The malleability of competitive preferences

Åshild A. Johnsen [c,d,*], Henning Finseraas [a], Torbjørn Hanson [b], Andreas Kotsadam [c]

[a] *Norwegian University of Science and Technology, Norway*
[b] *The Norwegian Defence Research Establishment (FFI), Norway*
[c] *Ragnar Frisch Centre for Economic Research, Oslo, Norway*
[d] *Oslo Metropolitan University, Norway*

A R T I C L E   I N F O

A B S T R A C T

Men are more competitive than women, but we do not know how stable competitive preferences are. We conduct a pre-registered data collection in the Norwegian Armed Forces, a traditionally male environment, using survey measures of competitiveness that are known to be correlated with competitive behavior in the lab. We find that there is selection into the environment but that there is still a gender difference at baseline. We further find that the competitive preferences become stronger for both women and men over a period of eight weeks. The changes are large enough to eliminate the initial gender gap if only women had been exposed to the setting.

1. Introduction

Women are less willing to compete than men (e.g. Niederle & Vesterlund, 2007; 2011). This difference exists even in comparatively gender equal societies such as Sweden (Boschini et al., 2019; Cárdenas et al., 2012) and Norway (Almås et al., 2016; Tungodden, 2018). The potential sources of these differences in competitiveness ranges from culture and gender roles (Andersen et al., 2013; Gneezy et al., 2009; Hauge et al., 2020), to biology (Geary, 2010), to structural factors, and to exposure to different environments (Croson & Gneezy, 2009).

Competitive preferences are likely to be consequential for behaviour, as they are correlated with gender differences in educational choices and labor market outcomes (Berge et al., 2015; Buser et al., 2014; Bosquet et al., 2019; Buser et al., 2014; Flory et al., 2015; Kanthak & Woon, 2015; Reuben et al., 2019). Reuben et al. (2019) find that competitive individuals earn 9% more than their less competitive counterparts do, and these differences persists seven years later. Buser et al. (2014) find that gender difference in competitiveness accounts for about 20% of the gender difference in the choice of ambitious academic tracks.

Alleability of Competitive Preferen[1] A pre-condition for the first case is that competitive preferences actually are malleable. Psychology research finds that personality traits are stable over time (Cobb-Clark & Schurer, 2012; Mueller & Plug, 2006), and Lackner (2021) concludes that the empirical evidence indicates that attitudes toward competition

are formed early and turn out to be remarkably persistent. Contrary to this perspective, several studies have recently investigated interventions to reduce the gender gap in competitiveness (Sutter et al. 2016; Alan and Ertac, 2018; Kessel et al., 2021). One strand of this literature uses experiments in the laboratory to investigate how gender differences in competitiveness can be mitigated by the use of "affirmative action" and preferential treatment (Balafoutas and Sutter, 2012; Niederle, Segal, and Vesterlund, 2013), incentive systems (Datta Dargnies, 2012; Gupta et al., 2013), and sponsorship programs and priming (Baldiga and Coffman, 2018; Balafoutas et al., 2018). Another strand of literature relates gender differences in competitiveness to external and environmental factors, such as family background (Almås et al., 2016), institutions (Booth et al., 2019), culture (Andersen et al., 2013; Gneezy et al., 2009; Hauge et al., 2020) and related (see Alan and Ertac (2018) for more on this). Our study contributes to the discussion by investigating whether competitive preferences are indeed malleable, and if so, which factors matter.

In this paper we study the evolution of competitive preferences among young adults over eight weeks attending the Navy and Air Force recruit school of the Norwegian Armed Forces, denoted the *recruit school* hereafter. Our setting allows us to closely follow a large group of comparable and newly employed young adults over a longer period of time. This setting provides us with a unique overview of their environment, enabling us to look for potential mechanisms in their environment that
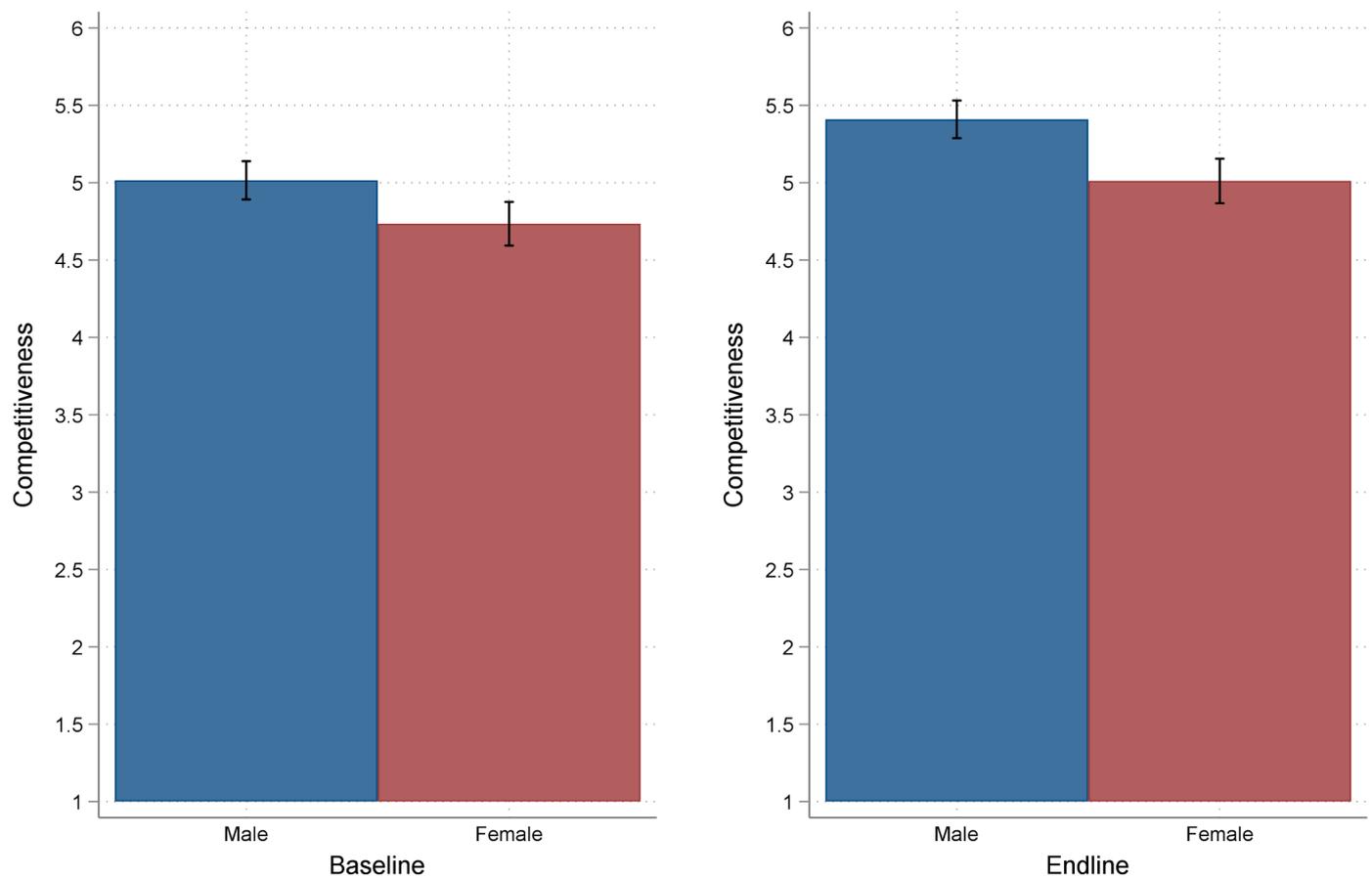

Fig. 1. Competitiveness by waves and gender.

Table 1
Gender differences in competitiveness at baseline and comparison to Hauge et al. (2020)

VARIABLES	(1) Soldiers	(2) Citizens	(3) All	(4) Norwegian parents	(5) Only young citizens	(6) Female soldiers and male citizens
Female	-0.29***	-0.81***	-0.81***	-0.97***	-0.89***	-0.02
	(0.08)	(0.06)	(0.06)	(0.19)	(0.11)	(0.08)
Soldier			0.27***	0.20	0.01	
			(0.07)	(0.15)	(0.10)	
Female soldier			0.51***	0.72***	0.60***	
			(0.10)	(0.21)	(0.14)	
Constant	5.00***	4.73***	4.73***	4.79***	4.99***	4.73***
	(0.06)	(0.04)	(0.04)	(0.14)	(0.08)	(0.04)
Observations	798	2,138	2,936	978	1,356	1,328
R-squared	0.01	0.08	0.10	0.08	0.08	0.00

Note: The dependent variable is the competitiveness index score for our sample and from the Norwegian population (Hauge et al., 2020). Column (1) includes all observations at baseline, (2) includes individuals born in Norway between 1980 and 2000 with either parents born in Norway (n=228) or with at least one parent born abroad (n=1910), (3) pools both samples, (4) Only citizens with Norwegian parents, (5) Only individuals below 22 years of age, (6) Female soldiers and male citizens. OLS. Robust standard errors in parentheses, *p<0.1, **p<0.05, ***p<0.01,

would be hard to study in other labor market settings, where employees move between units, go home after work, interact with colleagues as well as establishes networks, start and end their vacancies at different points in time, work under difference leaders and so on.

We use surveys to measure preferences at baseline on the first day of military service as well as at the end of the recruit period.[2] We find a gender gap in competitive preferences at baseline among the selected Norwegian women who are joining the Armed Forces. We find that the

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[2] The survey measure we use have been shown to correlate strongly with measures of competitiveness in classic lab experiments (Bönte et al. (2017), as well as in a Norwegian setting (Hauge et al. 2020). Two recent studies (Buser, Niederle and Oosterbeek 2021; Fallucchi, Nosenzo and Reuben, 2020) have also thoroughly documented that unincentivized survey questions eliciting preferences for competition are strongly correlated with incentivized choices in an experiment.

Table 2
Competitiveness measured at endline.

	(1)	(2)	(3)
Female	-0.40***	-0.20***	-0.19***
	(0.10)	(0.07)	(0.07)
Competitiveness (baseline)		0.72***	0.70***
		(0.03)	(0.03)
Grades above median			0.01
			(0.07)
Mother higher education			0.05
			(0.09)
Father higher education			0.05
			(0.08)
Mother works			0.11
			(0.11)
Father works			0.10
			(0.15)
Plan higher education			0.06
			(0.09)
Willing to take risk (8 bins) = 4			-0.17
			(0.22)
Willing to take risk (8 bins) = 5			0.08
			(0.21)
Willing to take risk (8 bins) = 6			-0.00
			(0.20)
Willing to take risk (8 bins) = 7			0.08
			(0.20)
Willing to take risk (8 bins) = 8			0.08
			(0.21)
Willing to take risk (8 bins) = 9			-0.05
			(0.23)
Willing to take risk (8 bins) = 10			0.54**
			(0.23)
Observations	620	620	620
Individual controls	No	No	Yes
Sample	All	All	All
Mean competitiveness at endline for men	5.41	5.41	5.41
SD	1.16	1.18	1.16

Note: The dependent variable is the competitiveness index score for our sample measured at endline. (2) also includes competitiveness index measured at baseline, (3) also includes pre-specified set of controls. OLS. Robust standard errors in parentheses, *p<0.1; ***p<0.01, **p<0.05,

Table 3
Competitiveness over time.

	(1)	(2)
Female	-0.28***	-0.25***
	(0.10)	(0.10)
Time	0.39***	0.39***
	(0.05)	(0.05)
Female*Time	-0.12	-0.12
	(0.07)	(0.07)
Observations	1,240	1,240
Individual controls	No	Yes
Sample	All	All
Mean competitiveness for men	5.21	5.21
SD	1.19	1.19

Note: The dependent variable is the competitiveness index score for our sample measured at both baseline and endline. Standard errors clustered at the individual level in parentheses. (2) includes pre-specified set of controls. OLS. Robust standard errors in parentheses, , **p<0.05, *p<0.1; ***p<0.01,

gender difference is substantially smaller in our sample than in other Norwegian populations comparing our results to Hauge et al. (2020). After 8 weeks of bootcamp, we find that women on average are 4 percentage points less competitive than males at baseline (0.20/5.41). A recent meta-study finds that overall, men choose a tournament scheme 13 percentage points more often than women (Markowsky & Beblo, 2022), again illustrating that we are studying a selected sample.

The Armed Forces is a traditionally male-dominated and competitive setting, which allows us to examine the role of both selection and adaptation for the gender difference in competitiveness. Eckel and

Füllbrunn (2015) and Roth (2006) argue that women in finance-related fields adapt in order to survive in a competitive environment. Our results show that, at least in our context, there is also a large degree of selection driving the gender gap. We show that women selected to a competitive setting are also more competitive than women in general. This is important as a purely cross-sectional comparison of gender gaps across settings would not be able to separate selection from adaptation.

Furthermore, we find that there are significant changes in preferences over time whereby both men and women become more competitive during the eight weeks. The gender difference in preferences is still present at endline, but on average women at endline are as competitive as men at baseline. Our findings show that competitive preferences are still malleable in early adulthood, at least in new and competitive environments. On average, female recruits increase their score by 6 percent over 2 months, compared to 8 percent for males. In terms of the maximal attainable value of competitiveness, females' competitiveness changes by 4.5 percentage points, and males' competitiveness increases by 5.6 percentage points. The only longitudinal study of whether individuals change their competitiveness over time (as opposed to cohort differences or differences across space) that we are aware of is Sutter and Glätzle- Rützler (2015). They find that competitive preferences are stable in a longitudinal study of 316 adolescents in Austria over 2 years. In their study the environment does not change. In contrast, studies using more targeted interventions seem to find large effects. Using an intervention aimed at improving grit, Alan and Ertac (2018) find that the gender gap in competitiveness is completely mitigated among Turkish children. Females in the intervention group choose competition 16 percentage points more often than the females in the control group (9 percentage points difference for the males). Kessel et al. (2021) investigate whether an information treatment that informs participants of the gender gap and advise them about the potential earnings implications can mitigate the gender differences. Across three treatments, their overall finding is that advice increased female willingness to compete by 11 percentage points, while it had no effect on men's average willingness to compete. While our measure is not directly comparable to these measures, we can infer that our findings imply a change that is positive and significant, but likely not in the range of changes caused by intervention and information treatments.

The question is what it is about the military setting that creates these changes. Most of the recruits are 19-20 years old. Several studies show that gender differences in preferences emerge at an early age. Andersen et al. (2013) find in cross-sectional data that gender differences in competitive preferences become visible around the age of puberty. Cárdenas et al. (2012) find differences for 9-12 year old children in Sweden, but not in Colombia. Booth and Nolen (2012) find gender differences for 15-16 year old British children, and Almås et al. (2014) find gender differences for Norwegian adolescents. If competitive preferences are biologically fixed or set at an early age we should see no evolution over time within the bootcamp. Previous studies show that willingness to compete is likely malleable to large institutional shifts, and several recent papers have shown that exposure to different institutions over a long period of time affects competitiveness. In particular, women growing up under a communist ideology (Booth et al., 2019), before and after reforms (Zhang, 2019), or in single-sex schools (Booth & Nolen, 2012) have different competitive behavior than other women (but see Lee et al. (2014) for a null finding in the school setting with random allocation to schools). Sutter and Glätzle-Rützler (2015) did not find changes, but their individuals were not exposed to a new environment, however, whereas our individuals are exposed to a new and competitive environment (Hellum, 2020).

While family background (Almås et al., 2016), institutions (Booth et al., 2019), reforms (Zhang, 2019), and culture (Andersen et al., 2013; Gneezy et al., 2009) reflect strong external factors, another strand of literature documents that external events and changes in the current environment have an impact on women's competitiveness (Sutter et al. 2016, Alan and Ertac, 2018, Kessel et al., 2021, Balafoutas and Sutter,
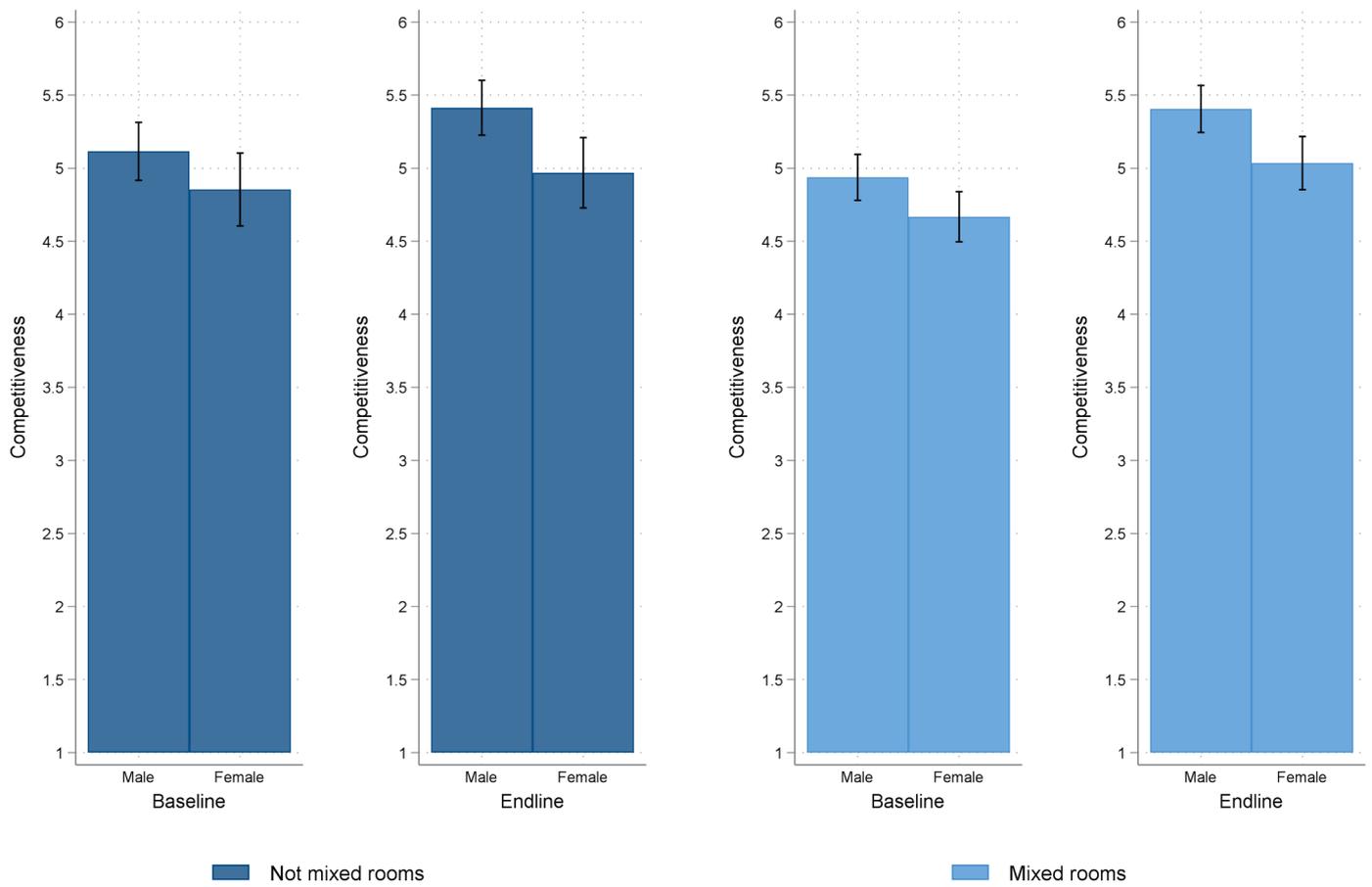
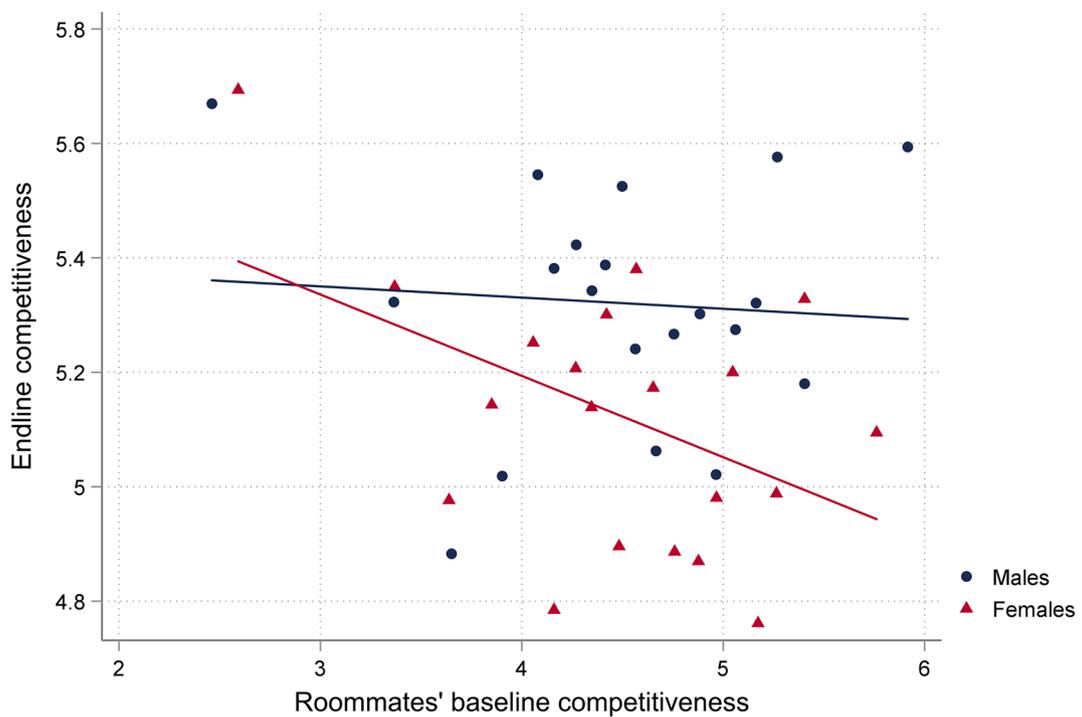**Fig. 2.** Competitiveness index by waves, gender, and treatment status.

Fig. 3. Individual competitiveness and roommates' baseline competitiveness.
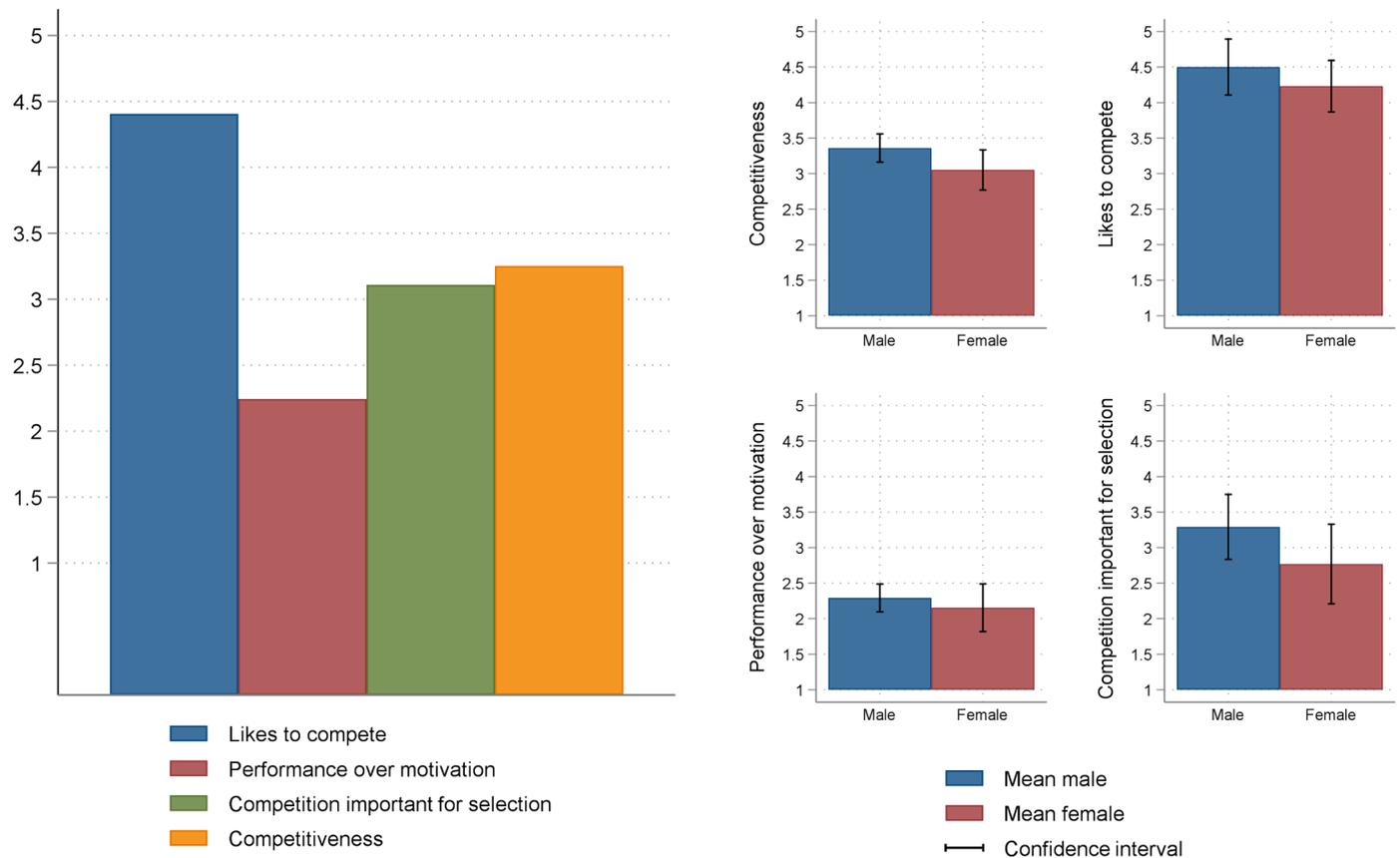
Officers

Fig. 4. Officer attitudes towards competition.

Table 4

Officer competitiveness.

	(1)	(2)	(3)
Female	-0.40***	-0.19***	-0.18**
	(0.10)	(0.07)	(0.07)
Mean competitiveness score of officers within troops (std)	0.06	0.05	0.05
	(0.05)	(0.03)	(0.03)
Competitiveness (mean)		0.72***	0.69***
		(0.03)	(0.03)
Observations	620	620	620
Individual controls	No	No	Yes
Mean Competitiveness	4.89	4.89	4.89
SD Competitiveness	1.18	1.19	1.19
Mean Competitiveness w2	5.24	5.24	5.24
SD Competitiveness w2	1.19	1.18	1.18

Note: The dependent variable is the competitiveness index score measured at endline for recruits. The navy is the base, air force is controlled for. Column (1): Mean competitiveness score of officers is averaged across officers within each troop and standardized to have mean of 0 and standard deviation of 1. Column (2): Corrects for the competitiveness index measured at baseline. Column (3): Includes the pre-specified controls used in Tables 2 and 3. OLS. Robust standard errors. *p<.05; **p<.01; ***p<.001.

2012, Niederle, Segal, and Vesterlund, 2013, Datta Dargnies, 2012, Balafoutas et al., 2018, Balafoutas et al., 2018; Gupta et al., 2013). First, we investigate whether peer effects can explain our findings by comparing individuals that live and work with people that are more or less competitive at baseline. We do not find that being assigned to peers that are more competitive at baseline correlates with endline competitiveness. If anything, there is a negative correlation between room level competitiveness and changes in competitiveness among women. We also investigate whether being assigned to mixed gender teams correlates with endline preferences, but we find that it does not. Furthermore, we

investigate, but reject the hypothesis that having an officer with stronger competitive preferences correlate with stronger changes in preferences.

Buser and Yuan (2019) show that women's willingness to compete is responsive to experiences of winning and losing for female chess players and within a lab experiment. Relatedly, Reuben et al. (2019) argue that the willingness to compete is related to experiences within firms over time. Inspired by this literature, we investigate whether we can observe gender differences in competitiveness for recruits who do not get their top choice of post-boot camp position in the army. This part of the analysis was not pre-specified. The recruits are applying for a wide range
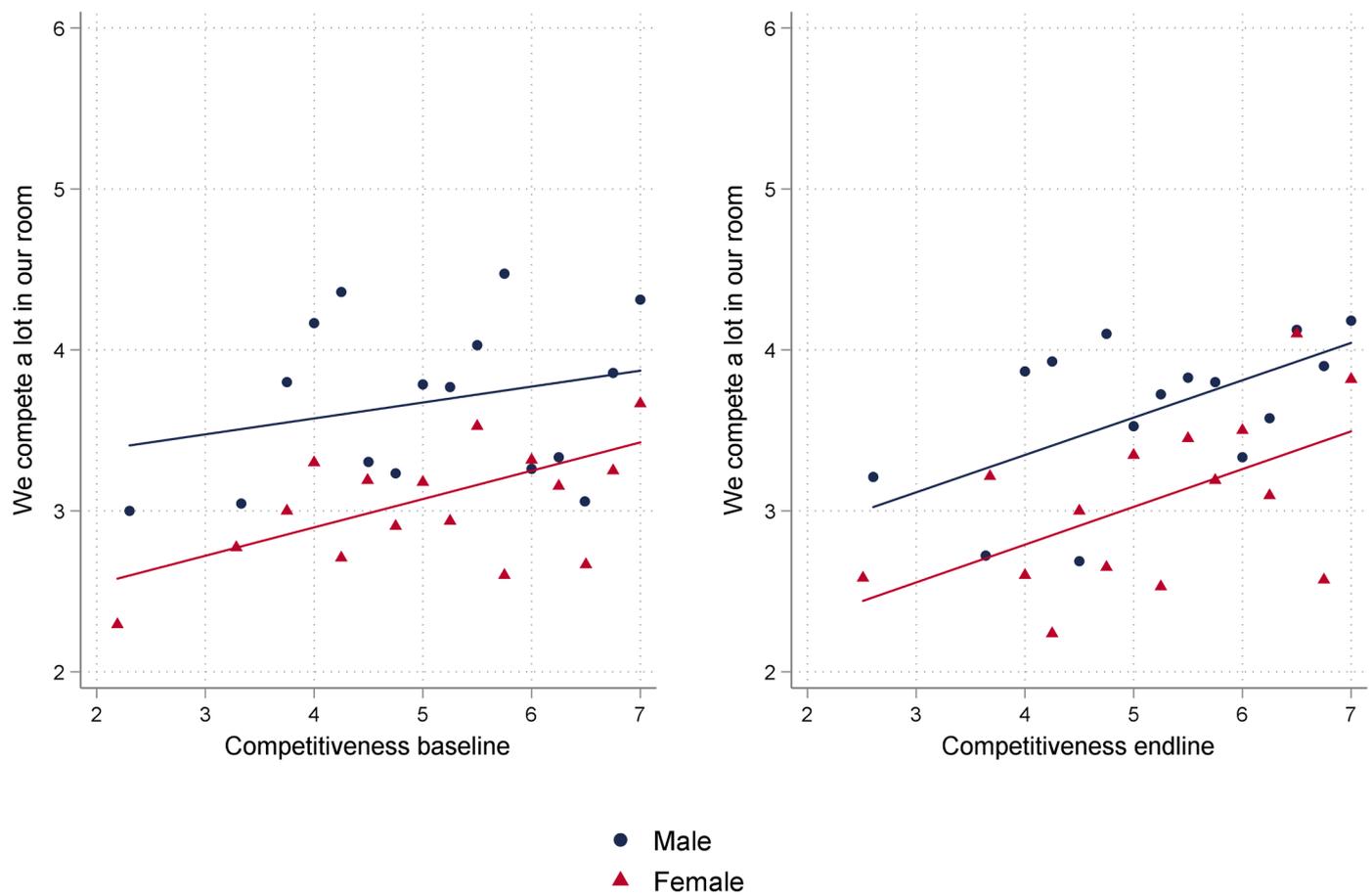
Fig. 5. Perceived competition within room and individual competitiveness
Note: The first panel from the left depicts the relation between perceived competition within room measured at endline (y-axis, both panels) and individual competitiveness score at baseline (x-axis). The second panel depicts individual competitiveness at endline (x-axis).

of positions following the 8 weeks training period, and they are noticed about what position they get during the last week of bootcamp training, which is when we are collecting our data. We find that female soldiers who do not get their top choice report a reduced willingness to compete compared to females who do get their top choice. The male soldiers' reported willingness to compete is, on the other hand, not associated with getting one's top choice. These results are in line with what Buser and Yuan (2019) find, and implies that gender differences in the event of negative outcomes is an important channel to address, perhaps especially in occupations with large gender imbalances. But importantly, as it is not random who was assigned their top choice, we cannot say that the association we are observing is causal. For instance, we see that female recruits who get their top choice are initially more competitive and have higher ambitions. We control for these variables measured at baseline, and the results are robust to the inclusion of a large number of factors.

Alan and Ertac (2019) find that the gender gap in competitiveness is eliminated by an intervention that focuses on grit for Turkish elementary school children. Their intervention highlights the role of effort, but importantly encourages challenge seeking - and likely to matter to our findings - a constructive response to performance feedback. How to deal with loosing and negative feedback seems like a very relevant channel to understand more about female competitiveness. It remains to be investigated the role played by setting itself – Exley and Kessler (2022) show that when individuals are asked to subjectively describe their performance on a male-typed task relating to math and science, there is a large gender gap in self-evaluations. This is only the case for male-type tasks – for female type tasks they find no gender difference. Dutch chess Olympiads and the Armed Forces are arguably male-type settings, and it

remains to be investigated whether females respond more negatively to loosing/ not getting the top choice in more female-typed settings. We conclude that there is scope for testing information treatments and/ or affirmative action measures more in the field.

The association between top choice and competitiveness provides perhaps the missing link between our observation that the recruits are becoming more competitive, in contrast to our lacking evidence concerning how competitive bootcamp is. One the one hand, we do not find evidence in our data from the officers that they emphasize competition more than other factors, such as cooperation. Informal talks with previous soldiers have not indicated that bootcamp is a very competitive setting. On the other hand, both the recruitment processes following conscription service and the military career itself, are often referred to as tournaments.[3] In their seminal paper on the theory of compensation and personnel policy in hierarchical organizations, Asch and Warner (2001) stress that the lack of lateral recruitment in the military complicates the problem of staffing the upper-level positions, as personnel in the upper

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[3] If our respondents choose to pursue a military career, they have to pass training for enlistment or officer schools. Further military career depends on selection to enlistment or officer schools. From 5,000 applicants to the Norwegian Armed Forces Officer Candidate Schools, 1,400 meet for a 2–3-week long selection consisting of preparation and exercises, competing for some 600 places (Rones, 2017). Upon the end of service (completed one year of compulsory service) the personnel are granted a service evaluation and diploma rating their performance on a four grade scale. The diploma is important for application to positions within the enlisted corps of personnel, to officer schools, and as an educational "signal" in the search for a job in the civil sector.
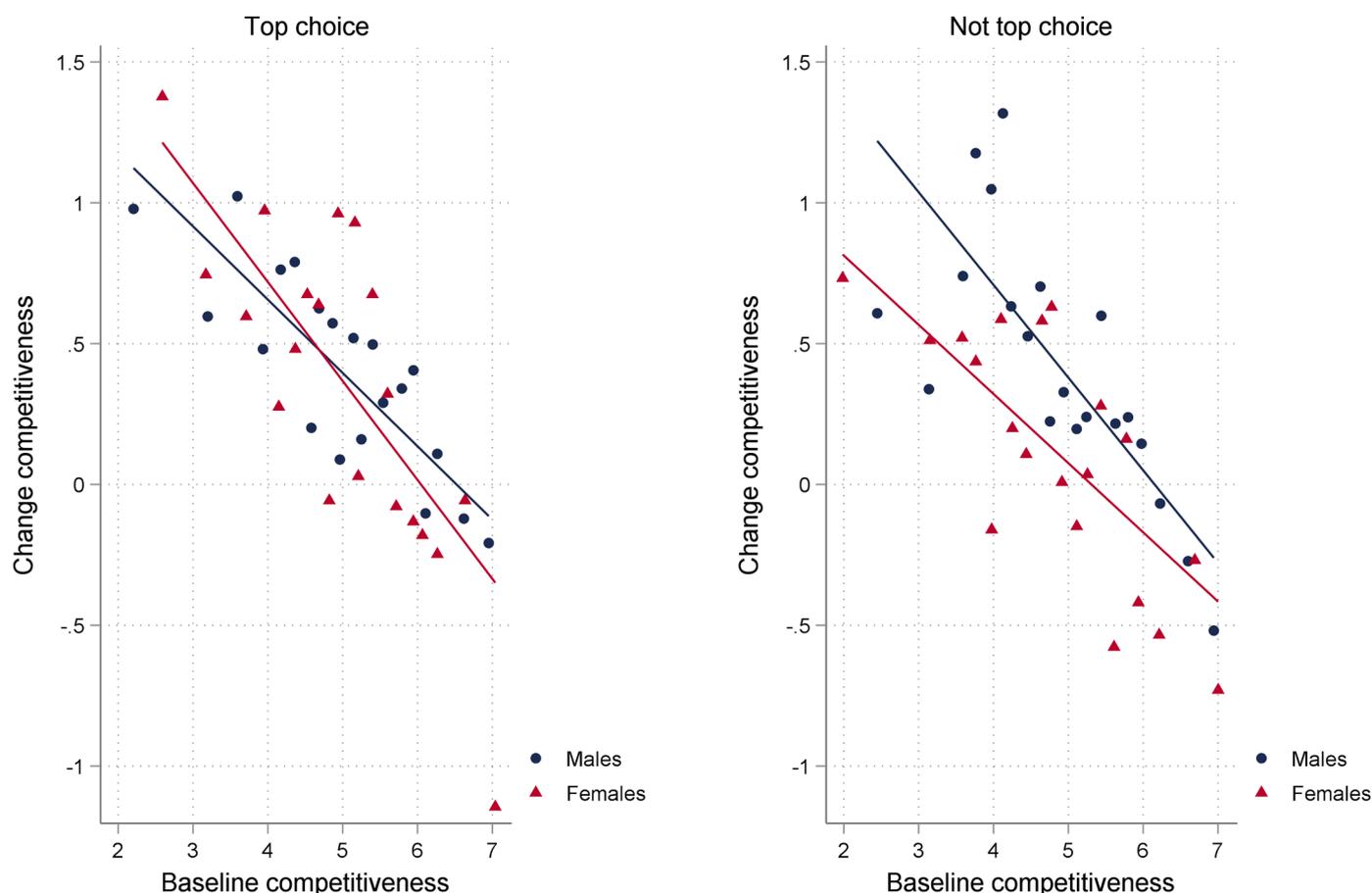
Fig. 6. Change in competitiveness and top positions.

ranks cannot be hired off the street. Due to the military's need for "youth and vigor" and a substantial "learning-by-doing" element, they have to grow their future leaders from within. These characteristics result in a military promotion contest at each level of the organization where the losers of the contests are dismissed. The policy is usually referred to as an "up-or-out" rule (Kahn & Huberman, 1988; Lazear, 1991). We observe that only half of the recruits get their top choice, and for some of these positions, the competition is tough. This is compatible with a world where military training comprises both competitive and non-competitive elements, but for those recruits who have specific ambitions, this is a very competitive setting. Reuben et al. (2021) also find that more competitors in the tournament makes participants more competitive in a lab experiment, and our findings can also be interpreted in support of this being a relevant channel. We unfortunately do not have the data to delve more into detail on this. We conclude that when running studies in the field, there is a need for more formal definitions of what a competitive setting is, especially in sectors that are not arche-typical representations of competitive settings.

2. Setting and data

2.1. The draft

Norway has compulsory universal conscription. Universal conscription was introduced in Norway in 2014 and women born in 1997 or later have the same conscription duty as men. The screening process usually takes place in the last year of upper secondary high school. In the first

step, all individuals in the cohort (approximately 60 000) fill in a self-declaration form from the Armed Forces. Based on this information, approximately 17 500 of these individuals go on to conduct physical, medical, and cognitive tests in ten test centers throughout the country. At the end, the conscripts are interviewed about their interest and what type of service they wish to pursue. About half of those who are screened (approximately 8 000 since 2014) are then recruited for service based on ability and motivation (https://www.forsvaret.no/krav).

The proportion of female conscripts has continued to increase in subsequent years, from 17 percent in 2014 to just over 30 per cent in 2020. Of the branches of the armed forces, the Air Force has by far the highest proportion of women, while the Army has the lowest. There is also a big difference between troops, some of which have a completely even gender distribution, while other troops have well under 20 percent women. Most conscripts who serve in the Armed Forces declare that they serve voluntarily (Køper, 2020).

2.2. Bootcamp

The duration of military service is normally one year, and it starts with an eight-week basic training. Our data collection is conducted in close collaboration with the Basic Training Establishment KNM Harald Haarfagre. The camp hosts basic bootcamp training for military con-scripts doing service in the Air force and the Navy. The basic military training is over a period of eight weeks. Previous studies have investi-gated peer effects for men in close collaboration with the Norwegian Army (Dahl et al., 2021; Finseraas & Kotsadam, 2017; Finseraas et al.,
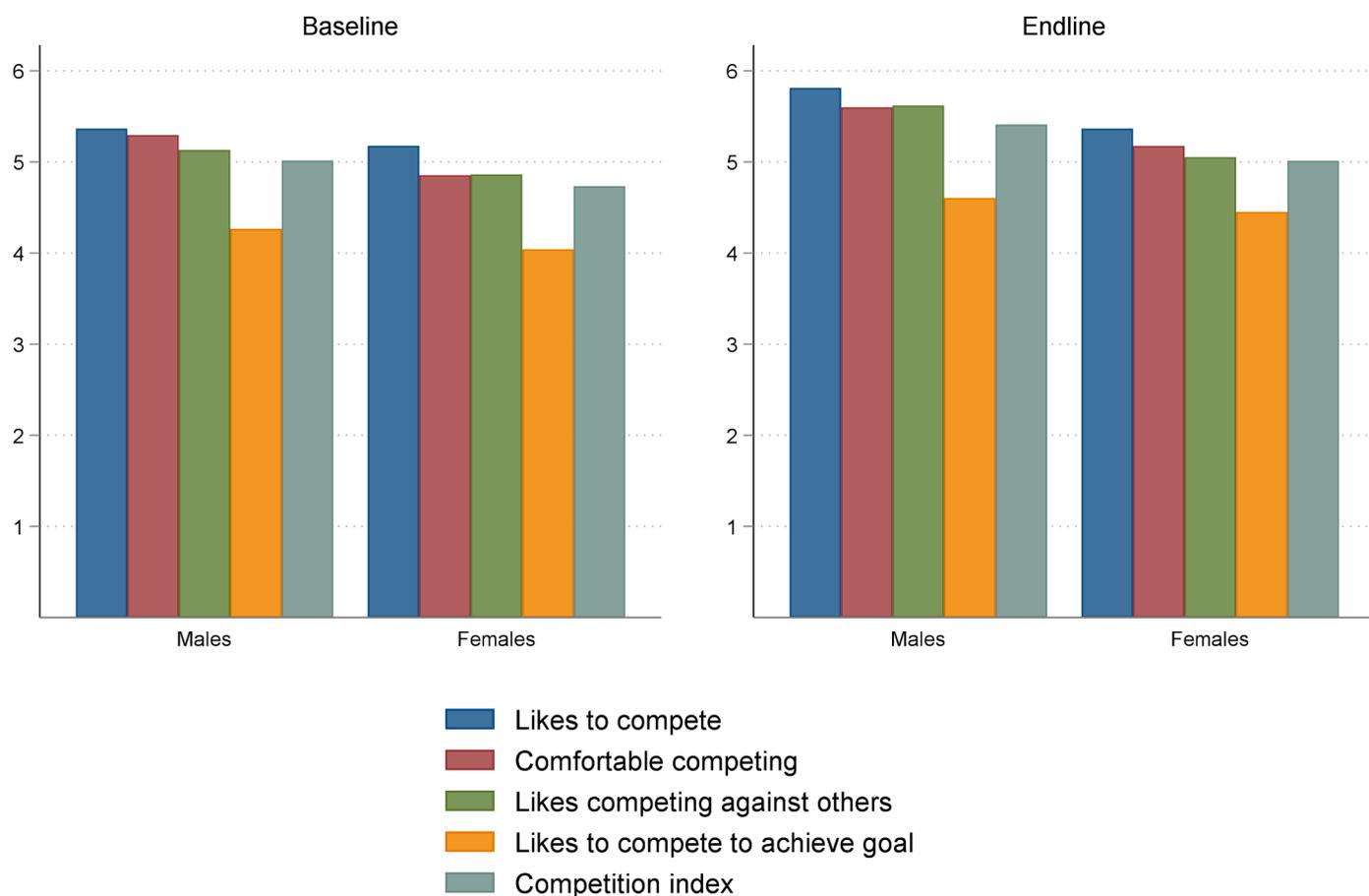
Fig. A.1. Components of competitiveness at baseline and wave 2.

2016; 2019; Hanson, 2019). A notable difference when comparing this setting to that of those studies is that the gender balance is much more even, such that our study can analyze effects of military service on both men and women.

During bootcamp individuals are assigned to a troop, and then to a room within the barrack of that troop. The individuals conduct most of their training together as a troop but there are also many tasks that they need to solve as a team at the room level, such as room cleaning. Qualitative data from the same camp shows that individuals are more likely to spend time with people in their room and in their own troop rather than with people in other troops during bootcamp (Hellum, 2020). After bootcamp, the soldiers apply for different positions and are spread to different camps around Norway.[4]

2.2.1. Performance, competition, and evaluation

The recruit training consists of both competitive and cooperative elements. During the application process, the Armed Forces informs applicants that they will receive training in how to perform as a single soldier and as part of a troop,[5] emphasizing both competition and cooperation as important elements of the training. Competition plays an important role in the process of getting the preferred after-bootcamp position, and in individual tasks, such as at the shooting range, in physical tests and so on. In order to achieve the highest grade on physical tests, women have to perform as well as men. For the lower

scores, the requirements differ by gender.[6] Troops are often competing against each other as part of the training, and we see that individual competitiveness and liking and finding military service meaningful is correlated, indicating that this is a competitive setting.[7] On the other hand, officers agree only moderately that competition is an important tool to select good candidates.

2.3. Data collection

We collected data at the first day of the military service in January 2020 and follow up data in late February 2020. In both waves, groups of around 45 recruits, and in 3-4 instances close to 100 recruits, enter a room where they a provided with a link to the survey, which they reply to using their phone. They are not allowed to communicate while filling out the survey. The researchers are available for questions, and officers are not present. The participants answer survey questions related to their preferences, attitudes, and behavior on a range of issues. Our

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[4] These aspects may make the setting different from the Army setting studied previously. In the Army, bootcamp is perhaps more cooperative as more of the training is in teams that are comprised by the room and individuals remain in the same troop after bootcamp.

[5] https://www.forsvaret.no/forstegangstjeneste/rekruttskolen

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[6] Other branches, such as the Armed Forces' special command soldiers, firefighters and anti-terror police have gender-neutral requirements (https://www.forsvaret.no/krav/fysiske-tester-i-forsvaret).

[7] We present the results from a set of regressions which was not pre-specified in Table A.14. More competitive individuals are more likely to state that they like military service, find it more meaningful, recommending military service to others, and competitiveness is negatively correlated with finding military service physically challenging. Competitiveness, at the individual or the room level, is not correlated with various aspects of cooperation such as roommates helping each other, collaboration in the room. Neither are there signs of "toxic competitiveness" as there are no correlations between competitiveness and friendship formation in the room or with bullying. In total, the results indicate that competition and cooperation are not necessarily mutually exclusive.
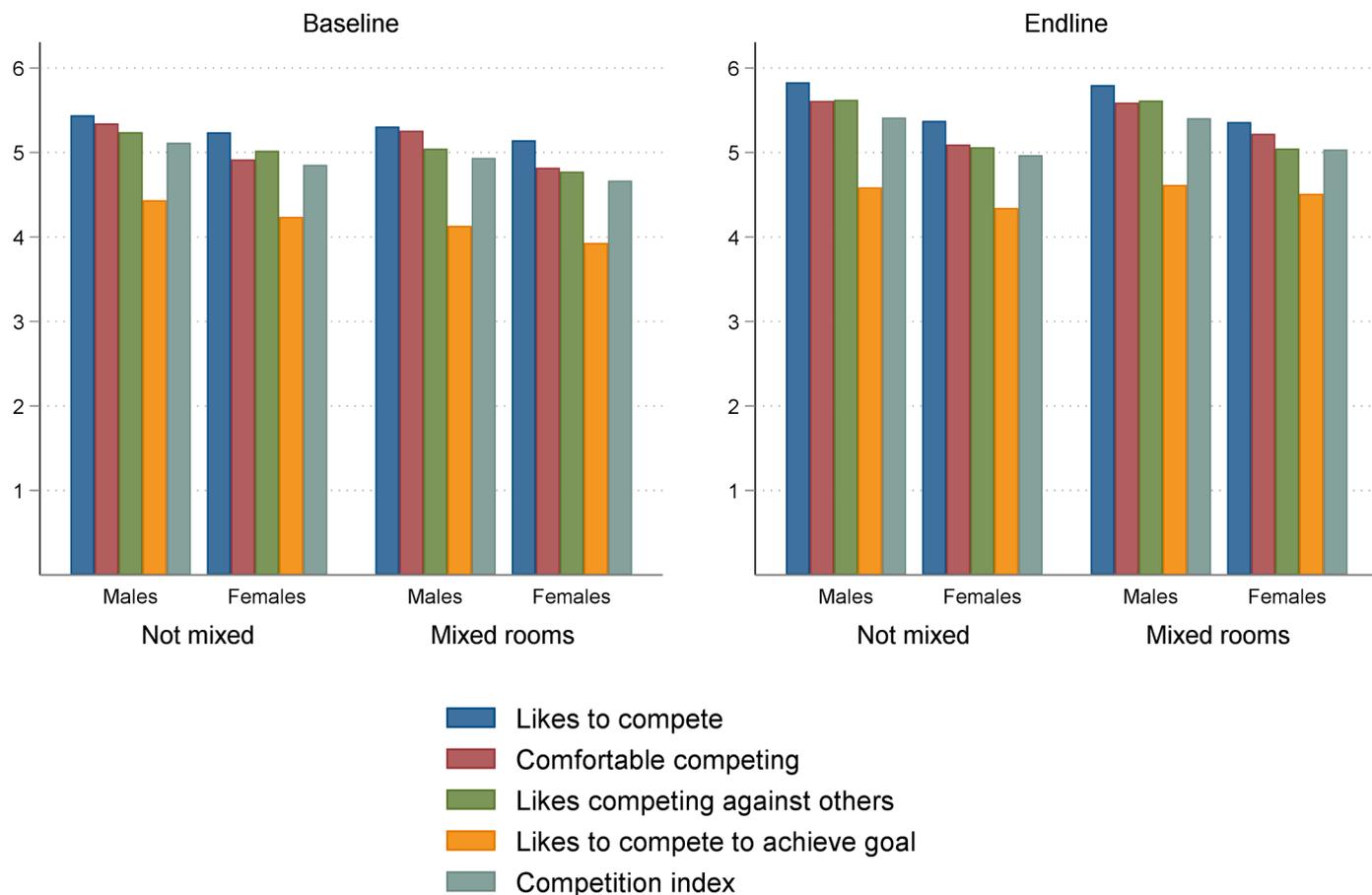
Fig. A.2. Components of competitiveness at baseline and wave 2.

Fig. A.3. Change in competitiveness from baseline to endline.

Table A.1
Gender balance.

Variable	(1) Male	(2) Female	(3) Difference
Grades above median	0.44	0.62	0.18***
	(0.50)	(0.49)	(0.04)
Willing to take risk (10 bins)	6.54	6.49	-0.05
	(1.85)	(1.71)	(0.14)
Mother higher education	0.75	0.70	-0.05
	(0.43)	(0.46)	(0.04)
Father higher education	0.56	0.59	0.03
	(0.50)	(0.49)	(0.04)
Mother works	0.91	0.93	0.01
	(0.28)	(0.26)	(0.02)
Father works	0.93	0.94	0.01
	(0.26)	(0.24)	(0.02)
Plan higher education	0.71	0.87	0.16***
	(0.45)	(0.34)	(0.03)
Competition index (mean)	5.02	4.73	-0.28***
	(1.18)	(1.17)	(0.10)
Mixed room	0.56	0.64	0.08**
	(0.50)	(0.48)	(0.04)
Room average: others competitiveness	4.49	4.48	-0.01
	(0.84)	(0.69)	(0.06)
Mixed gender teams perform better (5 point)	3.69	3.97	0.28***
	(0.77)	(0.77)	(0.06)
Prefers mixed room (5 point)	3.09	3.29	0.21**
	(0.89)	(1.13)	(0.08)
Defense capability not reduced by females (5 point)	4.11	4.40	0.29***
	(0.89)	(0.77)	(0.07)
Share of friends of opposite gender (6 point)	3.40	3.62	0.21***
	(0.98)	(0.98)	(0.08)
Observations	352	268	620

Note: Means and difference in means. Robust standard errors in parenthesis. *p<.05; **p<.01; ***p<.001.

Table A.2
Attrition.

	(1)	(2)	(3)	(4)
Competitiveness		-0.01	-0.01	-0.01
		(0.01)	(0.01)	(0.02)
Female	0.05		0.05	0.08
	(0.03)		(0.03)	(0.13)
Female* Competitiveness				-0.01
				(0.03)
Observations	798	798	798	798
Troop FE	no	no	no	no
Individual controls	no	no	no	no
Sample	All	All	All	All
Mean attrition male	0.20		0.20	0.20
Mean female	0.45			
Mean attrition		0.22		
Mean index		4.87	4.87	4.87

Note: We have 798 observations where we have data on gender and the competitiveness score at baseline. At endline the sample is reduced to 625. Our main sample is based on the 620 observations where we have information on troop and room. Robust standard errors in parentheses *** p<0.01, ** p<0.05, *p<0.1.

baseline sample consists of 798 soldiers, of which 45 percent are women. Our longitudinal sample, i.e. soldiers that participated in both waves, consists of 352 males and 268 females, 620 in total.[8] All coding of variables and all analyses follow a pre-registered analysis plan unless otherwise stated.

Our main dependent variable is *General self-reported competitiveness (competitiveness* for short). We follow Bönte et al. (2017) and Hauge

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Table A.3
Competitiveness measured at baseline for the balanced sample.

	(1)	(2)
Female	-0.28***	-0.26**
	(0.10)	(0.10)
Observations	620	620
Individual controls	no	yes
Sample	All	All
Mean Competitiveness male	5.02	5.02
SD	1.18	1.18
Share females	0.43	0.43

Note: The dependent variable is the competitiveness index score measured at baseline. (2) includes the same pre-specified set of controls as in Tables 2 and 3. OLS. Robust standard errors in parentheses, * p<0.1. ***p<0.01, **p<0.05,

Table A.4
Percent living in mixed rooms within troop, by gender and total.

Troop	In mixed room (%)		
	Male	Female	Total
A1 (Sample size = 74)	0	0	0
A2 (Sample size = 73)	45	57	51
A3 (Sample size = 59)	100	100	100
A4 (Sample size = 67)	88	64	76
B1 (Sample size = 61)	49	79	61
B2 (Sample size = 56)	66	95	77
B3 (Sample size = 64)	38	52	44
B4 (Sample size = 66)	45	58	50
B5 (Sample size = 56)	66	100	79
B6 (Sample size = 44)	85	89	86
Total (Sample size = 620)	56	64	60

et al. (2020), and ask the following four questions: "I enjoy competing against others", "I find competitive situations unpleasant", "I like situations where I compete against others" and "When I try to reach a goal I prefer to compete against others instead of trying to reach the goal on my own".[9] Bönte et al. (2017) and Hauge et al. (2020) show that an index based on the average score on these questions correlates strongly with incentivized lab measures of competitiveness, and this index constitutes our main outcome.[10] Similarly, Buser et al. (2021) also show that unincentivized survey question eliciting general competitiveness are strongly correlated with incentivized choices in an experiment. In another recent paper, Fallucchi et al. (2020) validate experimentally survey items to measure the preferences for competition, and go on to show that these measures of competitiveness predict behavior observed outside the lab.

Our measure of competition is strongly linked to ambitions and motivation for the military service. More competitive individuals are more interested in employment in the armed forces, more motivated for military service, and more likely to consider themselves qualified for service, but they are not more likely to have clear ideas about what after-bootcamp position they prefer (see Table A.12).

We collected a set of independent variables which are described in section A1 in the appendix. Descriptive statistics by gender are included in Table A.1. These comparisons show gender differences on many background variables, but interestingly, no significant difference in willingness to take risks which is often, but not always, found for other populations (Eckel & Grossman, 2008).

Table A.5
Balance: Mixed room and gender.

Variable	(1) Female rooms	(2) Mixed rooms female	(3) Difference females	(4) Male rooms	(5) Mixed rooms males	(6) Difference males
Grades above median	0.65	0.60	0.06	0.46	0.42	0.04
	(0.48)	(0.49)	(0.04)	(0.50)	(0.50)	(0.06)
Willing to take risk (10 bins)	6.55	6.45	0.10	6.40	6.65	-0.26
	(1.73)	(1.70)	(0.26)	(1.97)	(1.75)	(0.21)
Mother higher education	0.71	0.70	0.01	0.73	0.77	-0.03
	(0.46)	(0.46)	(0.06)	(0.44)	(0.42)	(0.05)
Father higher education	0.48	0.65	-0.18***	0.57	0.55	0.02
	(0.50)	(0.48)	(0.06)	(0.50)	(0.50)	(0.05)
Mother works	0.90	0.94	-0.05	0.89	0.92	-0.03
	(0.31)	(0.23)	(0.03)	(0.31)	(0.27)	(0.03)
Father works	0.94	0.94	-0.00	0.91	0.94	-0.04
	(0.24)	(0.23)	(0.03)	(0.29)	(0.23)	(0.03)
Plan higher education	0.90	0.85	0.04	0.72	0.71	0.01
	(0.31)	(0.35)	(0.04)	(0.45)	(0.46)	(0.04)
Competitiveness (mean)	4.85	4.67	0.19	5.12	4.94	0.18
	(1.23)	(1.14)	(0.14)	(1.25)	(1.12)	(0.12)
Room level baseline competitiveness	4.54	4.45	0.09	4.54	4.45	0.09
	(0.48)	(0.78)	(0.14)	(0.94)	(0.75)	(0.14)
Mixed gender teams perform better (5 point)	4.05	3.92	0.13	3.76	3.63	0.13*
	(0.79)	(0.75)	(0.09)	(0.82)	(0.73)	(0.08)
Prefers mixed room (5 point)	3.34	3.26	0.08	3.16	3.03	0.13
	(1.17)	(1.12)	(0.16)	(0.95)	(0.84)	(0.10)
Defense capability not reduced by females (5 point)	4.50	4.34	0.16*	4.12	4.10	0.02
	(0.66)	(0.83)	(0.09)	(0.89)	(0.89)	(0.10)
Share of friends of opposite gender (6 point)	3.53	3.66	-0.13	3.35	3.45	-0.10
	(0.94)	(1.00)	(0.11)	(1.03)	(0.93)	(0.11)
Observations	96	172	268	154	198	352
F-test males and females separately	F(12, 94) =1.60, Prob > F =0.1038			F(12, 120) =0.70 Prob > F = 0.7518		
F-test all	F(13, 144) =1.45 Prob > F =0.1435					

Note: Standard errors clustered by room in parentheses (145 clusters). All regressions control for troop fixed effects.

Table A.6
Competitiveness index.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Female							-0.46***	-0.25***	-0.24***	-0.22	-0.13	0.24
							(0.14)	(0.09)	(0.09)	(0.20)	(0.42)	(0.62)
Mixroom	0.06	0.25**	0.22*	-0.08	0.01	0.02	-0.10	0.05	0.05	-0.08	0.01	0.00
	(0.18)	(0.11)	(0.12)	(0.15)	(0.10)	(0.11)	(0.14)	(0.10)	(0.10)	(0.15)	(0.10)	(0.10)
Female* Mixroom							0.11	0.09	0.09	0.15	0.24	0.25
							(0.18)	(0.12)	(0.12)	(0.23)	(0.15)	(0.15)
Competitiveness		0.73***	0.73***		0.71***	0.68***		0.72***	0.70***		0.71***	0.68***
		(0.05)	(0.05)		(0.04)	(0.05)		(0.04)	(0.04)		(0.04)	(0.05)
Female* Competitiveness											0.03	0.05
											(0.07)	(0.07)
Observations	268	268	268	352	352	352	620	620	620	620	620	620
Troop FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Ind controls	no	yes	yes	no	yes	yes	no	yes	yes	no	yes	yes
Sample	Fem	Fem	Fem	Male	Male	Male	All	All	All	All	All	All
Mean comp	4.73	4.73	4.73	5.02	5.02	5.02	4.89	4.89	4.89	4.89	4.89	4.89
SD comp	1.17	1.17	1.17	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18
Mean comp w2	5.01	5.01	5.01	5.41	5.41	5.41	5.24	5.24	5.24	5.24	5.24	5.24
SD comp w2	1.20	1.20	1.20	1.16	1.16	1.16	1.19	1.19	1.19	1.19	1.19	1.19

Note: The dependent variable is the competitiveness index score measured at endline. OLS. Standard errors clustered by room in parentheses (145 clusters). *p<.05; **p<.01; ***p<.001. Pre-specified set of controls now also includes attitudes, see section A1.

Furthermore, we also surveyed the officers the day before recruits started to arrive at the camp. Using administrative data from the camp we matched officers to the troops in our survey data, giving us a sample of 38 officers in total (13 females, 24 males), ranging from 2 to 5 employees per troop in our sample. We ask the officers if they like to compete, whether performance matters more than motivation when recruiting soldiers, if competition during bootcamp is important to identify who is suited to become a good soldier (scale 1-5). We combine these questions in an index, where we average over non-missing answers.

3. Empirical strategy

We test our main hypotheses using different specifications and samples. We first identify the gender difference in the total sample, where we expect that women score lower than men on the competitiveness scale.

We estimate the following regression:

$$Competetiveness_{it2} = \beta \text{Female}_i + \gamma X_{it1} + \varepsilon_{it} \tag{1}$$

where i indexes individuals and t is time (baseline t1 and follow up t2).

We estimate this for both baseline and follow up. X_{it1} includes the controls stated above, including baseline levels of competitiveness. We will present results with and without these controls. We cluster the standard errors at the room level in all estimations that involve room level explanatory variables but use robust standard errors otherwise.

To investigate changes over time we will stack the data, so that each individual has two observations, and interact the female dummy with a dummy variable for the follow up survey (T2). The standard errors will be clustered at the individual level.

$$Competitiveness_{it2} = \beta Female_i + \delta T2 + \lambda T2 * Female_i + \varepsilon_{it} \quad (2)$$

The coefficient β shows the gender gap at baseline, while the coefficient δ shows how competitiveness change over time for men. The coefficient λ shows whether the change is different for women. The main specification is one without any controls.

4. Main results

On average, males score 5.0 on the competitiveness index at baseline, while females score 4.7. In Fig. 1, we show that males score higher on the competitiveness index (y-scale) also at endline. Both genders increase their score throughout the eight-week period; at the second wave males score 5.4 and females 5.0.

In column 1 of Table 1, we show that the raw gender difference at baseline is statistically significant.[11] In column 2 we use data from Hauge et al. (2020) to compare our gender gap to the gender gap in a sample of individuals born in Norway between 1980 and 2000 with either parents born in Norway (n=228) or with at least one parent born abroad (n=1910). The gender gap in the citizen sample is much larger than in the soldier sample.

In column 3 we pool the data together and test for differences across samples. We find that both men and women in the sample of soldiers are more competitive, but the difference is especially stark for women. This is true also when we only study individuals with parents born in Norway, or only young individuals (below 22 years of age) in the citizen sample (columns 4 and 5). We note that the male soldiers are not statistically significantly different from the citizen males in column 4 (but the differences are of a similar magnitude) and in column 5 the male soldiers are neither statistically nor economically significantly different from other young males. In column 6 we show that there is no gender difference if we compare the female soldiers to all male citizens.

Table 2 presents the results from the endline survey. Women score lower than men on the competitiveness scale also at endline. On average, males get a score of 5.4 and females 5.0, a difference that is statistically significant. Adjusting for the competitiveness score at baseline reduces the gender gap substantively, while adding other controls (columns 3) leaves the coefficient almost unchanged.

Next, we stack the data so that there are two observations for each individual and estimate the model in Eq. (2). We present the results in Table 3. The time coefficient shows how competitiveness change over time for men and shows that men become more competitive. We see that the gender difference in the change over time—measured by the interaction term for females and the second wave/time—is not statistically significant. It is negative, which indicates that it increases slightly less for women over time. We further test the joint hypothesis that the coefficients for time and female*time sum to zero, which we can reject (F $(1, 619)=25.67$, Prob$>$F=0.000). That is, we find that competitiveness increases for both genders. In fact, after 8 weeks of bootcamp, female recruits are as competitive as male recruits are at arrival. On average, females increase their score over bootcamp by 6 percent ((5.01-4.7)/

Table A.7
Balance.

VARIABLES	(1) Grades above median	(2) Willing to take risk (10 bins)	(3) Mother higher education	(4) Father higher education	(5) Mother works	(6) Father works	(7) Plan higher education	(8) Competitiveness (mean)	(9) Room level baseline competitiveness	(10) Mixed gender teams perform better (5 point)	(11) Prefers mixed room (5 point)	(12) Defense capability not reduced by females (5 point)	(13) Share of friends of opposite gender (6 point)
Female	0.19***	0.18	-0.02	-0.06	-0.01	0.03	0.19***	-0.29*	-0.01	0.30***	0.11	0.43***	0.19
	(0.06)	(0.25)	(0.06)	(0.06)	(0.04)	(0.03)	(0.05)	(0.15)	(0.15)	(0.09)	(0.16)	(0.11)	(0.13)
Mixed room	-0.06	0.29	0.01	-0.05	0.03	0.04	-0.02	-0.21*	-0.04	-0.15*	-0.11	-0.07	0.06
	(0.06)	(0.23)	(0.05)	(0.06)	(0.03)	(0.03)	(0.05)	(0.13)	(0.15)	(0.09)	(0.09)	(0.12)	(0.11)
Female*Mixed room	-0.01	-0.39	-0.04	0.17**	0.03	-0.03	-0.04	0.02	-0.01	-0.00	0.13	-0.18	0.02
	(0.08)	(0.31)	(0.07)	(0.08)	(0.04)	(0.04)	(0.06)	(0.19)	(0.16)	(0.12)	(0.19)	(0.14)	(0.16)
Observations	606	620	617	617	617	617	615	620	620	620	620	620	617
Troop FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Mean dep var male	0.44	6.54	0.75	0.56	0.91	0.93	0.71	5.02	4.49	3.69	3.09	4.11	3.40
SD male	0.50	1.85	0.43	0.50	0.28	0.26	0.45	1.18	0.84	0.77	0.89	0.89	0.98
Share females	0.43	0.43	0.43	0.43	0.43	0.43	0.44	0.43	0.43	0.43	0.43	0.43	0.43

Note: The dependent variables are all measured at baseline. See section A1 for details. Standard errors clustered by room in parentheses. (145 clusters) *p<.05; **p<.01; ***p<.001

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[11] In Fig. A.1 in the appendix, we present the results from each of the four variables separately and by gender. In Table A.3 we present results using the balanced longitudinal sample of 620 individuals to show that the gender difference is the same in this slightly smaller sample.

Table A.8
Roommates' baseline competitiveness and individual competitiveness.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Female							0.38	0.49	0.47
							(0.45)	(0.37)	(0.36)
Room level baseline competitiveness	-0.30***	-0.14**	-0.12*	-0.12	-0.01	0.01	-0.12	0.00	0.02
	(0.10)	(0.06)	(0.07)	(0.08)	(0.07)	(0.07)	(0.08)	(0.07)	(0.06)
Female*Competitiveness room							-0.18*	-0.15*	-0.14*
							(0.10)	(0.08)	(0.08)
Competitiveness (mean)		0.72***	0.72***		0.71***	0.68***		0.71***	0.69***
		(0.05)	(0.05)		(0.05)	(0.05)		(0.04)	(0.04)
Observations	268	268	268	352	352	352	620	620	620
Troop FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Individual controls	no	yes	yes	no	yes	no	no	yes	yes
Sample	Female	Female	Female	Male	Male	Male	All	All	All
Mean Competitiveness	4.73	4.73	4.73	5.02	5.02	5.02	4.89	4.89	4.89
SD	1.17	1.20	1.20	1.16	1.16	1.18	1.18	1.18	1.18
Mean Competitiveness w2 male	5.01	5.01	5.01	5.41	5.41	5.41	5.41	5.41	5.41
SD	1.20	1.17	1.17	1.18	1.18	1.16	1.16	1.16	1.16

Note: The dependent variable is the competitiveness index score measured at endline. OLS. Standard errors clustered by room in parentheses (145 clusters in main sample, 95 for female sample, 122 for male sample). *p<.05; **p<.01; ***p<.001. Pre-specified set of controls now also includes attitudes, see section A1.

Table A.9
Room level baseline competitiveness and individual competitiveness.

	(1)	(2)	(3)
Female	0.58	0.55	0.93
	(0.54)	(0.62)	(1.16)
Room level baseline competitiveness	-0.12	-0.01	0.01
	(0.08)	(0.07)	(0.07)
Competitiveness (mean)		0.71***	0.68***
		(0.05)	(0.05)
Female*Competitiveness		0.01	0.03
		(0.07)	(0.07)
Female*Competitiveness room	-0.18	-0.13	-0.13
	(0.11)	(0.08)	(0.09)
Observations	620	620	620
Troop FE	yes	yes	yes
Individual controls	no	yes	yes
Sample	All	All	All
Mean Competitiveness	4.89	4.89	4.89
SD	1.18	1.19	1.18
Mean Competitiveness w2	5.24	5.24	5.24
SD	1.19	1.18	1.19

Note: The dependent variable is the competitiveness index score measured at endline. OLS. Standard errors clustered by room in parentheses. (145 clusters) **p<.01, *p<.05; ***p<.001. Pre-specified set of controls now also includes attitudes, see section A1.

4.7)), compared to 8 percent for males ((5.4-5.0)/5.0)).

In terms of the maximal attainable value, females on average attain 67.1% at baseline, and 71.6% at endline, with a difference equal to 4.5 percentage points. Males change from 71.4% to 77%, equal to a difference of 5.6 percentage points. The gender difference is equal to 4.3 percentage points at baseline and 5.4 percentage points at endline.

Fig. A.3 presents how changes in competitiveness from baseline to endline relates to baseline competitiveness. Each plot for males (blue) represents 22 individuals and their average competitiveness score at baseline (x-axis) and endline (y-axis), and each plot for females (red) represents 16-17 individuals. We see that those who are least willing to compete increase their competitiveness more, while those with the maximal willingness to compete reduce their score.[12]

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[12] 62 percent of males and 59 percent of females increase their score, while 12 percent of males and 9 percent of females do not change their score at all. There are in total 25 individuals (16 males and 9 females) who attains the maximal score at baseline, and hence, cannot by definition increase their score any further, as represented by the red and the blue plots at the end of the x-axis (see Fig. A.3 in the appendix).

Table A.10
Balance room average roommates' competitiveness at baseline.

	(1)
Female	-0.02
	(0.07)
Troop = 2	-0.24
	(0.21)
Troop = 3	0.20
	(0.19)
Troop = 4	-0.41*
	(0.24)
Troop = 5	0.00
	(0.21)
Troop = 6	-0.41
	(0.26)
Troop = 7	0.07
	(0.19)
Troop = 8	-0.34
	(0.21)
Troop = 9	-0.29
	(0.27)
Troop = 10	-0.44
	(0.30)
Observations	620
Troop FE	Yes
Individual controls	No
Sample	All
Mean dep. var. male	4.49
SD	0.84

Note: Dependent variable is the competitiveness index score of roommates (excluding ego) measured at baseline. OLS Standard errors clustered by room in parentheses (145 clusters). **p<.01; ***p<.001; *p<.05;

As noted in the second section, competitive individuals are highly motivated and ambitious. We construct an index for military service ambitions, denoted *ambition index*, which consists of willingness to work in the armed forces, motivation for serving, and whether the soldier plans to attend a prestigious military academy, reported both at baseline and endline (these are the measures we have in both waves). We find that our competition measure correlates with ambitions, both at baseline and endline. Furthermore, we see that changes in the ambition index correlates with changes in competitiveness, see Table A.13. The analyses in Tables A.13 and A.14 were not pre-registered.

Table A.11

Perceived competitiveness in the room measured at endline.

	(1)	(2)	(3)	(4)	(5)	(6)
Female	-0.64***	-0.60***	-0.60***	-0.60***	-0.80	-0.86
	(0.15)	(0.15)	(0.15)	(0.17)	(1.22)	(1.27)
Competitiveness (mean)		0.13**	0.13**	0.11*	0.11	0.09
		(0.06)	(0.06)	(0.06)	(0.09)	(0.09)
Room average: others competitiveness			-0.02	-0.02	-0.02	-0.03
			(0.10)	(0.10)	(0.13)	(0.13)
Female*Competitiveness					0.05	0.04
					(0.12)	(0.13)
Female*Competitiveness in room					-0.01	0.01
					(0.21)	(0.21)
Observations	618	618	618	618	618	618
Troop FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	No	No	Yes	Yes	No	Yes
Sample	All	All	All	All	All	All
Mean dep. var. male	3.68	3.68	3.68	3.68	3.68	3.68
SD	1.70	1.70	1.70	1.70	1.70	1.70
Mean Competitiveness	4.89	4.89	4.89	4.89	4.89	4.89

Note: The dependent variable is perceived competitiveness in the room measured at endline. OLS. Standard errors clustered by room in parentheses (145 clusters). *$p<.05$; **$p<.01$; ***$p<.001$. Pre-specified set of controls also includes attitudes, see section A1.

Table A.12

Competitiveness and ambitions.

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Interested in working in the armed forces w1	How motivated w1	Suited to complete service w1	Will continue after recruit period w1	Have ambitions for service w1
Competitiveness (mean)	0.04**	0.22***	0.01*	0.02*	0.02
	(0.02)	(0.05)	(0.01)	(0.01)	(0.02)
Observations	620	620	620	620	620
Individual controls	No	No	No	No	No
Sample	All	All	All	All	All
Mean dep. var. male	0.56	8.64	0.99	0.17	0.60
SD dep. var.	0.50	1.42	0.11	0.37	0.49
Mean Competitiveness	4.89	4.89	4.89	4.89	4.89

Note: Robust standard errors in parentheses. **$p<.01$. Independent variables: (1): Interested in working in the armed forces w1, yes=1, 0 otherwise (2) How motivated they are, scale 1-10, standardized to mean 0 sd 1, (3) Considers themselves suited to complete service, yes=1, 0 otherwise (4) Whether they want to consider working in the armed forces after the recruit school, yes=1, 0 otherwise (5) Whether they have a clear idea for what after-bootcamp service they want, yes=1, 0 otherwise. *$p<.05$; ***$p<.001$

Table A.13

Changes in competitiveness and ambitions.

VARIABLES	(1) W1	(2) W2	(3) W2	(4) Change competitiveness
Ambitions index			0.51***	
			(0.05)	
Competitiveness	0.06***	0.07***	0.04**	
	(0.01)	(0.02)	(0.02)	
Change_ambitions index				0.35***
				(0.08)
Observations	620	620	620	620
Mean dep. var. male	0.60	0.27	0.27	0.34
SD	0.49	0.47	0.47	0.89
Mean Competitiveness	4.89	4.89	4.89	
Mean change_army_index				0.05

Note: Dependent variable is the ambitions index at either baseline or endline. Column (1): Dependent variable is the ambitions index measured at baseline, independent variable is the individual competitiveness index measured at baseline. Column (2): Dependent variable is the ambitions index measured at endline. Column (3): Also controls for the ambitions index measured at baseline. Column (4): Dependent variable is change in competitiveness (competitiveness index w2-competitiveness index w1), the independent variable is change in the ambitions index (ambitions index w2-ambitions index w1). OLS. Robust standard errors in parentheses, * $p<0.1$; **$p<0.05$; ***$p<0.01$

4.1. Secondary hypotheses

In this section we investigate whether the competitiveness of individuals is influenced by their environment and peers. We pre-registered three secondary hypotheses, two on the heterogeneity with respect to room assignment and one regarding the moderating role of officers' attitudes. We stress that none of these factors are randomly assigned in this study. We describe the allocation to rooms in detail in Appendix section A3. In particular, we show that room assignment seems to be fairly exogenous with respect to baseline variables. In particular, the F-tests reported in Table A.5 show that all baseline variables together do not predict living in mixed rooms.

We begin by investigating whether an indicator for mixed room explains variation in female and male competitiveness. In doing so, we restrict the sample to either the female or the male soldiers, add our measure of mixed rooms, and estimate the following regression:

$$Compete_{irt2} = \varphi\text{Mixed}_r + \chi X_{irt1} + \varepsilon_{ir} \tag{3}$$

We use the subscript r for room. The error term ε_{ir} is clustered at the room level. The hypothesis is that φ is statistically significantly different from zero. Here the control variables include the extra room level variables and troop level fixed effects.

In Fig. 2 we display the results separated by living in a mixed room or not (see Appendix Table A.6 for the regression results). We find indications that females in mixed rooms become more competitive than females in non-mixed rooms, but the differences are not significant in a

Table A.14
Competitiveness and wellbeing.

VARIABLES	(1) I like being in the armed forces w2	(2) Military service meaningful w2)	(3) Military service physically challenging w2	(4) Recommend military service w2	(5) I like living in my room w2	(6) At least one friend among roommates w2	(7) Roommates help one another w2
Competitiveness (mean)	0.20***	0.14**	-0.13***	0.03**	0.07	0.04	0.00
	(0.04)	(0.05)	(0.04)	(0.01)	(0.05)	(0.06)	(0.06)
Room average: others competitiveness	-0.04	-0.02	-0.06	0.00	-0.03	-0.13	-0.09
	(0.06)	(0.07)	(0.05)	(0.01)	(0.08)	(0.10)	(0.10)
Female	0.15*	0.28**	0.12	0.05**	0.03	0.12	0.00
	(0.08)	(0.12)	(0.09)	(0.02)	(0.11)	(0.14)	(0.13)
Observations	619	620	620	620	620	620	618
Troop FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	No	No	No	No	No	No	No
Sample	All	All	All	All	All	All	All
Mean dep. var. male	5.98	4.88	4.27	0.89	5.99	6.20	5.43
SD	1.01	1.29	1.22	0.31	1.23	1.77	1.72
Mean Competitiveness	4.89	4.89	4.89	4.89	4.89	4.89	4.90

Note: All dependent variables are measured at endline. Column (1) is "I like being in the armed forces" (7-point, higher value more positive). Column (2): Finding military service meaningful" (7-point, higher value more positive). Column (3): Finding military service physically challenging (7-point, higher value more challenging). Column 4: Recommend military service to others (Yes 1, 0 otherwise). Colmn (5): I like living in my room (7-point, higher value more positive). Column (6): Have at least one friend among roommates w2 (7-point, higher value agrees more). Column (7): Roommates help one another w2 (7-point, higher value agrees more). OLS. Standard errors clustered by room in parentheses (145 clusters). *p<.05; **p<.01; ***p<.001.

pooled regression model.

We also estimate Eq. 4 with baseline competitiveness of the others in the room instead of Mixed as the moderating variable (we show in Table A.10 that there is no gender difference at baseline with respect to how competitive roommates are). We find that a high level of competitiveness in the room is negatively correlated with endline competitiveness for women. In Fig. 3 we show that females' competitiveness is decreasing in the average level of roommates' competitiveness. The regression results are presented in Appendix Tables A.8 and A.9. The coefficient for females interacted with roommate's competitiveness is equal to around -0.15, but only statistically significant at the 10 percent level.

Next, we use the data on officers to see if officer attitudes are correlated with competitiveness. In general, the officers i) report a high willingness to compete, ii) are close to neutral about whether performance matters more than motivation when recruiting soldiers, and iii) agree to some extent that competition during bootcamp is important to identify who is suited to become a good soldier (see Fig. 4). The female officers' score is lower for all measures, but the differences are small and none of them are statistically significant.

We average the officers' competitiveness index across troops, as recruits in a troop share the same staff, and we standardize this measure to have mean 0 and standard deviation equal to 1. We use the same specification as in the main section and add the competitiveness score of the officers to the specification. We replace troop fixed effects (as they correlate perfectly with the competitiveness score of the officers) with a dummy for being enrolled in the air force, so that with being in the navy becomes the base category. We use robust standard errors as we only have 10 troops, which implies that clustered standard errors might be biased. As we show in Table 4, we do not find evidence in favor of staff competitiveness affecting the recruits' willingness to compete.

4.2. Exploratory analyses on perceptions of competitiveness

In addition to our pre-specified analysis, we investigate perceptions of competitiveness. We stress that the results in this section need to be replicated in order to give them as much weight as our pre-specified tests.

We asked the recruits at endline to which extent they agreed that there was a lot of internal competition among roommates. First, we find that females perceive there to be significantly less competition within

the room than what males perceive, see Fig. 5 and Table A.11 in the appendix. Second, the individual competitiveness score is positive and significantly correlated with perceptions, regardless of gender; competitive people in general perceive their room to be a more competitive environment as well. These findings are robust to controlling for competitiveness of roommates measured at baseline.

These exploratory analyses suggest that perceptions about competitiveness in the environment is a potentially important factor to understand individual competitiveness. Future research should investigate this further. In particular, it would be interesting to investigate how changes in perceived competitiveness correlate with changes in competitive preferences, something we are unable to do.

4.3. Exploratory analyses on potential mechanisms: winning/ losing in selection to future position

Bootcamp lasts for 8 weeks, and during the final week, the recruits are informed about where they will continue their training. The selection process is based on individual performances, the recruits' preferences, availability of positions, and the need for personnel in various locations around the country at the time of selection. We collect the endline data the same week as the recruits are preparing to travel to the next part of their training, and we collected data on whether they got their preferred position. This section is inspired by Buser and Yuan (2019), who show using field data from the Dutch Math Olympiad, that women are more likely than men to stop competing if they lose. They also observe that women are much less likely to choose competition after an exogenous loss in a lab experiment.

We explore whether we can observe a similar association between getting one's preferred position ("losing") and the recruits' willingness to compete. 45.6% of the male recruits' report that they did not get their preferred choice, compared to 49.6% of the female recruits. We see in Table A.15 that not getting ones' top choice is negatively associated with competitiveness at endline in column (1). In terms of effect sizes, this is equivalent to about 0.2 of the standard deviation of the mean of competitiveness. The coefficient for females is negative, but insignificant. In (2), we see that the negative association between "losing" and competitiveness at endline is driven by female recruits: female recruits who did not get their top choice report significantly lower willingness to compete at wave 2, while the coefficient for males is close to zero. In (3) and (4), we control for baseline willingness to compete, which reduces

Table A.15

Willingness to compete at endline and not getting their first-choice position.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female	-0.21	0.11	0.02	0.18	-0.03	0.14	0.13	0.20
	(0.29)	(0.29)	(0.19)	(0.20)	(0.19)	(0.20)	(0.20)	(0.26)
Not 1st choice	-0.24**	0.04	-0.16**	-0.02	-0.15**	-0.00	-0.01	0.00
	(0.10)	(0.13)	(0.07)	(0.09)	(0.07)	(0.09)	(0.09)	(0.11)
Notfirst*female		-0.66***		-0.33**		-0.35**	-0.36***	-0.41**
		(0.19)		(0.14)		(0.14)	(0.14)	(0.17)
Competitiveness			0.85***	0.84***	0.83***	0.82***	0.82***	0.79***
			(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)
Grades above median					-0.00	-0.00	-0.01	0.00
					(0.07)	(0.07)	(0.07)	(0.09)
Mother higher education					0.05	0.05	0.06	0.04
					(0.09)	(0.09)	(0.09)	(0.11)
Father higher education					0.05	0.06	0.07	0.13
					(0.07)	(0.07)	(0.07)	(0.09)
Mother works					0.09	0.09	0.07	0.07
					(0.12)	(0.12)	(0.11)	(0.15)
Father works					0.08	0.10	0.08	-0.01
					(0.15)	(0.15)	(0.14)	(0.18)
Plan higher education					0.02	0.03	0.02	-0.00
					(0.09)	(0.09)	(0.09)	(0.11)
Interested in working in the armforc							0.01	-0.01
							(0.07)	(0.09)
Have ambitions for service w1							-0.08	-0.06
							(0.07)	(0.13)
Will continue after recruit period w1							0.02	0.05
							(0.11)	(0.14)
How motivated w1							0.03	0.04
							(0.03)	(0.03)
Suited to complete service w1							-0.39	-0.60*
							(0.34)	(0.35)
Contribute to public goods							0.03	-0.06
							(0.21)	(0.25)
Important to donate blood							-0.12	-0.14
							(0.10)	(0.13)
Willing to take risk (8 bins) = 4					-0.26	-0.27	-0.26	-0.24
					(0.22)	(0.22)	(0.22)	(0.27)
Willing to take risk (8 bins) = 5					0.01	-0.00	-0.00	-0.04
					(0.20)	(0.20)	(0.20)	(0.26)
Willing to take risk (8 bins) = 6					-0.10	-0.09	-0.09	-0.15
					(0.20)	(0.20)	(0.20)	(0.26)
Willing to take risk (8 bins) = 7					0.01	-0.00	-0.01	-0.01
					(0.20)	(0.20)	(0.20)	(0.25)
Willing to take risk (8 bins) = 8					-0.00	-0.02	-0.03	-0.03
					(0.20)	(0.20)	(0.21)	(0.27)
Willing to take risk (8 bins) = 9					-0.12	-0.10	-0.11	-0.28
					(0.23)	(0.23)	(0.23)	(0.31)
Willing to take risk (8 bins) = 10					0.35	0.36	0.31	0.22
					(0.22)	(0.22)	(0.23)	(0.29)
Observations	619	619	619	619	619	619	619	615
Troop FE	yes	yes	yes	yes	yes	yes	yes	yes
Individual controls	no	no	no	no	yes	yes	yes	yes
Sample	All	All	All	All	All	All	All	All
Mean std compete_index male	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
SD	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Mean compete_index_w2 male	5.41	5.41	5.41	5.41	5.41	5.41	5.41	5.42
SD	1.16	1.16	1.16	1.16	1.16	1.16	1.16	1.16

Note: The dependent variable is the competitiveness index score measured at endline. Did not get first choice is equal to 1 for those recruits who report that they did not get their first choice when positions for the period following bootcamp were allocated. Pre-specified controls in (6). In column (7), additional controls have been added (measured at baseline): binary variable equal to 1 for recruits who report yes/ maybe that they would be interested in working in the armed forces, who have specific ideas for what service they would like to pursue as conscripts, who are considering continuing in the armed forces for a while after the end of conscription, whether they consider themselves suited to complete service, a continuous measure of their self-assessed motivation for serving. Contribute to public goods and Important to donate blood is equal to 1 for the half of the sample who agrees that they are a type of person who contributes to public goods/ that it is important to donate blood, 0 otherwise. In (8) a measure of position fixed effects is included, based on what the recruits reported at baseline. OLS. Robust standard errors in parentheses. *p<.05; **p<.01; ***p<.001.

Table A.16

Not getting their first-choice position and baseline willingness to compete.

	(1)	(2)	(3)	(4)	(5)	(6)
Female	0.03	0.02	0.04	0.09	0.09	0.06
	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.15)
Competition index (std)		-0.02	0.02	0.02	0.02	0.00
		(0.02)	(0.03)	(0.03)	(0.03)	(0.04)
Female*competition index (std)			-0.10**	-0.08**	-0.09**	-0.08
			(0.04)	(0.04)	(0.04)	(0.05)
Grades above median				-0.06	-0.05	-0.05
				(0.04)	(0.04)	(0.05)
Mother higher education				0.01	-0.01	-0.02
				(0.05)	(0.05)	(0.06)
Father higher education				-0.01	-0.02	-0.01
				(0.04)	(0.04)	(0.06)
Mother works				-0.02	-0.02	0.02
				(0.08)	(0.08)	(0.10)
Father works				0.33***	0.33***	0.34***
				(0.07)	(0.07)	(0.09)
Plan higher education				-0.09*	-0.06	-0.05
				(0.05)	(0.05)	(0.07)
Interested in working in the armed forces w1					0.01	0.02
					(0.04)	(0.06)
Have ambitions for service w1					-0.06	0.05
					(0.04)	(0.08)
Will continue after recruit period w1					0.12*	0.16**
					(0.06)	(0.08)
How motivated w1					0.02	0.02
					(0.02)	(0.02)
Suited to complete service w1					-0.03	0.04
					(0.16)	(0.20)
Contribute to public goods					0.21*	0.17
					(0.11)	(0.14)
Important to donate blood					-0.03	-0.03
					(0.06)	(0.07)
Willing to take risk (8 bins) = 4				-0.01	-0.01	-0.03
				(0.11)	(0.12)	(0.14)
Willing to take risk (8 bins) = 5				-0.07	-0.09	-0.09
				(0.10)	(0.11)	(0.12)
Willing to take risk (8 bins) = 6				-0.11	-0.10	-0.10
				(0.10)	(0.11)	(0.13)
Willing to take risk (8 bins) = 7				-0.09	-0.10	-0.10
				(0.10)	(0.10)	(0.12)
Willing to take risk (8 bins) = 8				-0.18	-0.17	-0.20
				(0.11)	(0.11)	(0.13)
Willing to take risk (8 bins) = 9				-0.15	-0.15	-0.11
				(0.13)	(0.13)	(0.15)
Willing to take risk (8 bins) = 10				-0.22*	-0.23*	-0.18
				(0.12)	(0.13)	(0.15)
Observations	619	619	619	619	619	615
Troop FE	yes	yes	yes	yes	yes	yes
Individual controls	no	no	no	yes	yes	yes
Mean depvar male	0.45	0.45	0.45	0.45	0.45	0.45
SD	0.50	1.00	0.50	0.50	0.50	0.50
Mean compete_index	0.02	0.02	0.02	0.02	0.02	0.02
Mean compete_index female	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12

Note: The dependent variable is *Did not get first choice*, which is equal to 1 for those recruits who report that they did not get their first choice when positions for the period following bootcamp were allocated. (2)-(6) include the competitiveness index score measured at baseline, standardized with mean 0 and a standard deviation of 1 for the main sample. Pre-specified controls in (4). In column (5) the additional controls have been added (measured at baseline): binary variable equal to 1 for recruits who report yes/ maybe that they would be interested in working in the armed forces, who have specific ideas for what service they would like to pursue as conscripts, who are considering continuing in the armed forces for a while after the end of conscription, whether they consider themselves suited to complete service, a continuous measure of their self-assessed motivation for serving. Contribute to public goods and Important to donate blood is equal to 1 for the half of the sample who agrees that they are a type of person who contributes to public goods/ that it is important to donate blood, 0 otherwise. In (8) a measure of position fixed effects is included, based on what the recruits reported at baseline. OLS. Robust standard errors in parentheses. *p<.05; **p<.01; ***p<.001.

the magnitude by half, but the result is still statistically significant at the 1 percent level. In (5), we include the same controls as in previous analyses, and in (6) we control for measures of ability, aspirations for service, motivation and higher education in the armed forces, and proxies for social preferences, in addition to the previously specified controls. In (7) we include a crude measure for what position the recruits were targeting.[13] Overall, we find that "losing" is negatively and significantly associated with competitiveness for female recruits at endline. In terms of effect size, it ranges between 0.18-0.20 in (5)-(8).

These results do not have a causal interpretation, as these positions are not randomly allocated. Socio-economic factors, the process of allocating these positions, as well as other elements in the recruits' environment, initial competitiveness and so on are likely to affect aspirations and preferred positions. This in turn should be expected to affect the outcome, making it hard to identify the exact mechanisms at work. Moreover, this part of the analysis was not pre-specified, which means that inference is more uncertain.

We show how baseline variables are correlated with not getting ones' preferred position in Table A.16. First, we see that there is no initial gender difference in getting ones' preferred position in column (1). In (2) we see that competitiveness measured at baseline is not correlated with getting their preferred position. In (3), we add an interaction between female recruits and competitiveness, and we see that this association is statistically significant and negative, meaning that more competitive female recruits are more likely to get their preferred position. In terms of effect sizes, the coefficient ranges between 0.07-0.08, and it is no longer significant when we add position fixed effects in (6).

What are the implications for our main findings? Fig. 6 below displays a binscatter plot with the absolute change in competitiveness for males (blue line) and females (red line) between endline and baseline on the y-axis and baseline competitiveness on the x-axis, with one panel for those who got their top choice (right panel) and those who did not get their top choice (left panel). For males and females who got their top choice, we see that the large majority become more competitive, with relatively similar patterns across genders. For those who did not get their top choice, we first observe that the male recruits increase their competitiveness relatively more than female recruits across all baseline competitiveness levels, and that the pattern is similar regardless of whether they got their top position. Second, we see that it is the initially more competitive female recruits who reduce their competitiveness. Thus, while in the Armed Forces, most recruits become more competitive, with the exception of very competitive female recruits who do not get their top choice.

5. Concluding remarks

Women are less willing to compete than men, which likely has consequences for educational choices and on the labor market. The preference for competition has been shown to emerge early in life and to be stable in stable environments. We show, however, that exposing individuals to a competitive environment in the Norwegian Armed Forces changes the competitive preferences of both women and men.

We show that there is selection into our setting, whereby the competitive preferences are already strong. Comparing our results to Norwegian citizens we find that the gender difference is substantially smaller and that the selection into the army is strong enough to eliminate the gender difference if we compare the female soldiers to male citizens. While we still find gender differences at endline, we note that the average women at endline is as competitive as the average man at

baseline.

We show that the change in preferences is unlikely to be driven by variations within our sample in competitiveness of the officers, peer competitiveness or peer gender. Nonetheless, the results show that the environment affects preferences. Exploratory analysis indicate that allocation of future positions matters for female, but not for male, recruits. Female recruits who do not get their top choice scores lower on competitiveness at endline compared to males, who seem unaffected by whether or not they got their top choice, holding a large number of factors constant.

The results are based on the results from an index measuring components of competitiveness, shown to correlate with actual behavior in experiments (Buser et al., 2021; Fallucchi et al., 2020). Without an actual experiment at both baseline and endline we cannot rule out that the responses we are collecting reflect perceptions of norms rather than actual preferences (Eckel & Füllbrunn, 2015). If the bootcamp is indeed a very competitive setting, this could lead to social desirability bias. If women are more prone to respond to social desirability, our results could underestimate the gender difference in competitiveness at endline. Relatedly, the military experience might change what the recruits associate with competition. Cassar et al. (2016, 2021) show that women compete more when the incentives/ payoffs from competing are more socially oriented. If the soldiers are answering the questions in our competition index with a different mindset (as soldiers, protectors and defenders of the state as opposed to just-graduated teenagers), this could affect how they think about competition, and thus constitute a potential explanation for the increase in competitiveness. It should be noted, however, that we find that both men and women increase their competitiveness.

What is it in this environment that leads to an increase in competitiveness? One the one hand, we do not find evidence in our data from the officers that they emphasize competition more than other factors, such as cooperation. Informal talks with previous soldiers have not indicated that bootcamp is a very competitive setting. But we do know that the recruitment processes in the armed forces that follows conscription service are known to be very competitive. As only half of the recruits get their top choice, the competition is tough for some positions. This is compatible with a world where military training comprises both competitive and non-competitive elements, but for those recruits who have specific ambitions, this is a very competitive setting. Reuben et al. (2021) also find that more competitors in the tournament makes participants more competitive in a lab experiment. The number of competitors is also a likely mechanism in this setting, but in order to investigate this properly, we would have needed detailed information about the soldiers baseline aspirations and ambitions, elicited information about their beliefs about the extent of competition, detailed information about the availability of positions at endline, how these position rank in terms of attractiveness, the recruits submitted ranking of positions, as well as their perception of the process and what information they had been provided with concerning the requirements of each position. Unfortunately, we did not collect this information. In future work it would also be interesting to uncover details of the allocation process. Are positions allocated according to the requirements in a transparent and fair way? Is grading based on objective criteria, or a reflection of the subjective perception of the officer in charge? There is a vast literature on discrimination in the labor marker (Betrand & Duflo, 2017), and in future work, it would be interesting to investigate to which extent the recruits perceive these processes to be fair and transparent. All of these aspects of the allocation process of positions are likely to spill over on the recruits' perception to how competitive bootcamp is. We conclude that for studies in the field, more work needs to be done to formalize what a competitive setting actually is, especially in sectors that are not archetypical representations of competitive settings.

The Norwegian Armed Forces encourages women to pursue a career in the armed forces, but recent research has shown that the setting is one with more hostile gender attitudes than in Norwegian society in general

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[13] We asked recruits to self-report their preferred position at baseline. Based on this information, we add position fixed effect. Ideally, the survey should have included pre-specified positions, which it unfortunately did not. Hence, this measure indicates whether the recruit had clear aspirations or not, and whether they had aspiration for more specific or generic positions.

(Dahl et al., 2021). Over the recent years there has also been several scandals on sexual harassment, and although the armed forces repeatedly have stated that harassment is not tolerated, a number of reports have documented that sexual harassment, bullying and other unwanted behavior persist (Fasting et al., 2021; Rones et al., 2018). Sexual harassment is very likely to affect female turnover and aspirations, as well as competitiveness, so there is a dire need for more studies that link these topics.

To summarize, our results show that when highly competitive individuals work and spend time together over a longer period, their competitiveness increases even further, and it is the least competitive individuals who increase their competitiveness the most. If increased individual competitiveness leads to better individual socioeconomic outcomes, it is important to understand when and where this applies. Is there a parallel to other settings, such as schools, so that students who enter into highly competitive programs become even more competitive, or for firms who rely on highly competitive recruitment processes? Will exposure to more competitive settings always drive up competition, or is there a threshold where less competitive individuals resign? What about settings characterized by low competitiveness? In this setting, being competitive is associated with positive outcomes, such as wellbeing and achievements. We know that this is not always the case (see for instance Eckel and and Füllbrunn (2015 and Roth (2006)). But if negative outcomes lead promising or ambitious candidates to quit or give up too easily, then investigating channels to mitigate this could be valuable. As Buser and Yuan (2019) write, the gender difference in the reaction to negative competition outcomes may help to explain why fewer women make it to the top in business and academia.

We are unable to study whether the changed competitiveness translates into behavior. Moreover, while we have not been able to document any significant negative aspects of living and working with roommates who are competitive, there are other potential drawbacks to a highly competitive environment. There are a number of studies finding that female performance in fact does not improve and often suffers under competition, whereas males, if anything seem to improve (Buser, 2016; Gill & Prowse, 2014; Gneezy et al., 2003; Morin, 2015; Niederle & Vesterlund, 2010; Ors et al., 2013; Price, 2008). In future work we aim to study how changes in reported competitiveness links to behavior in our setting.

Future research is needed to investigate whether these changes are stable over time, if competitiveness continue to change, or if the competitiveness reverses to its original level. Another important quest for future research will be to investigate the specific environmental factors that are conducive for preference change. Our exploratory analyses lend support to the existing research concerning gender differences with respect to winning and losing, and that the line of work that investigates various affirmative action and/ or information treatments should be expanded to various sectors and occupations.

Acknowledgements

Appendix

A.1. Coding of independent variables

Female: Administrative data on sex connected to most individuals in the baseline survey. Replaced with information from the follow up data if missing at baseline

High grades: Self reported grades from high school at baseline, equal to 1 if grades are above median and zero otherwise.

Risk aversion: Answer to the question "In general, how willing are you to take risks?" The answer categories are from 1 to 10 where 1 is labeled "not willing to take risk at all", and 10 is labeled "very willing to take risk".

Mother and Father employed (2 variables): Based on the question: "Are your parents working?" Original: 1= Yes, both, 2=My mother is in work, my father is not, 3=My father is in work, my mother is not, 4=No, neither of them is in work. Recode: We recode into two variables: *Mother employed* (1/2=1, 3/4 = 0) and *Father employed* (1 and 3=1, 2 and 4=0)

Mother and Father with high education (2 variables): Based on the question: "Do your parents have higher education (university/college)?". Original: 1= Yes, both have higher education, 2=My mother has higher education, my father has not, 3= My father has higher education, my mother has not, 4=No, neither of them have higher education Recode: We recode into two variables: *Mother with high education* (1/2=1, 3/4= 0) and *Father with high education* (1 and 3=1, 2 and 4=0)

Planned education: Based on the question: "Do you plan to take higher education?" Original: 1=Yes, 2=Don't know, 3=No Recode: 2/3=0.

Room level variables

Mixed gender=1 if there is at least 1 person of each sex in the room, zero otherwise.

Room level baseline competitiveness: The average score on the competitiveness scale for all others in the room (excluding the person herself)

Variables to be used when investigating mixed rooms (all measured at baseline)

Attitude towards mixed gender teams: Based on the statement: "A team performs better when it consists of people with the same gender". The answer categories are on a five point scale from Agree a lot to Disagree a lot. We will create dummy variables so that at least 5 percent of the individuals are in each group.

Attitude towards mixed living in mixed gender rooms: Based on the question: "To what degree do you prefer to live in a room where everyone has the same gender as you?" The answer categories are on a five point scale from Strongly prefer that everyone is of the same gender to Strongly prefer a mixed gender room. We will create dummy variables so that at least 5 percent of the individuals are in each group.

Attitude towards women in the Armed Forces: : Based on the statement: "A higher share of women in the Armed Forces reduces the defense capacity." The answer categories are on a five point scale from Agree a lot to Disagree a lot. We will create dummy variables so that at least 5 percent of the individuals are in each group.

Share of friends of opposite gender: Based on the question: "During your last year of school. How many of your friends were of opposite sex than you?" The answer categories are on a seven point scale from No one to All. We will create dummy variables so that at least 5 percent of the individuals are in each group.

Variables collected at endline (wave 2): perceived competitiveness in the room, collaboration among soldiers, and how much the soldiers like their room, whether they enjoy military service and related, to describe differences and correlations with own and room competitiveness.

Respondents with missing background information will be included in the analysis by giving them a missing value and missing indicators. The missing indicators will be included in the regressions.

A.2. Individual figures and tables referred to in the text

Figs. A1 and A2.

A.3. Description of room variables and room level balance tests

We worked with the military camp to allocate soldiers to rooms, so that half of the female soldiers would be in single-gender rooms, and the rest in mixed gender rooms. Due to a number of practical difficulties at

the camp, in particular that recruits arrived at other times than scheduled and technical problems with the administrative system in the camp, it was not possible to use a common protocol for all troops at all times, and different troops solved the allocation process in their own manner. Hence, allocation to rooms was not randomized and we investigate the plausibility of treating it as exogenous empirically. Furthermore, the camp changed the room structure a few weeks into bootcamp. 81 percent remained in the same room. 20% of females and 19% of males changed rooms. Among those who changed, 43% of women and 28% of men in single-gender rooms changed rooms, while 7% of women and 12% of males in mixed rooms changed rooms. In our estimations, we use the rooms allocated at baseline (intention to treat).

In Table A.4 we present the shares of treated with mixed rooms within troops, as well as female and male shares. We see that there are large variations: Within one troop there are only female and male rooms, one troop has only mixed rooms, and in one troop all females are living in mixed rooms. Overall, 56 percent of males live in mixed rooms, and 64 percent of women. On average, 60 percent of all individuals are living in mixed rooms.

We begin by investigating whether an indicator for mixed room explains variation in female and male competitiveness in Table A.6. In doing so, we restrict the sample to either the female or the male soldiers, add our measure of mixed rooms. Controlling for competitiveness measured at baseline in (2), we see that there is a larger difference in competitiveness measured at endline for females in mixed rooms. Adding the full set of controls in (3), the difference is still marginally significant at 10 percent. There is no corresponding difference for mixed rooms for males, as can be seen in column (4)-(6). After controlling for baseline competitiveness, there is close to zero difference for males in mixed and non-mixed rooms. In (7)-(9) we investigate if the gender difference in competitiveness is moderated by mixed rooms. When testing this hypothesis, we use the full sample of both men and women, add a female dummy and an interaction term between female and mixed rooms. We find that women in non-mix rooms score significantly lower on the competitiveness scale compared to males in non-mix rooms. The coefficient for males in mixed rooms is small and positive, but not significant. The coefficient for women in mixed room is positive, but not significant. In order to investigate whether the coefficient for mixed rooms for males is different from the coefficient for mixed rooms for women, we interact all covariates in (10)-(12) with female. We do not find that they are statistically different.

A.4. Ambitions and motivation

Table A7

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