Pre-analysis plan for additional long run results for "Does Integration Change Gender Attitudes?"

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Abstract: We have previously found that exposure of men to women in the Norwegian army changes attitudes about mixed-gender productivity, gender roles, and gender identity in the short run. We will now investigate longer term effects on the same outcomes as well as effects on other outcomes using register data. We have not yet received the register data and in this plan we describe the hypotheses to be tested and how they will be tested once we get the data. The description includes how the variables are coded, how we will deal with missing values, and the specification of the estimation equations.

Keywords: Gender attitudes, occupational segregation, contact theory

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1 Introduction

In our previous analyses (documented in Dahl et al. (2018)) we find that living and working with women for eight weeks causes men to adopt more egalitarian attitudes. Whether such effects are durable, and whether exposure to women has an effect on performance and longer run education and career choices are open questions of high relevance. We already have access to a six month follow up survey from the military where some of our attitude questions were asked.[1] Hence, the analysis of the longer run attitude data is not covered by the present pre-analysis plan, but it directly mirrors the analyses of the short run outcomes. We will also add data from the service evaluation which is conducted near the end of the initial service period as well as administrative data from the Norwegian registers on education, occupation, and workplace characteristics. These data have not been received yet and we describe here how we plan to analyze them.

2 Data and coding of long run behavioral outcomes

For confidentiality reasons, the military is working directly with Statistics Norway to create a merged dataset for us. The data for merging on longer run outcomes includes information on Camps, Buildings, Troops and Rooms during bootcamp, whether the rooms were part of the sample that was randomly assigned, and a military ID number. This data is merged with data on the service evaluation by the military using the military ID number and the Norwegian personal number is added. The military ID number is deleted and the data is sent to Statistics Norway. Statistics Norway then uses the Norwegian personal number to merge on data on education, occupation, and workplace characteristics. An encrypted ID is added in place of the personal number and the data is sent to the Frisch centre and stored at a secure server.

2.1 Medium-term performance data.

We will use data from the service evaluation, which is conducted near the end of the initial service period (10 months for a typical assignment), to get longer run measures

[1] In particular, the follow up survey included two of our three gender attitude questions: The question on whether mixed versus same gender teams perform better and the gender identity question on the disavowal of feminine traits. The question on whether housework should be shared equally was not included.

of performance in the military. We have two types of performance variables: grades and other measures of achievement.

Our main interest is the data on grades. The possible grades are Below Expectation, At Expectation, Above Expectation, and Excellent. Grades are given in four different categories:

- Conduct: At Expectation = the soldier performs the required tasks reliably, acts courteously, is punctual, and shows respect for fellow human beings.
- Cooperation and Communication: At Expectation = the soldier solves tasks together with others, is open to the views of others, contributes to good communication, and shows a willingness to cooperate.
- Independence and Initiative: At Expectation = the soldier takes initiative and is active as well as demonstrates an ability for independent judgment.
- Overall Assessment: At Expectation or above is needed to qualify for international operations, the home guard, or further education and employment in the Military.

We will encode these variables so that they range from 1-4, where 4 is Excellent. We will then create binary variables. The binary variable will be set in order to create 2 groups, as similar in size as possible, while respecting the order of the answers. For example, if 25% have grade 1, 25% have 2, 25% have 3 and 25% have 4, then the binary variable will be equal to 1 if the respondent has 3 or 4 and zero otherwise. On the other hand, if for example 20% have 1, 10% have 2, 5% have 3 and 65% have 4, then the binary variable will be equal to 1 if the respondent has 4. We will only consider the answers of the respondents in the control group (the all male rooms) when creating the coding rules for the binary variables.

Our main variables of interest will be the binary variables for the different grades and a similarly constructed binary variable based on the average of the grades. We will also explore if there are effects at other margins of the distributions.

For other measures of achievement, which we will report in the paper, the data contains information on:

- Ending military rank. We will define a dummy variable for obtaining a higher military rank than Private.

- Awards and Commendations: There are many awards and commendations in the military, although we do not have a list of possible awards or their distribution at this point. Therefore, we will primarily use the log of the number of awards and commendations, and then explore awards and commendations which have variation in their receipt.

- Whether the individual has served in a leadership role. We will create a dummy variable equal to 1 if the individual has had a leadership role.

2.2 Longer-term education, occupation, and workplace data.

By linking our data from the military with registry data from Statistics Norway, we will have data on whether an individual was exposed to women during bootcamp and their field of study in college (if they enroll in college) and their occupation (if they work). This will enable us to see if treatment causes men to choose a field of study or occupation which has a higher fraction of women in it.

We will create the following variables:

Share of women in field of study. We define this as the share of women in the field of study of the individual in the first year of enrollment in higher education after 2014. It is based on the first four numbers in the Norwegian Standard for Educational codes, which corresponds to the discipline studied. If there are fewer than 100 observations in a four digit code, we will collapse to the three digit level. We calculate the share of women using all individuals enrolled in higher education born between 1991 and 1995. Individuals not pursuing higher education will be coded as missing when this variable is used as an outcome.

Share of women in occupation. We define this as the share of women in the occupation of the individual. Occupation is based on the Norwegian version of the International Standard Classification of Occupations and we use the first four digits, as we did for the population in calculating the Duncan index in the original paper. If there are fewer than 100 observations in a four digit code, we will collapse to the three digit level. The share of women is calculated using all individuals that are working and that are between 18-65 years old. The variable will be coded based on the first year the individual has been working after 2014. Individuals not working will be coded as missing when this variable is used as an outcome.

Share of women in the establishment. We are also able to link our individuals to data on the fraction of women in the establishment an individual works at. We will take

all individuals working in the same establishment and calculate the share of women. If an individual has several jobs, the establishment is based on the job with the highest earnings. The variable will be coded based on the first year the individual has been working after 2014. Individuals not working will be coded as missing when this variable is used as an outcome.

Some individuals will be enrolled in higher education after completion of military service, and some will be working. Therefore, to increase the sample of observations with non-missing outcome data, we will create a combined outcome variable *Share of women in field of study or occupation.* We will normalize the two share variables to be mean 0 and variance 1 before combining them. This will be our main variable of interest for the long run analysis of the share data, although we will also report results for *Share of women in field of study*, *Share of women in occupation*, and *Share of women in the establishment*. We will also explore other ways of coding the long term variables, such as creating dummy variables based on the shares.

2.3 Control variables

Including basic demographic characteristics may improve the precision of our estimates. We will code the following variables:

- Share of women in high school education track: The tracks are defined by the six numbered education codes for the whole population born in 1991 to 1995. If the group has fewer than 100 individuals we replace it with the share of women in the track defined by the first five numbers of the code, then the first four and finally the first three numbers.
- Final grades in junior high school: Average of all grades.
- Immigrant: Dummy variable = 1 if the individual is born abroad or if both parents are born abroad, 0 otherwise.
- Sister and Brother: Indicator variables for having at least one sister or having at least one brother.
- Mother's and father's share of women in their occupation: Using the same occupation codes as above. We use the occupation that the parent had in 2010, when our individuals were around 15 years old. If the parent is not working in

2010 we will use the first non missing value for the variable in the following order: 2009, 2011, 2008, 2012, 2007, 2013.

- Parents have higher education: Indicator variables equal to 1 if mother or father respectively have any higher education.
- Mother's and father's share of women in their field of study: Using the same education codes as above but based on data for the whole Norwegian population aged 45-65. We will base this on the highest education the parent has attained by year 2010.

3 Empirical specifications

In the analyses we will only include the 942 individuals (163 rooms/squads) that were part of the sample using random assignment.

3.1 Main regressions

In the main regressions we limit the sample to the 815 men that were randomly assigned to either male only or gender mixed squads. We model outcomes for individual i, in squad j, in troop k, in period 3 (longer run), as:

$$y_{ij3} = \alpha_k + \theta F_{ij} + \gamma x_i + \epsilon_{ij3} \tag{1}$$

where α_k is a set of troop fixed effects, F_{ij} is a dummy variable for whether a female is assigned to individual i's squad j and x_i is a set of pre-determined control variables described in Section 2.3. We will investigate whether the control variables can help with estimating the effects more precisely. We will also see if we can improve precision in the estimates by picking optimal controls from the total list of controls using LASSO (Belloni et al., 2014). Since treatment is at the room level, in all of our main regressions we will report standard errors clustered by room.

3.2 Attrition, missing values, and limited variation

We will check whether attrition and missing outcomes are correlated with treatment. If there are statistically significant differences in attrition or non-response between treatment and control (controlling for the troop fixed effects), we will follow the correction proposed by Lee (2009).

If we have missing values on explanatory variables we will code the variables as zero and include dummy variables controlling for missing status so that we do not lose observations.

4 Archive

The pre-analysis plan is archived before the longer run administrative data is received. We archive it at the registry for randomized controlled trials in economics held by The American Economic Association on June 9, 2020. Data is expected in late June at the earliest.

References

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