Demographics. Participants reported age, class year, race/ethnicity, intent for future military service including intended branch (i.e., Air Force, Army, Coast Guard, Navy, Marine Corps, or Space Force), and student-athlete status and varsity sport(s). Participants also reported their current/prior enrollment in SMC course offerings that feature WT elements.

Participants indicated their moderate and vigorous weekly physical activity via items from the American College Health Association (2023) National College Health Assessment (ACHA-NCHA III). Weekly resistance training behaviors were similarly reported using ACHA-NCHA III items, with modified categories of *calisthenics* (defined as body weight movements) and *WT* (defined as use of weighted implements). The ACHA-NCHA III has acceptable validity and reliability (inter-item correlation = 0.61, $\alpha = 0.86$; ACHA, 2013).

WT Behaviors. Participants self-reported their WT knowledge, participation prior to enrolling in college, and current involvement in multiple forms of WT via items adapted from Hurley et al. (2018). Participants also rated their comfort on a 5-point Likert scale (1 [not at all] to 5 [totally]) and frequency using several weight room facilities on campus via items adapted from Salvatore & Marecek (2010) and Wilson et al. (2020).

WT Perceptions. Perceived benefits and barriers to WT were assessed via the Benefits and Barriers to Strength Training Questionnaire (BBSTQ) developed by Harne & Bixby (2005). The BBSTQ featured 55 items (i.e., 24 benefits and 31 barriers) rated on a 5-point Likert scale (i.e., 1 [not important at all] to 5 [extremely important]). Benefit category sub-scales included psychological, social, body image, and health. Barrier category sub-scales included time-effort, physical effects, social, and specific obstacles. Five additional items were added to each benefits/barriers section to address separate SMC-specific factors that possibly impacted WT behaviors (e.g., “improves military preparedness” [benefit]; “upperclassmen in the weight room are intimidating” [barrier]). All subscales exceeded the minimal threshold for reliability (Cronbach’s $\alpha = 0.71-0.91$) except for two barrier categories (i.e., physical and specific; $\alpha = 0.66-0.69$). Three open-ended response questions following each benefits/barriers section were included for participants to report other potential factors that impact WT participation (i.e., increase/decrease likelihood, makes it easier/harder), and comfort/discomfort in the weight room.

WT Resources. Participants rated the usefulness of several potential resources to support WT participation on a 5-point Likert scale (i.e., 1 [not at all] to 5 [extremely]). Two open-ended response questions were also included to report ways for the SMC to support future WT participation (i.e., support you/women).

Phase 2: Interviews

Interviews were semi-structured, featuring questions that were broad and guiding, but allowed for spontaneity in follow-up questioning (McGrath et al., 2019; Rubin & Rubin, 2012). Main questions focused on individual, environmental, and cultural factors that encouraged or discouraged current/future WT behaviors among cadet women. See Appendix B for interview guide.

Analysis and Integration

Survey data were analyzed using the Statistical Package for Social Sciences 26.0 for Windows (SPSS Inc.; Chicago, IL, USA) for descriptives (means \pm standard deviations [$M \pm SD$], medians [mdn]) and frequencies.

Open-ended survey responses were analyzed using summative content analysis (Hsieh & Shannon, 2005). Key words were identified, grouped into categories, and reported in terms of frequency. Interviews were transcribed verbatim and reviewed for accuracy with all identifying information removed. Transcripts were analyzed using the Sort and Sift, Think and Shift method (Maietta et al., 2023). Analysis began with several readings of each file. Each file was distilled to an episode profile in which power quotations were summarized (e.g., interesting, confirmatory, or contradictory to other files). Profiles were interpreted through subsequent diagramming and memo-writing amongst two researchers to discuss, reflect, and develop a list of emergent themes (i.e., six meetings over data collection period).

Trustworthiness

Analysis involved multiple reviewers and prolonged engagement with data (Creswell, 2013b, 2014; Patton, 2015). The primary investigator and an additional staff colleague at the SMC engaged in reflexive writing, noting their positionality and its potential to impact interpretation of data (see Appendix C for that of the primary investigator; Creswell, 2013b). Interview participants had the opportunity to review and/or modify their transcripts to confirm authenticity with their experiences (i.e., member checking; Patton, 2015). An initial summary of findings was shared with all interview participants for their review. Three participated in a follow-up focus group to provide feedback and ensure the summary reflected the cadet experience (i.e., member reflection; Smith & McGannon, 2018).

Findings

Primary descriptive findings from survey responses are presented first, followed by the analysis of the interview data. Data from both phases are integrated wherever possible.

Survey

Cadet women reported high levels of physical activity, with 88% meeting the minimum guidelines for American adults (i.e., ≥ 150 mins of moderate-vigorous/wk) and 80% exceeding 300 mins/wk (ACSM, 2017). The proportion of cadet women meeting the minimum resistance training guidelines (i.e., ≥ 2 days/wk.; ACSM, 2017; CDC, 2020) based on self-report was also exceedingly high (96%).

WT Behaviors

Weekly resistance training behaviors are further delineated into calisthenics and WT in a table in Appendix D. Participation rates for calisthenics ($mdn = 3$ days/wk) were generally higher than WT ($mdn = 2$ days/wk) for the total sample, with 79% of women participating on ≥ 2 days/wk. Among women who participated in twice per week ROTC or institute-led physical training ($n = 47$), 83.0% reported participating in calisthenics either “usually” or “almost every time.” Calisthenics participation rates were similar among athletes, across class years, and between military seeking and non-military seeking women.

As WT on ≥ 2 days/wk aligns with recommendations for general health (ACSM, 2017) whereas WT on ≥ 3 days/wk has been shown to meaningfully improve women’s military task performances (Harman et al., 1997; Kraemer et al., 2004; Nindl et al., 2017), these cut-offs were used to further characterize participation in this sample. Participation rates for WT were high, with 77% of women participating on ≥ 2 days/wk and 49% on ≥ 3 days/wk for the total sample. Given that athletes participate in required team lifts on 2-3 days/wk, WT participation rates were

also examined among non-athletes only ($n = 30$). Rates were lower within this subsample, with approximately half (53%) of non-athletes reporting participation on ≥ 2 days/wk and 33% on ≥ 3 days/wk. Participation was also comparatively higher among the subsample of women seeking military service ($n = 68$; $mdn = 3$ days/wk), with 81% participating on ≥ 2 days/wk and 57% on ≥ 3 days/wk. However, WT participation was low during institute-facilitated physical training times. Among women who participated in twice per week physical training ($n = 44$), 70.5% reported participating in WT either “almost never” or “rarely.”

WT Perceptions

Among the total sample of survey respondents ($n = 92$), 41% of cadet women reported they were “moderately” knowledgeable about WT, while 39% reported they were either “quite” or “extremely” knowledgeable. Similarly, 33% of women reported they were “moderately” comfortable in weight room facilities on campus, and 44% reported they were either “very” or “totally” comfortable. Several factors emerged in open-ended responses regarding comfort, as evident in Table 1.

Table 1. Reasons for Comfort and Discomfort in Weight Room Facilities

Reasons for Comfort		Reasons for Discomfort	
Being with familiar others	28	Crowded space/lack of equipment	30
Perceived competence/strength	20	Feeling observed/judged	22
Less crowded space/equipment	19	Perceived incompetence/lack of strength	21
Having a plan	8	Male dominance and behaviors	20
Seeing other women	7	Class system	15
Motivating atmosphere	7	Not having a plan	5
Prior experience	5	Physical appearance	5
Music	4		

Note. Some participants gave multiple responses, while others gave no response for this question. Thus, total frequencies may not match the total sample n .

Mean item responses for the perceived benefits scale were generally rated higher than perceived barriers and are summarized in Table 2. The highest rated benefit categories were

health, psychological, and body image, while the highest rated barriers were SMC-specific (e.g., “the weight room is too crowded”) and time-effort.

Table 2. Overall WT Benefit and Barrier Scores

Overall (<i>n</i> = 92)			
Benefit category		Barrier category	
Social	2.72 ± 0.92	Physical	1.59 ± 0.51
Body image	3.78 ± 0.78	Time-effort	1.94 ± 0.65
Health	3.97 ± 0.67	Specific	1.88 ± 0.63
Psychological	3.80 ± 0.82	Social	1.89 ± 0.70
SMC-specific	3.52 ± 1.08	SMC-specific	2.64 ± 1.01

Note. Data are presented as mean item responses (M) ± standard deviations (SD) for each subscale. Item ratings: 1 = Not important at all, 2 = slightly important, 3 = moderately important, 4 = very important, and 5 = totally important.

Additional factors reported in open-ended survey responses that influenced WT participation among women are summarized in Table 3 (i.e., “what makes it harder/easier for cadet women to WT?”; “what would increase/decrease your likelihood to WT?”).

Table 3. Factors that Influence WT Participation

	“Easier”	“Increase likelihood”	Total
Less crowded space/equipment	3	26	29
Social support	18	9	27
Seeing other women	13	2	15
Personal motivation/progress	8	4	12
Time in schedule		11	11
Knowledge	4	6	10
Perceived competence/strength	5	3	8
Sport requirement	3	4	7
	“Harder”	“Decrease likelihood”	Total
Feeling intimidated/judged	22	10	32
Lack of time/competing priorities	6	23	29
Male dominance and behaviors	23	4	27
Crowded space/lack of equipment	8	17	25
Perceived incompetence/lack of strength	15		15
Few women	7	1	8
Class system	1	6	7
Gender stereotypes	5		5
Limited gym hours	1	3	4

Note. Some participants gave multiple responses, while others gave no response for this question. Thus, total frequencies may not match the total sample *n*.

The most frequently cited factors to facilitate WT participation were a less crowded gym space with greater equipment availability, social support, and the presence of other women. Feelings of intimidation or judgement, a lack of time or competing scheduling priorities, and male dominance and behaviors emerged as top factors to discourage WT participation.

Interviews

Three themes emerged from the analysis of interviews: building reputation, “it’s on multiple fronts,” and “having to adapt.” The first main theme thread through several topic areas, yielding additional subthemes: the class system, “I educated myself,” and minimizing the awkwardness, summarized in Appendix D. Each provides important context to capture a holistic understanding of cadet women’s WT experiences in their unique training environment.

Theme 1: Building Reputation

Arguably the most salient theme to emerge was a constant striving by cadet women to earn the respect of “others,” especially male others throughout their cadetship. Respect could be earned to some extent through WT given the tremendous focus on physical training in institute culture, assessed and observed regularly within a relatively small population. Thus, the perceptions held by men about women’s physical abilities and how they stacked up against their peers were a persistent concern for cadet women:

It almost feels like you're constantly being evaluated by your peers here. Reputation at [the SMC] is incredibly important, more so than other schools because we're a small school, everybody knows everything. And being physically fit is tied with your cadetship, like how good of a cadet you are. So it almost feels like you always have eyes on you.

This concept was thought of as a “score,” with outward displays of effort and ability (or lack thereof) adding or deducting from their point total which represented social standing in the

Corps. Cadet women felt they earned points towards their reputation by simply being seen in the gym, as there is often a gender discrepancy in this space: “It's good, like you get points if guys see you in the gym, because very rarely do I see another female in the gym when I go.” By showing up consistently and giving high effort, women could show that they truly “earned” their place in a male-dominated sphere that prioritizes self-discipline and fitness:

You have to assimilate into the group. Like you have to find a way to become one of the guys, sadly, in order to be really seen in the Corps. Like I know for a fact I have a very good reputation with most of the guys in my class. And I really think that comes from like they see me in the gym and they see me doing bro things.

Being seen as able to do stereotypically masculine things such as performing certain movements (e.g., pull-ups or bench press) or lifting a certain amount of weight seemed to earn the most points. In some cases, women sought out opportunities to display these abilities:

Pull-ups are just so fun ‘cause most guys can do pull-ups and then most guys have the stipulation of girls can’t do pull-ups... But with the guys I’ll be like ‘I bet I could do more pull ups than you’ (laughs). And it's just nice. It's just some equal ground that we can semi-have or some respect that I can earn from the guys a little bit be like ‘oh, okay, she can pull her own weight.’

While showing they were physically capable helped to build reputation, cadet women worried that being seen as less capable could likewise hurt their reputations. Women described concerns about being judged when operating at a lower ability level because it translated to being perceived as weak: “I worry that if I do... like if I'm not weightlifting a lot of weight and I'm around these meathead [guys] like they're gonna think that I'm weak.” At a minimum, women wanted to look like they knew what they were doing (i.e., have good form), and at least be able

to keep up with everyone else, male or female, to not be seen as obviously weaker than the rest of the group. This theme is further evidenced by survey responses (Table 1), as male dominance, feeling observed/judged, and perceived competence/ability factored into level of comfort in weight rooms seemingly due to concerns about reputation.

Interestingly, women more experienced with WT reflected on a perspective shift over time in which the preoccupation on comparisons and others' perceptions subsided and their focus instead shifted towards their personal journey. One upperclassman (a junior) reflected:

I do a lot of comparison to myself and others and it is because I've always just been you know, the smaller person. But then I realized that for my weight, like if I can put up my own weight, and more, I think that says a lot about how much I'm trying. And it may look different for other people too. But for myself, I think that's really good progress.

Subtheme 1a: The Class System. The unique class system characteristic of SMCs heightened the importance of these perceptions, as it places freshman students (i.e., “Rats”) at the bottom of the institutional hierarchy, which impacts privileges, social standing, and authority. Conversely, upperclassmen are very visibly at the top of the pecking order, especially if they serve in leadership roles (i.e., cadre). This system was a distinct barrier to WT participation for certain Rat women who feared they were not allowed to be in the gym, despite encouragement to go from cadre and other upperclassmen mentors. Fears were also rooted in intimidation due to the frequent presence of muscular upperclassmen in the weight room: “I ended up being too nervous... Rat year. As a Fourth, I definitely lifted a bunch. But as a Rat, I just... it's too scary. A lot of big people in the gym.” Fears were magnified due to the heightened evaluation of physical fitness during Rat year. Some Rat women avoided the weight room to keep their cadre guessing about their abilities and avoid losing points:

Especially as a Rat when you see [cadre] in the gym, it's like intimidating and they're always evaluating you, like your physical standards. And they thought I was super fit Rat year just because I could run, and I didn't want going to the gym changing that when I could like barely lift.

The class system was frequently cited in survey responses as a contributor to discomfort in the weight room by Rat women (Table 1). However, those who were experienced or bold enough to overcome their fears realized upperclassmen and cadre were there to support them. They described that the class system didn't apply inside the gym: "The whole facade drops in there. They understand you're there to work, and you're there to get better, and they're going to do everything in their power to make sure you can do that." While mutually respected, Rat women did not feel they were an equal part of the weight room community due to their "Rat stigma."

As upperclassmen and especially as cadre, women generally felt more confident in the weight room and while WT, but also a different pressure to physically perform in front of Rats (i.e., their Rats then joined their list of "others"). This also motivated them to participate in WT:

That was my first time in leadership, and I knew that there were Rats that were going to expect me to, not just keep up but do better than all of them. So, getting into the gym was a part of that.

Subtheme 1b: "I Educated Myself." Cadet women used preparation strategies to acquire WT knowledge (i.e., what to do) and skills (i.e., how to do it) and overcome initial feelings of intimidation or discomfort in the gym due to the perceptions of others: "I educated myself. I think that's the big thing is that... I think my lack of confidence for working out came from not knowing what I was doing and the fear of looking dumb." Specifically, women pre-

planned their WT sessions and spent time learning/refining their technique to make sure they knew (and *looked like* they knew) what they were doing in the gym:

But if you have [a plan] and you don't really know what you're doing, like it kind of helps you to get out of the awkwardness because you're just focused on... okay, I know that this exercise is what I'm going to be doing. And I know how to do this exercise because I watched the video. So now I'm just gonna look, I'm gonna see it, and I'm gonna do it.

Cadet women often cited the importance of a lift plan and prior WT experience to support weight room comfort in survey responses (Table 1). In interviews, they reported developing their knowledge and skills through online research (e.g., social media), SMC courses, and/or asking others for help. For many Rat women, upperclassmen female mentors often provided initial instruction and support. While others could help to expose cadet women to WT, acquiring personal understanding was key for building WT confidence and adherence: “I definitely have more confidence now in the gym than I did Rat year because I'm able to come up with a plan, stick to it, and like listen to music, like be comfortable on my own.”

While they placed great emphasis on education, cadet women also described that starting at a necessary lower WT ability level was a challenge in this setting. As a result, many women felt strongly that future programs, classes, and resources (see Table 5 in Chapter II) should provide opportunities to build skills without judgement so they could “break in” to the weight room with greater ease:

Like a workout session with women on [campus] to teach women who may want to get involved in lifting more, but they don't know what they're doing because I think, if you don't know what you're doing and you don't feel confident about yourself, you're not

gonna go to the gym because you're like, I'm gonna look stupid. Um, and I think a lot of women don't know how to lift and they just need help.

Education supports were requested as early as possible in their cadetship to maximize their four-year training window: “I would prefer it to start as a Rat because then you have all those years of your cadetship where you're getting stronger. Where I feel like I wasted like my third-class year, my second-class year, just like not training.” Participants had conflicting views on whether these skill-building opportunities should be limited to women only. Some felt that a women-only space or session would allow for greater comfort and encourage working at their ability level while others felt isolating women might reinforce gender stereotypes/biases on campus and discomfort integrating into the mixed-gender weight room later.

Subtheme 1c: Minimizing the “Awkwardness.” Cadet women also used strategies to maximize their comfort and minimize the perceptions of others *after* adopting WT behaviors. Some avoided onlookers by accessing the gym during less crowded times, using headphones to block out the “awkwardness,” or lifting in areas with less direct sightlines: “There's a chest press cable type machine in the back left corner of the gym. I'm really glad it's placed there because I don't like people seeing my weight, so that's very convenient for me.”

Some cadet women preferred to WT alongside *familiar* others like teammates, female peers, and certain male peers. Familiar others provided comfort for women to be vulnerable lifting perceived/actual lower weight and/or trying something new without fear of judgement. They also provided practical support (i.e., a spotter):

But I am a lot more comfortable when I go down with someone. That way if I do need someone to spot me, or if I do want to try something I'm not necessarily comfortable

with, or, you know, I'm not as good as I once was kind of thing and I'm worried I'm gonna fail something, then I have someone to kind of have my back.

Despite concerns regarding male perceptions, several cadet women described how male peers who were their friends (i.e., familiar) provided salient support for WT participation and greatly enhanced their comfort and motivation in the weight room. One described how her male friends encouraged her despite a comparatively lower ability level:

But they never had a problem either like sitting in the squat rack next to me or just having like a different set of weights and stuff and like, offloading the rack and putting on my weights. Like they always hyped me up.

Another described how lifting with other women specifically lessened her feelings of being the token woman in the space: “But it's like a mental state of, oh, I have other females with me, so no one's going to be pinpointing me as the one female kind of thing.” Similar sentiments were echoed in survey responses (Table 1), as less crowded spaces (i.e., fewer potential onlookers), being with familiar others, and seeing other women promoted weight room comfort. In total, reputation was pervasive to the experiences of cadet women. It served both a powerful motivator and challenge to WT participation for cadet women in this setting.

Theme 2: “It’s on Multiple Fronts”

In addition to reputation-building, women valued WT for several other reasons during their cadetship, further evidenced by the high perceived benefit ratings across multiple survey subscales (i.e., health, psychological, body image, SMC-specific; Table 2). Specifically, cadet women consistently explained how WT helped to improve their mood, relieve stress, and promote relaxation in a high stress environment: “I'm so busy. I'm always with people. I just need like me time and that's the gym.” Many also described that WT provided them with a sense

of individual accomplishment, which was perhaps more valued in this context because, as several women noted, the SMC is a place that sometimes made them feel like they were failing:

It makes you feel accomplished when like everything else hasn't gone well with your day, which happens often at [the SMC]. You constantly like fail something or whether it be like actually failing academically, or you get yelled at by somebody... It's like the gym is the one thing that you don't get yelled at for (laughs).

Many of the cadet women interviewed also valued WT to support their ability to perform in regular SMC events, like weekly institute-led physical training or fitness tests: “Especially when I see that... for example, as my bench press increases, my number of push-ups for say the [military fitness test] increases.” Several described how WT was also important to support their physical performance and reduce risk of injury in unanticipated situations or future extreme scenarios (e.g., emergency and/or warfare-related): “If you ever need to just pick up your rifle and you need to go, strength training is going to help you with that because you already have the power in your legs to do so.” This highlights the unique value of WT for women in military settings to support occupational readiness, a potentially salient facilitator for WT participation.

Theme 3: “Having to Adapt”

The final theme describes practical barriers to WT, like time and space constraints at the SMC, which also necessitated navigation strategies (as discussed in subtheme 1c) to overcome. Cadet women continually weighed competing priorities and flexibly adjusted to decide if WT would be productive on a given day:

I feel like I only do three things at [the SMC]. It's like sleep, workout and school. And then if I've got a big test, then I don't sleep. And then I don't work out. And then it's like if

I want to work out then I have to take from my sleep time to get all my schoolwork done. It's just like constantly balancing those three things.

If WT was deemed productive, they were also faced with time and space challenges in the gym, which were magnified given its relatively small size coupled with limited blocks of free time in cadet schedules (which resulted in periods of high usage): “If it's 4:00, I'm just not going to go because it's so crowded. And I know that they probably don't have like any equipment.” If undeterred by crowds, cadet women constantly assessed which equipment was available and flexibly adjusted their lift plan accordingly (e.g., changed lifts, order, or waited):

I will just kind of use any machine that's free, or I'll try to adapt it so that I can still try to do what I was trying to do, initially. Or let's say if it was an upper body day, I'm not going to go to a squat rack and do squats, but if there was a squat rack free, then I'll do shoulder press.

However, being able to make those adjustments required a certain level of WT knowledge, which not all cadet women possessed, suggesting that more education or resources may be needed (see Table 4 and 5 in Chapter II): “And also maybe just exposure to new workouts because then you can have more options when you walk into the gym. I don't know very many workouts so then that's why on those crowded days, I'll just walk out.” This final theme highlights opportunities for SMCs to aid cadet women in making these adjustments in the future.

Discussion and Implications

The purpose of this study was to explore women's behaviors and perspectives surrounding WT in a military college setting. Expectedly, most all cadet women participated in calisthenics because sit-ups, push-ups, and pull-ups are featured in the various military and/or institute fitness tests that cadets train towards either independently and/or during twice per week

physical training led by the institution. Calisthenics participation contributed greatly to the high proportion of cadet women meeting the minimum resistance training guidelines (96%). The resulting participation rate was more than twice that reported by undergraduate women in traditional (i.e., non-military) college settings (~40-46%; Hurley et al., 2018; Peters et al., 2019).

However, the primary interest in this investigation was on WT participation, as its loaded nature is key for women to build the strength/power required to adequately perform various military tasks (Harman et al., 1997; Knapik et al., 2012; Kraemer et al., 2001, 2004). While overall rates of WT-specific participation were relatively high in this population (77% on ≥ 2 days/wk and 49% on ≥ 3 days/wk), fewer women participated in WT compared to calisthenics, and participation varied based on group affiliation. Athletes and military-seeking women reported higher participation in WT than their counterparts, likely due to sport requirements and more value placed on strength development to support military preparedness, respectively. However, institute or ROTC-led physical training was not a consistent outlet for WT participation, which suggests: (1) common logistical constraints exist at SMCs that preclude WT during large group and mixed ability physical training, and (2) despite lack of institutional programming, military-seeking women were participating in WT on their own.

When rates of WT participation among the non-athletes in this study were aggregated, participation rates were comparable to rates observed by Meadows et al., (2018) in other groups of military women (i.e., 43% on 1-2 days/wk and 33% ≥ 3 days/wk among cadet women vs. 28% on 1-2 days/wk and ~39% on ≥ 3 days/wk among female service members). However, it is worth noting that the definition of strength training used by Meadows et al., (2018) could be interpreted to include body weight movements (i.e., “using weights or resistance training to increase muscle strength”) which could inflate rates. Nevertheless, participation rates among cadet women in the

present study were higher than reported among women in civilian populations (Hurley et al., 2018; Peters et al., 2019) but relatively comparable to that of other military women.

Beyond behaviors, numerous factors contributed to weight room comfort and WT participation among cadet women. Perceptions among cadet women often overlapped with those reported by other women in non-military settings, while other context-specific factors emerged. Knowledge and perceived competence or lack thereof were primary intrapersonal factors that contributed to cadet women's comfort and WT participation, consistent with previous research in non-military populations (Salvatore & Marecek, 2010; Stankowski et al., 2017; Wilson et al., 2021; Zach & Adiv, 2016). For cadet women, knowledge seemed to specifically include a lifting plan (i.e., knowing what lifts to do and in what order) and practical use of gym equipment, while perceived competence consisted primarily of technique. Both were important to provide the appearance of competence to others while in the gym.

Perceived proficiency (i.e., strength) with WT was a secondary factor that promoted comfort and participation for cadet women. This aspect existed on intrapersonal and interpersonal levels as strength was often self-determined based on the perceptions held by others and direct comparisons. Evaluation concerns consisted of cadet women feeling they would be seen as either unskilled or weak for not being able to lift a certain amount of weight. Similar concerns have been reported by women in weight room settings (Fisher et al., 2018; Harne & Bixby, 2005; Salvatore & Marecek, 2010), often magnified due to male-dominance and/or crowdedness in these spaces (Peters et al., 2019; Wilson et al., 2021). The latter appears to be especially relevant as the SMC population is 87% male and gym spaces were often crowded.

Regarding comparison concerns, several cadet women interviewed described how they strived to lift similar weight as their male counterparts and compared themselves to that standard.

Interestingly, comparison concerns are more often reported by males (in comparison to other males) than females among traditional college students (Salvatore & Marecek, 2010). It is likely that perceived strength compared to others (especially males) held special importance for cadet women given its value for social standing and respect in this context, which aligns with the masculine norms often reinforced in military settings (Do & Samuels, 2021). This value system would seem to exist in part due to the beliefs held by the male majority, into which cadet women felt they must assimilate. What is also distinctive about this factor is that WT proficiency was a concern that carried importance inside and outside of the gym. Because physicality is a defining feature of SMCs, evaluation/comparison concerns were potentially more intensified and omnipresent for cadet women compared to other college-age women. Heightened awareness of physical proficiency (often compared to male peers) and feelings of needing to “work harder” to prove themselves have been documented in several groups of military women (Brownson, 2014; Lewis, 2020; Silva, 2008). WT proficiency appears to be an extension of this relationship.

Interestingly, knowledge was rated highly among most survey respondents. Yet, access to WT plans, educational resources, and structured learning opportunities were frequently requested by cadet women in survey responses and individual interviews, suggesting additional supports are needed. Likewise, very few women reported taking WT courses, and those who did were all upperclassmen due to curriculum scheduling. Thus, courses or other educational resources should likely be made available earlier in a cadetship and in more accessible formats (e.g., outside of the academic schedule). Beyond the opportunity for basic skill and knowledge development for novices, these resources may assist experienced lifters to make the adjustments needed to navigate structural barriers in the weight room (e.g., crowdedness/lack of equipment).

Concerns about WT being incongruent with sex-typing (i.e., perceived archetypes of feminine and masculine activities/physiques) previously documented among other populations of women (Harne & Bixby, 2005; Salvatore & Marecek, 2010; Thomas et al., 2019) were largely absent in this population. The apparent comparatively reduced concerns about negotiating femininity and muscularity by most cadet women in this study is consistent with other populations of military women (Brownson, 2014; Silva, 2008) and female athletes (Roth & Knapp, 2017), and supports a greater emphasis placed on the physical utility of WT. Further, femininity may even be in direct opposition to the masculine value system previously described (Do & Samuels, 2021; Silva, 2008). Cadet uniform requirements possibly minimized feelings of objectification and comparison based on physical appearance (Fisher et al., 2018) among cadet women, though concerns remained among some survey respondents ($n = 5$).

Time constraints were another factor that impacted cadet women, shown previously to impede participation among non-military women (Harne & Bixby, 2005; Hurley et al., 2018). While the time challenges experienced by cadet women seemingly overlap with that of other college-age women, the list of competing priorities may be slightly different (e.g., additional military instruction/duties, required physical training) or more consuming (e.g., higher than typical academic courseloads), and compounded by structural challenges (e.g., size and limited hours of weight room). Interestingly, time constraints were a challenge that persisted throughout a cadetship. This is somewhat in contrast to women in other settings, where time constraints are more often an intrapersonal barrier for those who have not yet adopted WT, which reduces and shifts to other types of barriers over time (i.e., social or psychological; Vasudevan & Ford, 2022). The persistence of time challenges in this environment highlights its organizational level and cadet women's' resilience to access this form of training.

Social support was a source of comfort and encouragement for cadet women and seemed to minimize other WT challenges/sources of discomfort (i.e., perceived incompetence coupled with evaluation concerns). Social support has been similarly shown to be a salient motivator for WT participation among other groups of college-age women (Peters et al., 2019; Wilson et al., 2021), including female athletes (Gilson et al., 2008). Support from friends and teammates of both genders was considered helpful. However, additional benefits of training alongside women were reduced feelings of tokenism and potentially reduced comparison/evaluation concerns.

Other SMC sociocultural elements impacted WT behaviors and perceptions. The SMC class system impacted comfort with WT. Rat women were often more intimidated by the weight room environment because of their lower social rank and heightened evaluation concerns from cadre combined with lack of WT experience. For some, this was enough of a deterrent to delay WT initiation until their sophomore year. Equally, the SMC fitness culture created a motivational atmosphere in the weight room. This encouraged cadet women to participate in WT with greater emphasis on personal progress, regardless of individual ability level or starting point. This mindset seemed to come with greater WT experience and/or ranking and may tie to the greater purpose of SMCs for those seeking military service. Many cadet women were motivated to participate in WT to pass fitness tests, as shown among other groups of military personnel (Sigrist et al., 2005). They also described WT as a means to support their warrior readiness beyond the SMC, an emphasis shared by other military cadets (Do & Samuels, 2021).

In considering these findings, it should be noted that much of this sample was comprised of athletes and women seeking military service, which may not accurately represent the behaviors or experiences of all cadet women. Additionally, WT participation was self-reported which could reduce validity. Nonetheless, several of the findings may be transferrable to other

military colleges or training environments, including other SMCs and the federal service academies, which possess a similar culture, demographic, and perhaps challenges regarding WT (e.g., class system/culture, logistical/time constraints, intensified evaluation/comparison concerns, stereotypically masculine value system). Indeed, many of these context-specific factors may be representative of the larger cadet experience, regardless of gender, so future studies should also consider the perspectives of cadet men.

Conclusions

The integration of survey and interview data in this study helped to capture a more nuanced and contextually relevant understanding of factors influencing cadet women's WT perspectives and behaviors, as well as potential future solutions to existing challenges. A unique institutional culture creates both opportunities and challenges for cadet women to regularly access WT. The SMC system, norms, and mission place tremendous value on physical training of which WT is a part. WT benefits cadet women physically, emotionally, and socially at SMCs and for their various careers and lives beyond their cadetships. Findings suggest there is a need for additional supports to facilitate WT participation among cadet women, including more educational resources and learning opportunities to build WT knowledge, technique, and strength in a supportive environment that normalizes early skill development. Similarly, policy changes that increase the availability of weight room spaces and equipment could maximize accessibility of WT for cadet women (and all cadets) in this unique context. Specific actionable recommendations are detailed in Chapter II.

CHAPTER II: DISSEMINATION

The intended outcome of this investigation was to develop targeted strategies to promote WT participation among cadet women at an SMC. Surveys and interviews were completed by cadet women to capture their current WT behaviors and perspectives, with emphasis on factors that influenced their participation and ideas for future resource, program, or policy developments. I plan to first disseminate findings to relevant stakeholders at the SMC through an interdepartmental physical programs committee. This group includes those who direct or oversee physical training on campus, and thus, has potential to influence the day-to-day training practices of cadets, including that of cadet women. A project summary formatted as a presentation (Appendix E) will feature key findings and offer an initial assessment about how these findings might inform future policy and programmatic changes at the SMC. The intent is that the presentation will initiate a dialogue in which to gather thoughts, ideas, and reactions to the study from individuals not involved in data collection (Smith & McGannon, 2018). This tactic provides an opportunity to hear multiple perspectives, enrich understandings, and uncover insights. The culmination of feedback will be used to develop more formalized recommendations that align practices with the stated needs and preferences of cadet women.

Presentation Script

Slide 1: Introduction

Hi. For those who don't know me, my name is Katie Baur. I work in the Department of Human Performance and Wellness (HPW). Today I will be presenting the results of a recent study which considered the WT practices and perspectives of our cadet women on campus. I became interested in this topic due to my own personal experiences as well as many conversations I've had with cadet women which suggested that they were interested in WT,

understood its value, but sometimes didn't know where or how to start. These anecdotes were coupled with my direct observations as an instructor, in the weight room, and as director of the physical programming for the summer transition program – all of which further implied that women may specifically struggle to “break in” to this form of training. So, let's see what the results of this study may add to this anecdotal evidence.

Slide 2: Introduction, cont'd.

My first goal today is to convey to you why this research matters and specifically why it matters for SMCs. Those in this room who have ever trained or directly overseen physical training for others will likely have experienced or observed the unique physical challenges faced by women in meeting certain military fitness testing standards (DoD, 2020). These performance disparities are rooted in underlying physical differences that exist between the sexes, with women possessing less muscular mass, strength, and power (especially in their upper body) on average compared to men (Courtright et al., 2013). Fortunately, there is a way for women to overcome these challenges – WT. Numerous studies show that women who participate in WT can improve their muscular abilities and better meet testing standards (Knapik et al., 2012). They can also improve their bone health, risk for muscular or skeletal injuries, emotional and social well-being, and quality of life (DHHS, 2018). Therefore, for our commissioning and non-commissioning women alike, WT is key for their health, happiness, and ability to carry out our mission, which values physical challenge and military readiness over the short-term and long-term.

Unfortunately, at SMCs and many other military training applications, WT is not yet consistently a structured part of physical training for all groups due to legitimate logistical constraints, which often require large groups to train at the same time and is not conducive to

weight room settings (Szivak et al., 2015). Skill development for WT is also not yet a required part of our HPW curriculum as it is an upper-level elective course. This often leaves the onus for learning and participating in this form of exercise to the individual cadet. So, what? The potential issue is that many women in other military and non-military populations do not WT, with participation gaps consistently shown between the genders (CDC, 2020; Meadows et al., 2018). In non-military settings, this disparity often due to lack of exposure to WT in youth sport for girls (Shurley et al., 2020), a lack of knowledge and/or skill development (Salvatore & Marecek, 2010; Wilson et al., 2021), and gender stereotypes (Fisher et al., 2018), among others. However, the experiences and perspectives of women in military settings are not well understood, including those of cadet women at SMCs.

Slide 3: Purpose and Research Questions

In response to this gap in the research, I devised my own questions, to include first characterizing cadet women's WT participation. What are our women currently doing in terms of WT? How many are participating, how often, and through which outlets? Secondly, I wanted to know which factors influenced cadet women's *access* to WT. Which things make it harder to participate in WT at SMCs? Which things make it easier? If we know what's working and what's not working, we may better overcome challenges and lean into strengths. Finally, I wanted to know which specific strategies and resources might best support the ability of cadet women to WT in the future and be well-received in this culture. What kinds of programs could be developed that align with needs? What changes could we make to our current HPW curriculum offerings? How could policies or facilities be changed to promote WT participation among cadet women?

Slide 4: Methods

This study had two parts: a survey and interviews. In the survey, cadet women reported their class year, commissioning status, and student-athlete status. They also indicated their weekly WT behaviors (American College Health Association, 2023), including their involvement in WT during physical training (if any) and enrollment in HPW WT courses. Finally, they self-rated their knowledge of WT (Hurley et al., 2018), comfort in the weight room (Salvatore & Marecek, 2010; Wilson et al., 2020), benefits and barriers to WT (Harne & Bixby, 2005; Hurley et al., 2018), and usefulness of strategies and resources to support participation. Several open-ended response questions were also included throughout. Ninety-two women completed the survey, which corresponded to a 45% response rate.

At the end of the survey, women were invited to participate in follow-up interviews about their WT experiences; 11 women were interviewed in this second part of the study.

Slide 5: Findings: WT Participation

Results from the survey regarding weekly WT participation are shown at two thresholds: ≥ 2 days/wk and ≥ 3 days/wk because the first corresponds to general guidelines for health and the second has been shown to meaningfully improve performance in military tasks (ACSM, 2017; Harman et al., 1997; Kraemer et al., 2001). Rates were expectedly higher among athletes, as they lift under the guidance of coaches. When participation rates were calculated among non-athletes only, over half met the minimum guidelines for health and approximately one third participated in WT ≥ 3 days/wk. Rates were also higher among commissioning women than non-commissioning women, despite WT not frequently being included during PTT, which suggests they placed greater value on strength development to support military preparedness and engaged in WT on their own time.

When these rates are compared to other populations, cadet women non-athletes lifted more than women in traditional college settings (i.e., 40-46%; Hurley et al., 2018; Peters et al., 2019) and at rates comparable to female active-duty service members (Meadows et al., 2018). However, this still leaves a small portion of cadet women who were not meeting recommended minimums. Additionally, these participation rates are lower than those reported by male active-duty service members (51.9% on ≥ 3 days/wk; Meadows et al., 2018). While not measured directly in this study, it is also possible and likely that a WT participation gap exists between male and female cadets.

Finally, just 12% of women in the sample (that's 11 total out of 92) had taken a course related to WT skill and knowledge development during their cadetship, and all were upperclassmen due to our curriculum scheduling. Looking at total cadet enrollment during Fall 2023, only five women were enrolled out of 93 cadets across six sections, which equates to only 5.4%. These data make clear that for whatever reason, very few women are using our WT educational resources as they are currently offered.

Slide 6: Findings: What Discourages Women to WT

Numerous factors emerged from survey responses and individual interviews that impacted the WT experiences of cadet women. In my presentation today, I will detail those findings that are the most context-specific and thus, have the greatest potential to be addressed or harnessed through the work of this committee.

Primary challenges for cadet women to WT included the competing priorities in their packed daily and weekly cadet schedules. They constantly weighed their academic loads, other cadet responsibilities, and sleep against WT or other exercise to decide if participation would be productive for them on a given day. Some felt that gym hours were limited, which reduced the

chances they could keep WT in the balance. A second practical challenge cited by many was the small gym space, which was often crowded during common times in their schedules when they were most free to exercise (4:00-6:00 pm and after supper roll call). Even if they made the time to lift, if they accessed the gym during these popular time blocks, equipment was often not guaranteed. This resulted in feelings of frustration, discouragement, and sometimes discomfort due to the number of onlookers, especially when they were new to WT.

Another challenge was a lack of knowledge, skill, or experience, which fed into fear of judgement from others as well as possible social repercussions given the small size of the school and the emphasis on physical ability as an important part of a cadetship. Women who were novice lifters feared they would look “dumb” (because they didn’t know what they were doing in the weight room) or “weak” (because they couldn’t lift very much or as much as male cadets). Fears were magnified for women as Rats because of the emphasis on evaluation in the Ratline. While some were bold enough to overcome their fears, many avoided the gym entirely until after breakout.

Slide 7: Findings: What Encourages Women to WT

There were also several factors that facilitated WT participation among cadet women. Women valued WT for its stress reduction and sense of accomplishment, its role in supporting their ability to perform in fitness tests and other military tasks like rucks, and that it helped to build their reputation among their peers, especially male cadets. The SMC culture was especially motivating for women. Knowledge, skills, and experience were an important difference-maker in terms of weight room comfort and WT participation. Women spent time researching and building their skills mostly on their own or with the help of others so they would appear

competent. They specifically valued having a workout plan, correct form, and being able to lift a certain minimum amount of weight that they determined to be acceptable.

Many cadet women were also encouraged to WT through social support. Several mentioned the Rat-upperclassmen mentor relationship, and friends/teammates (male and female) as being motivating and providing emotional and practical support (like instruction or spotting). Some specifically sought to lift with other women so they didn't stick out as being the only female cadet in the gym.

Slide 8: Findings: What Women Request for the Future

Cadet women also indicated several resources and strategies that would be “very” or “totally” useful for their future WT participation at the SMC (Table 4).

Table 4. Rated Strategies and Resources to Support WT Participation

	Rated “very” (4) or “totally” (5) useful (<i>n</i> = 91)	
	<i>n</i>	%
Longer gym hours	70	76.9
Larger gym space	68	74.7
More equipment	68	74.7
Access to WT plans	67	73.6
PTT ^a devoted to WT	64	70.3
More separate gym spaces	61	67.0
More female weight room staff	60	65.9
Support from weight room staff	59	64.8
WT workshops	59	64.8
Access to WT apps	59	64.8
More female role models*	58	64.4
Women’s WT club*	56	62.2
Women-only WT course	53	58.2
Women-only weight room	51	56.0
Changing SMC gym culture	44	48.4

Note. Descriptives are presented as frequencies (*n*) and percentages (%). Response rates for this item were lower (*n* = 91; see additional note below) than the overall number of survey respondents (*n* = 92).

^a“PTT” refers to physical training time, a twice-weekly mandatory training period for freshman and sophomore cadets and those seeking commission.

*Number of respondents is different (*n* = 90) for these items.

The top three factors were all related to our current facility structures and policies, including space, equipment, and availability. This is interesting because these requested resources are seemingly less gender-specific, and may likely be valuable for all cadets, including cadet men.

Women also requested more gender-specific supports (i.e., “how can the SMC best support your/cadet women’s WT participation?”), with some opting for future women-only times or additional structured learning opportunities and resources (Table 5). Several were conflicted as to whether these should be limited to women or not because they didn’t want to reinforce existing gender stereotypes on campus, while others felt they would be more comfortable to start as true beginners if only surrounded by women. Coupled with low enrollment in current HPW course offerings, these requests tell us we can also be doing more on a curricular or co-curricular level to provide more educational resources for cadet women.

Table 5. Participant Recommended Strategies and Resources to Support WT Participation

	“Support you”	“Support cadet women”	Total
More gym space	17	10	27
Women-only gym space/time	10	15	25
Structured learning opportunities	9	15	24
Educational resources	11	9	20
Female leadership	8	8	16
Support and encouragement	3	9	12
Longer gym hours	4	4	8
More equipment/accessibility	8		8
Inclusive environment	1	6	7
Different uniform	3		3

Note. Some participants gave multiple responses, while others gave no response for this question. Thus, total frequencies may not match the total sample *n*.

Slide 9: Actionable Recommendations

So, what can we make of these findings? In general, many cadet women do already participate in WT. That said, there is certainly room for improvement, particularly if part of the SMC mission is centered on physical fitness for all cadets, not just athletes or commission-seeking individuals. Our current physical training does not (and possibly cannot reasonably)

oversee WT for the large groups who train at once. This is a pervasive challenge that we will continue to try to overcome. But for the time being, if the onus to participate remains on the individual, there are certainly more resources that can be provided— and be provided earlier in a cadetship— as directly requested by the female cadets who participated in this research.

Specifically, I propose the following (provide hardcopy handout):

1. Offer workshops through HPW, possibly in collaboration with the institute wellness coordinator, that provide structured learning opportunities for women to build their WT knowledge, technique, and strength in a supported environment. Workshops should be scheduled to facilitate participation as early as possible by being offered during the summer transition program and each fall semester. Workshops should include both women-only and general beginner's sessions (open to all genders/class years) to maximize comfort and options for women with equitable opportunities for all.
2. Offer a women-only section of HPW weight training course, as we currently do for boxing and combatives. A women-only section could be tailored to female-specific injury prevention, physiological challenges, goals/interests, and individual program development, as well as possibly promote comfort and encourage women to work at their own ability levels. Students would develop individual goals, complete homework assignments (so they must access the weight room on their own outside of class) and finish the course with a self-created program in-hand.
3. Provide WT resources online and in the weight room through HPW, possibly in collaboration with the institute wellness coordinator, to include: (a) general plan frameworks for common training goals (e.g., muscular size, injury prevention,

- rucking ability, fitness tests, etc.), (b) QR codes to images and/or videos to demonstrate form for major lifts, and (c) “replacement” exercises that can be substituted based on equipment availability.
4. Recommend to SMC policy makers the following institutional changes: (a) open NCAA weight room facilities to non-athletes during select time periods (e.g., daytime hours and after team practices), (b) extend gym hours (e.g., later during weeknights and earlier during weekends), and (c) add more frequently used and therefore, rate-limiting, equipment (e.g., lower weight dumbbells and cable machines). This final recommendation is critical and could begin on a probationary basis. Given the size of the Corps and majority of the student body not involved in NCAA athletics (men and women), it may be argued that more space and resources should be allocated to this majority. Fortunately, we already largely have the spaces and equipment – it is simply a question of personnel and other facility resources.

Slide 10: Thank You and Continued Discussion

Thank you for your time and attention today. I now welcome your thoughts, ideas, and reactions to these findings and initial recommendations.

CHAPTER III: ACTION PLAN

Several actionable recommendations were proposed in the initial dissemination of study findings detailed in the previous chapter. These are also outlined briefly below. The first three recommendations will be put into action at the curricular and co-curricular levels at the SMC, including offering workshops that provide structured learning opportunities for women to build WT knowledge, technique, and strength in a supported environment (recommendation #1), a women-only weight training course (#2), and providing additional WT educational resources (#3). The final recommendation exists on the policy/structural level to increase accessibility to weight room spaces and equipment (#4).

Long-term Action Steps

Future research should consider the effectiveness of proposed recommendations and changes. Specifically, in collaboration with other HPW faculty, the institute wellness coordinator, and with support from the physical programs committee, I hope to capitalize on the SMC's summer transition program to deliver structured WT workshops (recommendation #1) for incoming matriculants, with pre- and post-measures of weight room comfort and WT knowledge and confidence. Longer-term WT participation (i.e., over the following 6 mos.) may also be assessed and reported to indicate the effectiveness of workshops to long-term adherence. Participants will also be asked to provide feedback to improve programming, which will be reviewed by collaborators and incorporated for future refinements. In the following semesters, I intend for a larger and more comprehensive program to be developed and implemented. For example, a 15-week WT program (i.e., five 3-week mesocycles) could be provided, with guided instruction for included lifts available during a scheduled weeknight evening workshop (7:30-8:30 pm) at the start of each phase. Similar measures for WT behaviors and perceptions (i.e., pre-

, post-, and 6-mos post) could be collected to assess effectiveness as well as feedback for future improvements to content and/or delivery methods.

I also plan to audit the current mixed-gender sections of our HPW WT course offering, with plans to complete the Certified Strength and Conditioning Specialist (CSCS) certification through the National Strength and Conditioning Association. As an instructor in HPW and director of physical training for the summer transition program, this skillset would fall within my professional scope and complement my current responsibilities/role at the SMC. Specifically, this certification would provide me with the skill and confidence to teach a women-only section of the WT course in the future with refinements made to the curriculum as previously suggested (recommendation #2). Evaluating the effectiveness of this curriculum through surveys and/or interviews could lead me to pursue additional research efforts in this area.

Other ideas include tracking usage of created digital resources or linking them to a short survey to gather information about usefulness or future desired content (recommendation #3). Likewise, should policies change concerning weight room facilities on campus (recommendation #4), usage statistics across male and female cadets could be collected over time to comment on participation rates or identify other relevant issues. Additional studies should also consider the habits and experiences of cadet men, as anecdotally, it seems that many also experience the initial intimidation of the weight room and lack the skills/knowledge required of WT. Similarly, long-term research may investigate how this culmination of efforts may shape alumni's engagement with WT or other health-promoting physical activity behaviors.

Finally, it is also worth exploring other creative solutions to bring the WT stimulus beyond the weight room setting, maximizing training adaptation during the large-group physical training used in military settings. For example, several internal and alumni-based funding

opportunities exist that may be able to generate sufficient funding to provide certain WT implements as standard issue for all cadets – these items could then be used during field-based training. Similarly, funding could also be used to enhance current facilities. All relevant opportunities will be considered to support this effort.

Short-term Dissemination

Beyond the initial dissemination of findings to institute stakeholders, the results from the present investigation will also be made available to others in the institute community to increase awareness and buy-in for recommended changes among cadets, faculty, staff, administrators, alumni, and parents. I plan to submit short topic proposals to regular calls for academic presentations on Post, including the Brown Bag Seminar series and opportunities through the Building BRIDGES club. I also plan to disseminate findings through other channels, such as the institute's quarterly publication.

Given the uniqueness of this population and context, there may also be value in sharing this work directly with Kinesiology professionals working at similar institutions, such as other SMCs and the federal service academies. I possess two professional connections that may be helpful in this endeavor.

Long-term Dissemination

Over the long-term, current study findings will also be disseminated to the larger Kinesiology community. While the present investigation considered a specific context within a small undergraduate population, the present findings very likely have transferability to other populations of military women. These spaces share similar cultural elements, including masculine norms/values and a male majority, a hierarchical ranking system, high value placed on physical fitness and occupational readiness, as well as pervasive logistical challenges

surrounding physical training, including WT. Thus, the present findings have important implications for professional practice for all individuals or organizations that direct/oversee training in military settings.

It is my goal that the findings from this study be shared with other scientists and professionals, first through a regional conference presentation at the 2025 Annual Meeting of the Southeast Chapter of the American College of Sport Medicine. This conference draws members of the broader Kinesiology community across several subdisciplines. In the last several years, programs have included abstracts across a range of topic areas that overlap with the present investigation, like strength and conditioning, training military populations (including cadet undergraduates), and gender issues. Mixed and qualitative research methods are also gaining traction at this conference. Ultimately, I hope to publish these findings in a peer-reviewed journal in the field. The following journals contain articles in similar topic areas and will be considered: *Military Medicine*, *Women in Sport and Physical Activity Journal*, and the *International Journal of Kinesiology in Higher Education*.

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APPENDIX A: SURVEY

Thank you for your interest in this study about the weight training experiences of cadet women. Weight training is any type of exercise that causes your muscles to contract against an external resistance *beyond your own body weight* (i.e., using additional weights via machines, free weights, or other weight-loaded equipment) and results in the strengthening or toning of your muscles. Even if you do not weight train, we are still very interested to collect your response.

The survey will ask you some basic information about yourself, including your demographics and weight training background, habits, and perspectives. It will take about 15 minutes to complete.

Informed Consent

To be eligible for participation, you must be a cadet woman currently enrolled at [REDACTED] and 18 years or older.

Are you a cadet woman?

- a. Yes
- b. No [selecting this response will branch to end of survey]

Are you 18 years or older?

- a. Yes
- c. No [selecting this response will branch to end of survey]

Participation is voluntary and you may stop at any time by exiting the browser window. Please review the consent form below.

[IRB consent information sheet included here]

By clicking "Yes, I consent," you are agreeing to participate.

- a. Yes, I consent
- b. No, I do not consent [selecting this response will branch to end of survey]

Background Information

In this section, we'd like to gather some general information regarding your demographics, future military service plans, and general experiences on Post.


1. What is your age in years? (Will display as drop-down in Qualtrics)
 - a. 18
 - b. 19
 - c. 20
 - d. 21
 - e. 22
 - f. 23
 - g. 24
 - h. 25
 - i. 26
 - j. 27+

2. What is your class year?
 - a. First classman
 - b. Second classman
 - c. Third classman
 - d. Rat

3. Which of the following best describes your racial or ethnic background? Select all that apply.
 - a. Hispanic or Latino
 - b. American Indian or Alaska Native
 - c. Asian
 - d. Black or African American
 - e. Native Hawaiian or Other Pacific Islander
 - f. White
 - g. Other, please specify: _____ (write-in)
 - h. Prefer not to say or identify.

4. Are you currently planning to serve in the military (i.e., commission, enlist, or serve in National Guard/Reserves) after graduation?
 - a. Yes
 - b. No
 - c. Unsure

5. Which military branch do you plan to serve with? (Will auto-generate in Qualtrics based on “yes” response to Q5)
 - a. Air Force
 - b. Army
 - c. Coast Guard
 - d. Navy
 - e. Marine Corps
 - f. Space Force

6. Please select all the groups/teams that you currently or have previously participated in at .
 - a. NCAA sport
 - b. Club sport/team (includes Ranger Challenge)

7. Which NCAA team(s) did/do you participate in? Select all that apply. (Will auto-generate in Qualtrics based on “NCAA sport” response for Q7 and display as dropdown)
 - a. Cross country
 - b. Rifle
 - c. Soccer
 - d. Swimming & Diving
 - e. Track & Field
 - f. Water polo

8. Which club sport(s) or team(s) did/do you participate in? Select all that apply. (Will auto-generate in Qualtrics based on “Club sport/team” response for Q7 and display as dropdown)
- Boxing
 - Jiu-Jitsu
 - Marathon (Running Club)
 - Pistol
 - Powerlifting
 - Ranger Challenge
 - Rock Climbing
 - Rugby
 - Soccer
 - Triathlon
 - Other, please specify: _____ (write-in)
9. Please select all the following Department of Human Performance and Wellness (i.e., PE) course(s) that you have previously or are currently taking at _____.
- HPW 411: Fundamentals of Resistance Training/Conditioning (0.5 credit; first- or second-class year elective course)
 - HPW 412: Weight Training (0.5 credits; first- or second-class year elective course)
 - HPW 432: Concepts of Strength and Conditioning (3 credits; Exercise Science minor elective course)

Exercise History

In this section, we'd like to ask you a few questions about your exercise habits.

Physical activity intensity level can be characterized in terms of breathing difficulty. A person doing **moderate physical activity** will experience an increase in breathing but should be able to carry on a conversation comfortably during the activity. A person doing **vigorous physical activity** typically cannot say more than a few words without pausing for a breath while doing the activity.

10. In the **last 7 days**, how many (**total**) **minutes** did you spend doing **moderate physical activity**? Examples: brisk walking, very easy jogging, or military drills
- _____ minutes **per week** (write-in)
11. In the **last 7 days**, how many (**total**) **minutes** did you spend doing **vigorous physical activity**? Examples: running, swimming laps, or rucking
- _____ minutes **per week** (write-in)

Weight training uses weighted implements *beyond your body weight* to strengthen or tone your muscles. **Calisthenics**, a similar form of resistance exercise, includes performing repetitions of *body weight* movements to strengthen or tone your muscles.

12. In the **last 7 days**, how many **days** did you engage in the following? (Will display as matrix table in Qualtrics)

	0 days	1 day	2 days	3 days	4 days	5 days	6 days	7 days
Weight training (e.g., using machines, barbells, dumbbells, or resistance bands, weighted calisthenics etc.)								
Calisthenics (e.g., unweighted sit-ups, push-ups, pull-ups, etc.)								

13. In the **last 7 days**, how many minutes did you typically spend **each day** doing **weight training**? Examples: using machines, barbells, dumbbells, or resistance bands, weighted calisthenics

a. _____ minutes **per day** (write-in)

14. In the **last 7 days**, how many minutes did you typically spend **each day** doing calisthenics? Examples: unweighted sit-ups, push-ups, pull-ups

a. _____ minutes **per day** (write-in)

15. How often do you **typically** perform each of the following during mandatory physical training led by ROTC? (Will display as matrix table in Qualtrics)

	I do not participate in physical training led by ROTC	Almost never	Rarely	Sometimes	Usually	Almost every time
Weight training (e.g., using machines, barbells, dumbbells, or resistance bands, weighted calisthenics etc.)						
Calisthenics (e.g., unweighted sit-ups, push-ups, pull-ups, etc.)						

Weight Training Behaviors

The remainder of this survey refers to **weight training** and/or **weight room facilities**. Remember, weight training uses additional weighted implements *beyond your body weight* to strengthen or tone your muscles. Please complete this section even if you do not currently weight train.

16. Please choose the statement that is most like you.

- I do not see a need to weight train
- I would like to begin weight training
- I have plans to weight train in the future
- I recently began weight training
- I have been weight training for six months or more

17. How knowledgeable are you about weight training? (Options: 1 = not knowledgeable at all, 2 = slightly knowledgeable, 3 = moderately knowledgeable, 4 = quite knowledgeable, 5 = extremely knowledgeable)
18. To what extent does each of the following describe your weight training focus, if any? (Options: 1 = not at all, 2 = slightly, 3 = moderately, 4 = very much, 5 = totally)
- Aesthetics or bodybuilding (i.e., increasing muscle size or appearance)
 - CrossFit (i.e., high-intensity workout of the day)
 - General fitness (i.e., improving health or fitness)
 - Olympic lifting (i.e., developing explosiveness with snatch, clean and jerk)
 - Powerlifting (i.e., developing strength with squat, bench, deadlift)
 - Sport-specific development (i.e., to support sport performance)
 - Military-specific development (i.e., to support military preparedness)
19. How often do you participate in each of the following forms of weight training? (Options: never, 1-2 times per month, 1-2 times per week, 3-4 times per week, 5-6 times per week, every day; images embedded in Qualtrics to show example of each)
- Weight machines (i.e., adjusting a pin or adding a weighted plate to increase resistance)
 - Barbells (i.e., adding a weighted plate to a squat or bench bar)
 - Dumbbells (i.e., hand weights)
 - Kettlebells, tires, and/or medicine balls (i.e., non-traditional equipment)
 - Resistance bands (i.e., stretch bands)
20. How confident are you in your ability to use each of the following? (Options: 1 = not confident at all, 2 = slightly confident, 3 = moderately confident, 4 = very confident, 5 = totally confident; images embedded in Qualtrics to show example of each)
- Weight machines (i.e., adjusting a pin or adding a weighted plate to increase resistance)
 - Barbells (i.e., adding a weighted plate to a squat or bench bar)
 - Dumbbells (i.e., hand weights)
 - Kettlebells, tires, and/or medicine balls (i.e., non-traditional equipment)
 - Resistance bands (i.e., stretch bands)
21. Excluding work, classes, or internships, please indicate how often you use the following weight room facilities on Post. (Options: never, 1-2 times per month, 1-2 times per week, 3-4 times per week, 5-6 times per week, every day)
- Main weight room in [REDACTED]
 - Faculty weight room in [REDACTED] (upstairs – off the track)
[REDACTED]
 - [REDACTED]
 - [REDACTED]
 - Powerlifting gym

22. How comfortable are you in the weight room? (Options: 1 = not comfortable at all, 2 = slightly comfortable, 3 = moderately comfortable, 4 = very comfortable, 5 = totally comfortable).
23. Please rate your comfort level in each of the following areas contained within the weight room. (Options: 1 = not comfortable at all, 2 = slightly comfortable, 3 = moderately comfortable, 4 = very comfortable, 5 = totally comfortable).
- Rack area (i.e., squat/bench)
 - Dumbbell area
 - Machine area
 - Stretching/ab area
24. How has your weight training participation changed since enrolling in college?
- Much less now than before college
 - Less now than before college
 - About the same
 - More now than before college
 - Much more now than before college
25. **Before college**, did you participate in a sport that required weight training as part of practice or off-season/pre-season training?
- Yes
 - No

Benefits of Weight Training

Several statements that may describe reasons why people **DO** participate in weight training are given below. Read each statement and select the appropriate rating, with “1” representing a not important reason and “5” representing an extremely important reason as to **why you would** participate in weight training. There are no right or wrong answers. Do not spend too much time on any one statement. (Options: 1 = not important at all, 2 = slightly important, 3 = moderately important, 4 = very important, 5 = totally important)

Weight training...

- Provides a way to meet people (+SOC1)
- Improves physical appearance (BOD1)
- Improves health (HEA1)
- Helps increase my self-confidence (PSY1)
- Helps me stay in shape (BOD2)
- Improves strength (HEA2)
- Helps me to cope better with everyday demands (PSY2)
- Is a good activity to do with friends (+SOC2)
- Is stress-relieving (PSY3)
- Increases my metabolism (HEA3)
- Makes me feel more energetic (PSY4)
- Improves flexibility (HEA4)
- Improves self-image (BOD3)
- Helps me lose weight (BOD4)

15. Is competitive (+SOC3)
16. Helps me look good (BOD5)
17. Helps me feel better in general (PSY5)
18. Lifts my spirits (PSY6)
19. Helps maintain proper weight (BOD6)
20. Improves my attitude towards life (PSY7)
21. Improves cardiovascular fitness (HEA5)
22. Participating in weight training builds companionship (+SOC4)
23. Participating in weight training gives me time to think (PSY8)
24. Participating in weight training gives me peace of mind (PSY9)

25. Improves military preparedness (+SMC1)
26. Helps me pass my required fitness test (+SMC2)
27. Helps build my reputation at [REDACTED] (+SMC3)
28. Is a productive activity at [REDACTED] (+SMC4)
29. It is important to be seen weight training at [REDACTED] (+SMC5)

Open-ended responses

30. What, if anything, would increase **your** likelihood to weight train at [REDACTED]?
31. What, if anything, contributes to **your** comfort in the weight room at [REDACTED]?
32. What, if anything, makes it easier for **cadet women** to participate in weight training at [REDACTED]?

Barriers to Weight Training

Several statements that may describe reasons why people **DO NOT** participate in weight training are given below. Read each statement and select the appropriate rating, with “1” representing a not important reason and “5” representing an extremely important reason as to **why you would not** participate in weight training. There are no right or wrong answers. Do not spend too much time on any one statement. (Options: 1 = not important at all, 2 = somewhat important, 3 = moderately important, 4 = very important, 5 = extremely important)

Weight training...

1. Makes me look silly (PHY1)
2. Takes too much discipline (TEF1)
3. Interferes with my social life (SPE1)
4. Makes me hot and sweaty (PHY2)
5. Makes muscles look large and bulky (PHY3)
6. Is an activity for men only (-SOC1)
7. Is too inconvenient (TEF2)
8. Causes sore muscles (PHY4)
9. Is uncomfortable (PHY5)
10. Is too boring (TEF3)
11. Interferes with my academics (SPE2)
12. Interferes with my non-academic activities (e.g., clubs, club sports, work) (SPE3)
13. Makes me too fatigued (PHY6)
14. The weight room environment is intimidating (-SOC2)
15. My family discourages me to weight train (-SOC3)

16. I do not know how to use weight training equipment (TEF4)
17. I have too much work to do (TEF5)
18. I do not like to weight train alone (-SOC4)
19. There are no convenient places to weight train (SPE4)
20. I am too lazy to weight train (TEF6)
21. I am too uncoordinated to weight train (PHY7)
22. I am too tired to weight train (TEF7)
23. Bad weather keeps me from weight training (SPE5)
24. I am too weak to weight train (PHY8)
25. Family obligations keep me from weight training (SPE6)
26. I am too busy to weight train (TEF8)
27. My friends do not weight train (-SOC5)
28. I have medical problems that prevent me from weight training (SPE7)
29. I do not have enough time to weight train (TEF9)
30. Having men in the weight room is intimidating (-SOC6)
31. It is too difficult to learn how to weight train (TEF10)

32. The weight room is too crowded (-SMC1)
33. I can't lift as much weight as others (-SMC2)
34. Upperclassmen in the weight room are intimidating (-SMC3)
35. I feel rushed in the weight room (-SMC4)
36. I feel self-conscious while weight training (-SMC5)

Open-ended responses

37. What, if anything, would decrease **your** likelihood to weight train at [redacted]?
38. What, if anything, contributes to **your** discomfort in the weight room at [redacted]?
39. What, if anything, makes it harder for **cadet women** to participate in weight training at [redacted]?

Strategies to Improve Weight Training on Post

The final section of this survey considers how your weight training experiences could be improved at [redacted].

1. Please rate the extent that the following resources or institutional changes would be useful to cadet women to support their weight training participation (Options: 1 = not at all useful, 2 = slightly useful, 3 = moderately useful, 4= very useful, 5 = totally useful)
 - a. Larger gym space
 - b. Longer gym hours
 - c. More separate gym spaces
 - d. Changing SMC gym culture
 - e. More equipment
 - f. Access to weight training plans
 - g. Access to weight training apps
 - h. PTT devoted to weight training
 - i. Support from weight room supervisors/assistants
 - j. More female weight room supervisors/assistants
 - k. Opportunity to lift in a women-only weight room

- l. More academic course offerings in weight training
- m. More female role models
- n. Weight training workshops
- o. Women's weight training club

Open-ended responses

2. How can [REDACTED] best support **your** weight training participation?
3. How can [REDACTED] best support **cadet women's** weight training participation?

Exit Screen

Thank you for completing this survey. Your responses have been recorded. You may now exit the browser window.

Request for Follow-up Interview

A second phase of this study is planned to examine cadet women's perspectives of weight training and the weight room environment on Post in greater depth. If you are interested in being interviewed this semester, please follow this link so we may collect your contact information. Your contact information will be collected separately from your survey data (i.e., your responses to the survey you just completed will remain anonymous). Participants who complete the interview phase of the study (~1 hour) can receive a \$25.00 Amazon gift card at that time to compensate for their time.

APPENDIX B: INTERVIEW GUIDE

Introduction

Hi, I'm Katie Baur and I am an instructor in the Department of Human Performance and Wellness. I am also currently a graduate student at UNC Greensboro completing my dissertation project. It's nice to [meet you/see you again]. It's so great that you agreed to meet with me. Before we get started, I wanted to briefly remind you of the purpose of this interview: to investigate cadet women's perspectives surrounding weight training and the weight room environment on Post more generally.

By learning more about *your* prior weight training/weight room experiences within the unique context of this SMC, we may potentially improve future physical programming, education, policies, or spaces on Post. I am interested in your experiences even if you don't regularly weight train. Anything you say today will be kept strictly confidential. I will transcribe the interview and, in the process, remove all identifying information such as your name or other distinctive characteristics. So, please feel free to share your experiences candidly and honestly. The interview should not take longer than 60 minutes.

I also want you to know that your participation is entirely optional. You do not have to participate and there is no penalty for not participating. Even if we get started, but then change your mind, you are free to stop at any time. During the interview you may see me taking notes – this is simply to keep me on track and ensure I don't repeat any questions I'd like to ask you. I am also recording this conversation. If you say something during the interview and decide later that you do not want us to use it, I can remove it from the transcript.

Does everything sound okay with you? (Wait for response.) Okay, then let's get started.

Icebreaker

1. Please describe your (first) experience(s) in the weight room at [REDACTED].
 - a. Describe the scene or a specific situation that sticks out for you.
 - b. How did you get involved?
 - c. Who did you do it with (if anyone)?
 - d. Which areas did you access? Why?
 - e. Which body areas did you emphasize while lifting? Why?

Experiences and Perspectives

I would like to know more about your weight training and weight room experiences at [REDACTED] and *how* those experiences impact your ability to participate.

2. Describe your current weight training practices.
3. How have your weight training experiences changed (if at all) over your cadetship?
 - a. What were the reasons behind the change?
4. Describe the role that weight training has played in your life, if any.
 - a. What role does it play in your health or fitness?
 - b. ... your confidence?
 - c. ... your physical appearance?
 - d. ... your military preparedness?

5. What influences your ability to weight train at [REDACTED]?
 - a. Considering your personal characteristics (i.e., personality or experiences)?
 - b. ... other people?
 - c. ... [REDACTED]'s unique culture?
 - d. ... [REDACTED]'s unique organizational structure (i.e., hierarchy, schedules, mandatory training)?
 - e. ... the actual physical structure of the gym (i.e., layout, size, availability of certain equipment or resources)?

Institute Resources

I would like to know more about how SMC programs or resources support your ability to weight train.

6. How does [REDACTED] support your ability to weight train?
 - a. Through the current physical training program?
 - b. ... other institute-led programs or activities?
 - c. ... courses in Human Performance and Wellness?
 - d. ... the institute organizational structure?
7. How could [REDACTED] better support your ability to weight train?
 - a. Which particular people?
 - b. Additional programs or courses in Human Performance and Wellness?
 - c. ... the institute organizational structure (i.e., hierarchy, schedules, mandatory training)?
 - d. ... the actual physical structure of the gym (i.e., layout, size, availability of certain equipment or resources)

Wrap-up

8. If someone asked *you* to design the perfect weight room or weight training set-up for cadet women, what would that look like? Anything goes.
9. Who else do you think I should speak with to better understand this topic?

Exit

This has been great, and you've given me a lot to think about. Do you have any questions for me about this study? (Wait for response.) Would it be okay for me to contact you again as I compile my notes if any other questions arise? (Wait for response.) Remember, your experience will remain confidential. I can't thank you enough for sharing your insights with me.

APPENDIX C: POSITIONALITY

An essential component of trustworthiness is examining how the researcher's position relative to the topic area, participants, and context influences inquiry design and analysis (Holmes, 2020; Sikes, 2004). I approach this study first as a woman who has experienced many documented barriers to WT. An initial examination of this bias highlighted a need to expand the scope of the investigation to include *all* factors that influence WT participation (i.e., barriers *and* facilitators) to capture a more holistic picture of the phenomenon. Moving forward, these personal understandings could also lead to preconceived notions about the experiences of female cadets (e.g., privileging similar perspectives during analysis to confirm my bias). I must be mindful to prioritize what emerges from the data (i.e., what the data is telling me) over personal experiences.

As a woman viewing this research through a feminist-informed lens, it is my hope that findings may legitimize female experiences and reduce power imbalances created by dominant social groups (Arinder, 2020). However, I must be careful not to discount the experiences of cadet men, who may also face unique challenges to WT participation and are important allies to creating future changes in this sphere.

I am also a Kinesiologist who embraces the great importance of WT participation for all, but especially women. Given the high and positive value I place on WT, it is possible my beliefs could be dominating during interview or subsequent analysis. I must be careful to remain neutral during interactions with participants and document my bias throughout analysis (Patton, 2015).

I also approach this study as an instructor at the SMC, teaching a large portion of the Corps each semester (~175 cadets). I am familiar with many cadets, which has allowed me to glean valuable insights into the unique challenges encountered while training in military

environments. Further, as one of few young female faculty members on campus, I believe I have a heightened approachability, especially among cadet women (i.e., my gender/age may evoke a “quasi-insider” status to this group; Chhabra, 2020; Shurley et al., 2020). This familiarity and approachability may present both advantages (e.g., enhanced participant trust/comfort) and challenges (e.g., efforts to “please me” with their responses). Over the long-term, as my position exists in close proximity to my participant pool, I will need to navigate ethical ramifications of this research (Patton, 2015). While the nature of this investigation is not extremely sensitive, it still requires participants (from a somewhat marginalized group on campus) to speak their truth and may contain personal elements. As I encounter interview participants in the remainder of their cadetship, I must honor their confidentiality as well as minimize discomfort. I plan to accomplish both via a thorough informed consent process, a clearly stated timeline for results reporting, and a formal opportunity for study closure through member debrief.

While I am employed by a military institution, I am a civilian with no prior military service. I completed my undergraduate at a large public institution as a traditional student. Thus, I consider myself an outsider to military and SMC culture (Chhabra, 2020; Fay, 1996; Holmes, 2020). This position may be advantageous, as it may better allow participants to assume the role of expert and combat the innate power imbalance created by my instructor position (Emerson et al., 2011; Patton, 2015). It may also present challenges – I will need to consider the limits of my knowledge in this sphere and lean on insiders as necessary to fill gaps and better represent the holistic experiences of my participants.

APPENDIX D: SUPPLEMENTAL DATA AND ANALYSES

Table D6. Participant Characteristics

	Population ($N = 204$) ^a		Survey ($n = 92$)		Interviews ($n = 11$)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Race/Ethnicity						
Hispanic or Latino	29	14.2	8	8.7	2	18.2
American Indian or Alaska Native						
Asian	8	3.9	3	3.3	1	9.1
Black or African American	14	6.7	1	1.1		
Native Hawaiian or Other Pacific Islander	3	1.5	1	1.1	1	9.1
White	140	68.6	67	72.8	6	54.5
Two or more races	9	4.4	11	12.0	1	9.1
Prefer not to say or identify	1	0.5	1	1.1		
Class year						
Freshmen (Rat)	65	31.9	29	31.5	2	18.2
Sophomore (Third classmen)	45	22.1	17	18.5	2	18.2
Junior (Second classmen)	47	23.0	22	23.9	4	36.4
Senior (First classmen)	47	23.0	24	26.1	3	27.3
Intended military service and branch^b						
Yes	161	78.9	68	73.9	10	90.9
Air Force	31	19.2	7	10.3	2	20.0
Army	80	49.7	36	52.9	4	40.0
Coast Guard	9	5.6	5	7.4		
Marine Corps	16	9.9	6	8.8	2	20.0
Navy	25	15.5	14	20.6	2	20.0
No	43	21.1	24	26.1	1	9.1
Athlete						
Yes	98	48.0	62	67.4	4	36.4
No	106	52.0	30	32.6	7	63.6

Note. Descriptives are presented as frequencies (*n*) and percentages (%).

^aPopulation data provided by the SMC's Office of Assessment and Institutional Research and reflect trends for cadet women enrolled in Fall 2023.

^bBranch-specific service data presented as valid percent.

Table D7. Weekly Resistance Training Habits Differentiated into Calisthenics and WT

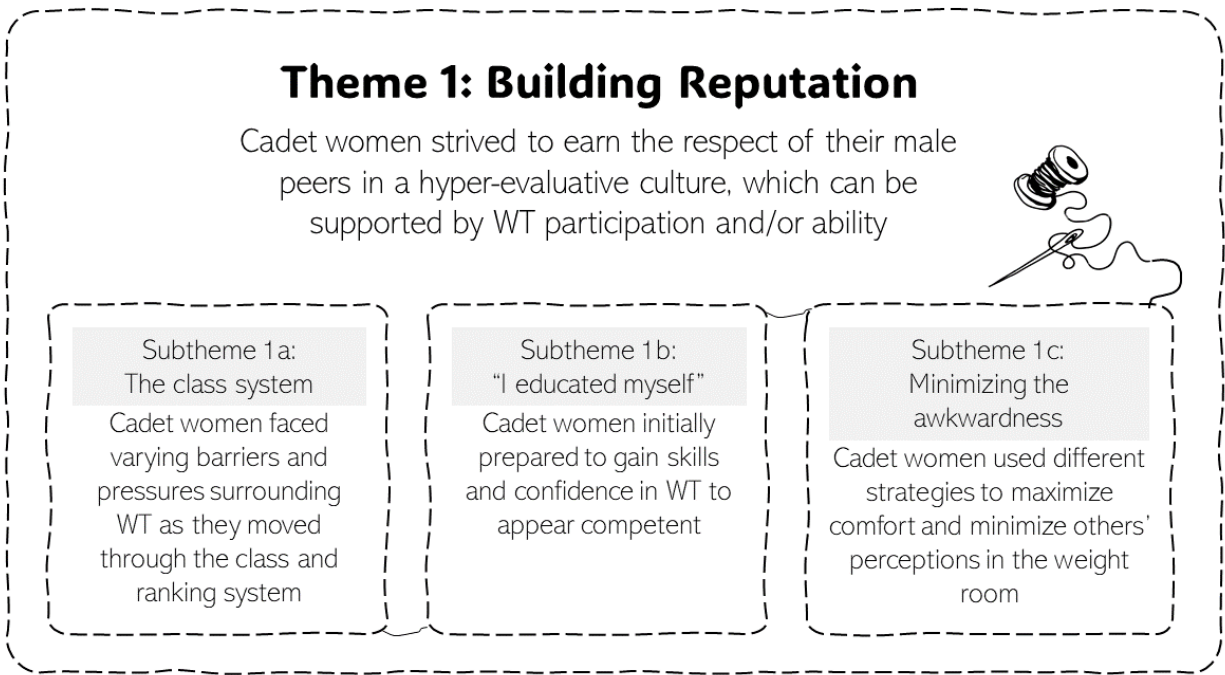
	Overall (<i>n</i> = 92)		Non-athletes (<i>n</i> = 30)	
	<i>n</i>	%	<i>n</i>	%
Calisthenics ^a				
0 days/wk	8	8.7	2	6.7
1 day/wk	11	12.0	2	6.7
2 days/wk	13	14.1	5	16.7
3 days/wk	20	21.7	4	13.3
4 days/wk	21	22.8	10	33.3
5 days/wk	8	8.7	3	10.0
6 days/wk	7	7.6	2	6.7
7 days/wk	4	4.3	2	6.7
WT ^b				
0 days/wk	11	12.0	7	23.3
1 day/wk	10	10.9	7	23.3
2 days/wk	26	28.3	6	20.0
3 days/wk	24	26.1	5	16.7
4 days/wk	11	12.0	3	10.0
5 days/wk	5	5.4	1	3.3
6 days/wk	3	3.3	1	3.3
7 days/wk	2	2.2		

Note. Descriptives are presented as frequencies (*n*) and percentages (%).

^aCalisthenics are defined as body weight movements such as push-ups, pull-ups, or sit-ups.

^bWeight training (WT) is defined as the use of additional weighted implements such as machines, barbells, dumbbells, or resistance bands.

Figure D1. Theme Summary



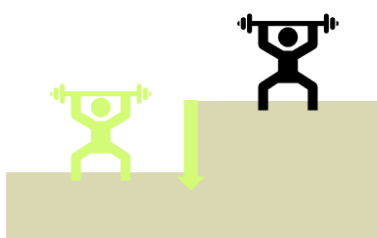
APPENDIX E: DISSEMINATION PRESENTATION



Introduction



Women have a distinct need for weight training (WT) participation to support their military readiness and long-term health and wellbeing



WT is not yet a structured part of our PT at █, leaving it to the individual. And in other populations, women participate in WT consistently *less* than men do

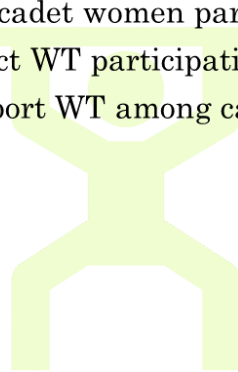


The experiences and perspectives of cadet women are not well understood, which warranted further investigation

Anderson et al., 2017; CDC, 2020; DHHS, 2018; Fisher et al., 2018; Hurley et al., 2018; Meadows, 2018; Peters et al., 2019

Purpose

- Identify factors that influence WT participation among cadet women to inform future institutional changes
 - Q1: To what extent do cadet women participate in WT?
 - Q2: What factors impact WT participation in this setting?
 - Q3: How can [redacted] support WT among cadet women?



Methods

PHASE 1: SURVEY (n = 92)

- | | |
|---|--|
| <ul style="list-style-type: none">• Demographics<ul style="list-style-type: none">• Class year• Commissioning status• Athlete status• WT participation | <ul style="list-style-type: none">• WT perceptions<ul style="list-style-type: none">• Knowledge• Comfort• Facilitators and barriers• Strategies and resources• Open-ended responses |
|---|--|

PHASE 2: INTERVIEWS (n = 11)

- **Individual, environmental, and cultural factors** that influence WT behaviors

American College Health Association, 2023; Hurley et al., 2018; McGrath et al., 2019; Meadows, 2018; Salvatore & Marecek, 2010; Wilson, 2020

Findings: WT participation

ALL RESPONDENTS (n = 92)	<ul style="list-style-type: none">• 77% on ≥ 2 d/wk• 49% on ≥ 3 d/wk
NON-ATHLETES ONLY (n = 30)	<ul style="list-style-type: none">• 53% on ≥ 2 d/wk• 33% on ≥ 3 d/wk

- Participation higher among athletes and commissioning women
- 71% “never” or “rarely” WT during ROTC/Institute-led PT
- Only 11% had taken an HPW-offered WT course

- *Some cadet women did not meet recommendations*
- *Possible and likely that gender gaps also exist among cadets*

Hurley et al., 2018; Meadows, 2018; Peters et al., 2019; Wilson et al., 2019

Findings: What discourages women to WT

Competing priorities

“Just having a **busy schedule** and the times its open sometimes. I wish they were **open longer at night.**”

Time and space constraints

“The gym is so **small**, and the machines, racks, and weights are always taken and **crowded**, since **everyone goes at once** since that is when no **obligations** are taking place.”

Lack of knowledge, skill, and experience...

“The largest thing keeping me out of the weight room is **being undereducated about proper forms, techniques, and plans.** This is in addition to the male-dominated culture and **fear of social repercussions.**”

“Especially for Rat females, the **intimidation** of men along with them being upperclassmen too.”

... coupled with fear of judgement due to class system and small population



Findings: What encourages women to WT

Personal benefits

"It makes you **feel accomplished** when everything else hasn't gone well with your day which happens often at █."

"As my bench press increases, my number of push-ups for the VFT increases."

█ values physical fitness...

"It is an **atmosphere that encourages weightlifting** no matter where you are in your journey."

"I realized weightlifting was a good way to **gain respect** from the guys because they knew I could keep up."

... which ties to social standing

Knowledge, skill, and experience

"**Pre-planning** my workouts."

"Knowledge, and assurance that my **form is correct.**"

Social support

"It doesn't really matter the gender; it's just having **someone there to support.** And I just feel safer doing certain lifts too."



Findings: What women request for the future

More time and space

"**More than one gym** open to non-athletes. I know this is probably said a lot."

"**More space and equipment.** It gets crowded fast and a lot of us have time sensitive schedules so its hard to actually do the workout you planned if everything it taken."

"Having **longer more inclusive hours.**"

More learning opportunities...

"More opportunities for women to **learn** how to lift and **be comfortable.**"

"Provide help with setting up **training plans** and schedules to make it easier to stick to and not just figuring things out on the fly."

... earlier in cadetship



Actionable recommendations

- Offer WT workshops *earlier*
- Offer Women's only section of WT course
- Provide access to WT resources *earlier*

KNOWLEDGE AND
SKILL
DEVELOPMENT



- Open NCAA spaces
- Extend gym hours
- Provide additional equipment for frequently used items

POLICY CHANGES
TO MAXIMIZE
TIME AND SPACE



Thank you. Thoughts? Ideas? Reactions?

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