

Language Influences Public Attitudes toward Gender Equality

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Does the way we speak affect what we think about gender equality? Languages vary by how much they require speakers to attend to gender. Genderless tongues (e.g., Estonian) do not oblige speakers to designate the gender of objects, while gendered tongues do (e.g., Russian). By neglecting to distinguish between male and female objects, we hypothesize that speakers of genderless tongues will express more liberalized attitudes toward gender equality. Using an experiment that assigned the interview language to 1,200 Estonian/Russian bilinguals, we find support for this proposition. In a second experiment, we replicate this result and demonstrate its absence for attitudes without obvious gender referents. We also provide some evidence suggesting that language effects weaken when social norms about acceptable behavior are made salient. Finally, we extend our principal finding through a cross-national analysis of survey data. Our results imply that language may have significant consequences for mass opinion about gender equality.

Many women across different nations still lag behind men in several domains (Blau, Brinton, Grusky 2006; OECD 2012), particularly in politics, where they are woefully underrepresented and underplaced (Arriola and Johnson 2014; Hinojosa 2012; O'Brien 2015; O'Brien and Rickne 2016). One line of investigation suggests that patriarchal attitudes and beliefs promote and maintain gender inequality (Epstein 2007; Inglehart and Norris 2003; Iversen and Rosenbluth 2010), with asymmetrical attitudes toward females affecting women's political representation (Huddy and Terkildsen 1993; Sanbonmatsu 2002) and economic opportunities (Fortin 2005), even in highly developed societies. Nevertheless, this research has difficulty explaining where these sentiments arise from in the first place and why they persist.

Part of the answer, we believe, has to do with the language one speaks. Languages vary by the degree to which they require speakers to attend to and encode gender (Boroditsky, Schmidt, and Phillips 2003; Corbett 1991; Cubelli et al. 2011; Vigliocco

et al. 2005). *Genderless* languages, such as Estonian or Finnish, do not require speakers to designate the gender of objects—even the word for “he” and “she” is the same in these tongues. In contrast, *gendered* languages, like Spanish and Russian, require speakers to differentiate genders and assign it to objects.¹ Spanish speakers, for instance, must mark the object “moon” as feminine by using the definite article *la*, as in *la luna*. Such grammatical rules make gender a more salient category for speakers.

If language sets a frame of mind for how people think, then nuances in gender markings across languages might partly account for individual differences in attitudes about gender equality. Cognitive psychologists find that language reliably affects human thinking (Boroditsky 2001; Boroditsky and Gaby 2010; Boroditsky et al. 2003; Fuhrman et al. 2011; Slobin 1996), with some political psychologists showing that language shapes survey response (Lee and Pérez 2014; Pérez 2015, 2016), thus opening a door to possible language effects on political opinions.

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1. All languages fall in between these two poles insofar as they contain gender markings. For example, English is weakly gendered: it uses gendered pronouns but does not require speakers to assign gender to objects. The *World Atlas of Language Structures* (WALS; Dryer and Haspelmath 2013) records that in 19 of the 141 countries covered, the dominant language is genderless, while in 39 it is gendered. The remaining languages contain varying degrees of gender markers.

We theorize that speaking a genderless tongue promotes greater perceived equity between men and women by neglecting to formally distinguish between male and female objects. Speakers of such languages are likely to find it harder to perceive a “natural” asymmetry between the sexes. This should affect opinions about gender equality, where speakers of genderless tongues express more support for political efforts seeking to rectify gender imbalances.

We test our claim across three studies. Study 1 randomly assigned the interview language to bilingual adults in Estonia who speak equally well a gendered (Russian) and genderless (Estonian) language.² This design lets us identify the effect of speaking a gendered or genderless tongue on people’s views about gender equality (Dunning 2016; Green 2004). We find that interviewing in a genderless tongue meaningfully affects people’s attitudes about gender parity, with respondents assigned to interview in Estonian reporting more liberalized attitudes than those assigned to interview in Russian. Study 2 replicates this principal result through a second experiment and bolsters it in two ways. First, a placebo test suggests that our language effects are limited to domains that clearly evoke gender. Second, we uncover some evidence that our language effects weaken when social norms about appropriate behavior are salient. Study 3 extends our main experimental finding beyond Estonia through a cross-national analysis of survey data from about 90 countries. Across these studies, our evidence indicates that the presence or absence of grammatical gender in a language may have significant consequences for mass opinion on gender equality—a fundamental social divide (Epstein 2007).

Our study underscores the benefits of harnessing insights from cognitive science and paying attention to language differences in order to address key political concerns, such as gender inequality. Linguistic variation features prominently in some political science research already, especially in the study of ethnicity and ethnic relations (e.g., Adida et al. 2016; Garcia Bedolla 2005; Laitin 1998; Laitin, Moortgat, and Robinson 2012) and mass attitudes toward immigrants and their integration (Hopkins 2014, 2015; Hopkins, Tran, and Williamson 2014; Sobolewska, Lessard-Phillips, and Galandini 2016). Closer to our own study, Laitin’s (1977) pioneering analysis in Somalia shows that language can affect how we solve conflicts, while Garcia (2009) and others (Lee and Pérez 2014) reveal the in-

2. While its current official language is Estonian, the country was part of the USSR until 1991, which made Russian a prominent tongue, with most Estonian speakers acquiring at least working knowledge of Russian and many becoming proficient. Large-scale immigration of Russians pre-1991 also created a sizable Russian-speaking population, some of whom acquired proficiency in Estonian. Segregated communities, intermarriages, and schools offering general education (equivalent to K–12) in either Estonian or Russian further increased the bilingual population.

fluence of interview language on survey responses among US Latinos. We break new ground in this wide research field by establishing that the language we speak can influence our construction of political reality, thereby broadening our understanding of mass opinion formation and change (Taber and Young 2013; Valentino and Nardis 2013).

THEORY: HOW LANGUAGE AFFECTS ATTITUDES ABOUT GENDER PARITY

Languages vary in their grammatical organization, which obliges speakers to focus on different aspects of their experience when using a tongue (Boroditsky 2001; Boroditsky et al. 2003; Fuhrman et al. 2011; Slobin 1996). For example, to say “the child ate the ice cream” in English, one must include the past tense. But to utter the same phrase in Russian, one must use the past tense, note the child’s gender, and note whether the child ate all or some of the ice cream.

If speaking a language requires one to make certain distinctions between objects (e.g., different colors, gender, and time orderings), then the speaker may take for granted that these categories actually exist in the world and are relevant (Boroditsky 2001; Boroditsky and Gaby 2010; Boroditsky et al. 2003; Danziger and Ward 2010; Fuhrman et al. 2011; Hunt and Agnoli 1991). Hence, grammatical differences between tongues provide one mechanism through which language shapes thought, where a grammatical habit of speech leads to a habit of mind.³ Most important for our purposes are the grammatical distinctions that languages make with respect to gender. Careful research reveals that speakers of gendered languages are more keenly aware of gender differences: they are more likely to categorize the world in feminine and masculine terms and to project gender features onto objects and individuals (Boroditsky et al. 2003; Cubelli et al. 2011; Konishi 1993; Phillips and Boroditsky 2003; Sera, Berge, and del Castillo Pintado 1994).⁴ Gendered language speakers are also more likely to attain their own gender identity sooner than speakers of less gendered tongues (Guiora et al. 1982).⁵ Accumulated work also reveals

3. The argument here is not about vocabulary or other surface differences between languages. Rather, we are concerned with fundamental concepts, like gender, that have been made part of grammar (Lakoff 1987). Such grammatical concepts “are used *in* thought, not just *as* objects of thought,” and they are used automatically and unconsciously, thus producing a significant “impact on how we understand everyday life” (335).

4. For example, when Russian speakers were asked to personify days of the week, they generally personified grammatically masculine days as males and grammatically feminine days as females (Jakobson 1966). Relatedly, young Spanish speakers generally rated object photos as masculine/feminine according to their grammatical gender (Sera et al. 1994).

5. Guiora et al. (1982) studied children, age 16–42 months, who spoke tongues varying by their genderedness: Hebrew (highly gendered), English (medium gendered), and Finnish (genderless). By 28–30 months of age,

that language effects like these arise from structural (i.e., grammatical) differences between tongues,⁶ and that they do so on both linguistic and nonlinguistic tasks, which indicates that language affects cognition with little to no verbalization (Fausey and Boroditsky 2011; Fuhrman et al. 2011).

Building on these insights, we argue that people's views about gender equality are affected, in part, by how their language structurally handles gender on an everyday basis. Gendered tongues require people to explicitly distinguish between males and females, which should strongly activate gender as a concept in memory and make it more mentally accessible (Lodge and Taber 2013). This is crucial, since leading models of survey response suggest that rather than having preformed opinions on all matters, individuals construct their opinions on the basis of those considerations "at the top of the head" (Tourangeau, Rips, and Rasinski 2000; Zaller 1992), with emerging work revealing that language can influence one's sample of considerations (Pérez 2015, 2016). Speakers of gendered languages are therefore sensitized to the feminine or masculine qualities of individuals or objects, which is why they are likely to perceive gender differences as more salient and the roles of men and women as more distinct and divided.

We expect the opposite among speakers of genderless tongues. Those languages minimize gender's salience as a significant category by not requiring its speakers to make distinctions on this basis. Therefore, speakers of genderless languages are less likely to perceive gender differences and more likely to see the roles of men and women as similar. We hypothesize, then, that speakers of genderless tongues will express more egalitarian opinions about women's place in politics and society.⁷

RESEARCH DESIGN

We test our claim across three studies. Study 1 is a survey experiment we administered in Estonia from May 26 to June 12, 2014. Twelve hundred ($N = 1,200$) Estonian-Russian bilingual adults were randomly assigned to interview in Estonian (a

genderless tongue) or Russian (a gendered tongue).⁸ Study 2 is a smaller experiment ($N = 262$) using the same design, with the aim of replicating and extending study 1's findings. We conducted study 2 from March 22 to April 10, 2016. These experiments provide a compelling and straightforward between-subjects design for identifying language effects (Dunning 2016; Green 2004).

Estonia is an ideal setting for testing our hypothesis for several reasons. First, it possesses a sizable population that is equally proficient in a gendered (Russian) and a genderless (Estonian) language: about 61% of the population identify Estonian and 29% Russian as their first language. Roughly 44% of the former group and 36% of the latter speak the other language well enough to qualify as bilingual according to our definition. Second, prior research shows that in terms of political opinions and values, Estonians and Russians in Estonia have more in common with each other than with any other group outside Estonia (Lauristin and Vihalemm 1997; Maimone 2004). Russians in Estonia do not express more traditional or conservative values than Estonians do. We demonstrate this with our own placebo test in study 2. This makes Estonia a uniquely ideal setting to isolate language effects on public opinion.⁹

Study 3 serves to mitigate concerns over the generalizability of the findings from our Estonian experiments. This last study is a cross-national analysis of survey data from the World Values Survey (WVS) designed to appraise the external validity of our experimental results. We now describe in further detail each study and its corresponding results.

STUDY 1: SURVEY EXPERIMENT WITH ESTONIAN-RUSSIAN BILINGUALS

We identified bilinguals via self-rated skill in Estonian and Russian. Respondents who said they "can understand, speak, and write" or are "fluent" in both tongues were randomly assigned to interview in Estonian or Russian. Appendix section OA.1 (appendix available online) provides details on the identification of bilinguals, the survey protocol, and our lan-

50% of Hebrew speakers expressed gender identification compared to 21% of English speakers and 0% of Finnish speakers.

6. For example, researchers have taught individuals fictitious languages that are completely stripped of any cultural or other contextual information and found that these tongues still affect individual behavior in predicted ways (Boroditsky et al. 2003).

7. We are not claiming that speakers of genderless tongues fail to discern gender but, rather, that such languages place less structural emphasis on gender. Even if some words in a genderless language develop subtle gendered connotations by way of social convention, speakers of a genderless tongue are still grammatically obliged to place weaker stress on gender as a component of their reality. The presence of such gender-associated words should simply make it harder to detect the effect of grammatical gender we are interested in.

8. Given the novelty of this first study, we wanted to ensure that our survey experiment had enough statistical power to detect nontrivial opinion differences. Mean differences with Cohen's $d = 0.20$ and two-tailed $p < .05$ require $N = 1,054$. Our sample ($N = 1,200$) can therefore unearth meaningful language effects, in either direction, if they in fact exist.

9. One might argue that Finnish and Swedish speakers in Finland offer another possible research site for this study. While Finnish (which is very close to Estonian) is clearly a genderless language, the status of Swedish as even a weakly gendered language is questionable. While Swedish has two grammatical genders, these are not masculine and feminine but "neuter" and "common gender." This does not allow for a clean design based on grammatical gender.

guage manipulation. Section OA.2 shows that various pretreatment variables (e.g., education, gender, age) are balanced across experimental conditions.¹⁰

Attitudinal measures of gender equality

Posttreatment, respondents answered items related to their perceptions of women and their role in society and politics (full item wording is in sec. OA.1.3). We developed these items by combining our knowledge of the Estonian context with prior research on attitudes about gender, with some of these items adapted from flagship surveys like the General Social Survey and the Americas Barometer. Our outcomes assess attitudes toward gender imbalances in several ways, including (a) those expressed in gender stereotypes, which foster unequal perceptions of men and women (Bauer 2015; Dolan 2014; Koch 2002); (b) preferences over women's participation in politics and political leadership positions, where females are substantially underrepresented (O'Brien 2015; O'Brien and Rickne 2016); and (c) support for policies aimed at enhancing gender equality. In designing these items, we chose issues that were relevant and topical in Estonian politics yet available information anticipated meaningful variation in opinion (Roosalu 2014). Thus, our outcomes generally steered away from directly comparing men and women in political and social roles, since gender relations in contemporary Estonia do not follow a strict hierarchical pattern in which females are expected to perform "traditional" duties (e.g., stay-at-home mothers; Roosalu 2014). More specifically, we used the following dependent measures.

Emotional women and *Emotional men* are seven-point scale ratings of how emotional (keyed as 7) versus rational (keyed as 1) bilinguals believe men and women to be, with the item order randomized. We use these ratings in two ways. First, we analyze them individually and in their original format (variable names *Emotional women: single rating* and *Emotional men: single rating*). Second, we difference these ratings to create a measure ranging from -6 to 6, where positive values indicate greater stereotypical belief in women as emotional (relative to men; variable name *Emotional women: relative rating*; cf. Kinder and Kam 2009).

Paternity leave queried bilinguals about whether they agreed (keyed as 1) or disagreed (keyed as 0) with a proposed change in family leave policy that would allow a father to stay home while the mother can return to work as soon as she is able to. (At the time of our surveys, legislation allowed the father to stay home only after the baby was at least 70 days old.)

Female Defense Minister asked bilinguals "If the party that you normally like nominated a generally well-qualified woman to be Minister of Defense, would you support that choice?" with support coded as 1 and opposition as 0. *Female political recruitment* asked whether one strongly disagreed (4), somewhat disagreed (3), somewhat agreed (2), or strongly agreed (1) that women should be recruited to "top-level government positions." We recode these replies so that higher values reflect greater support for this proposition.

Results from study 1

We first examine whether interviewing in Estonian (genderless tongue) affects how much asymmetry people perceive between men and women in terms of gender stereotypes by focusing on *Emotional women: relative rating*. Here, higher values reflect individual views of women as more emotional than men, with the scale midpoint indicating no sensed difference between men and women on this stereotypic trait.

We find that interviewing in Estonian significantly reduces how emotional respondents see women relative to men. The mean value for respondents interviewing in Russian is 1.34 (confidence interval [CI]: 1.17, 1.52) and in Estonian 1.14 (CI: 0.98, 1.30), for a difference in means ($t = 0.2, p = .09$, two-tailed test). We also performed a regression analysis, presented in the first column of table 1 to confirm this result. These results support our hypothesis. After using randomization to hold constant all other (un)observed differences between respondents interviewing in Estonian versus Russian, the former are still less likely to perceive women as more stereotypically emotional than men.

We now look at whether this cognitive mechanism travels to the political domain and affects people's opinions about gender equality, by estimating the effect of interviewing in Estonian on our other dependent variables: *Paternity leave*, *Female Defense Minister*, and *Female political recruitment*. We reason that if, in fact, a genderless tongue leads its speakers to perceive less asymmetry between men and women, then respondents interviewing in Estonian should be more supportive of these initiatives.

As the last three columns of table 1 indicate, this is indeed what we find. Given the nonlinear nature of these estimates, we delve more deeply into the substance of these results by translating the raw coefficients into predicted probabilities that we present in figure 1. Figure 1A shows the shift in the probability of supporting changes in paternity leave policy. Among respondents assigned to interview in Russian, the probability of supporting this policy change is 35%. But if a person is assigned to interview in Estonian, the probability of endorsing this proposal climbs reliably by eight points to 43% (first difference [FD] = 0.08, CI: 0.02, 0.14). Thus,

10. By design, our respondents are a subset (but not a random sample) of highly bilingual Estonian adults. We did not calculate sample weights since we are only interested in estimating the causal effect of our manipulation in this research setting.

Table 1. Effect of Genderless Language on Opinions toward Gender Equality (Study 1)

	Model 1: Emotional Women, Relative Rating (OLS)	Model 2: Paternity Leave (Probit)	Model 3: Female Defense Minister (Probit)	Model 4: Female Political Recruitment (Ordered Probit)
Estonian interview	-.20* (.12)	.21** (.08)	.22** (.08)	.14** (.06)
Constant	1.34*** (.09)	-.38*** (.05)	.40*** (.05)	
N	1,153	1,140	1,156	1,154

Note. Dependent variables are indicated in column headings. OLS = ordinary least squares. All two-tailed tests.

* $p < .10$.

** $p < .05$.

*** $p < .01$.

simply by interviewing in a genderless tongue, respondents are significantly more supportive of a parental leave policy that is more gender balanced.

Figure 1B shows that, when asked whether respondents endorse their party’s nomination of a female for the position of defense minister—a post typically occupied by males—the probability of supporting this nomination among those assigned to interview in Russian is about 66%. But when assigned to report a response to the same question in a genderless tongue, the probability of endorsing a female defense minister nominee increases to about 73%, a reliable eight-point shift in support (FD = 0.08, CI: 0.02, 0.13). Hence, interviewing in a genderless tongue also makes a female nominee for defense minister discernibly more palatable to respondents.

A comparable pattern emerges when we consider increasing the profile of women in the higher echelons of government more generally. As figure 1C illustrates, respondents inter-

viewing in Russian have a 23% probability of strongly agreeing with greater efforts to recruit females to top government positions. But for respondents interviewing in Estonian, the probability of strongly agreeing with the same proposal climbs to 28%, for a reliable five-point shift in support (FD = 0.05, CI: 0.01, 0.09).

We deem these results noteworthy for two reasons. First, for bilingual respondents like ours, both languages are activated when engaged in a task like answering survey questions, even though one of these languages is relatively privileged in the immediate interview context. Furthermore, psychologists have shown that people’s native language can affect their thinking in other tongues (Phillips and Boroditsky 2003). Since most of our bilingual respondents acquired one of their languages before the other one, it should be difficult to uncover language effects like ours. Second, unlike prior lab studies on language, we unearth our language effects in a large and hetero-

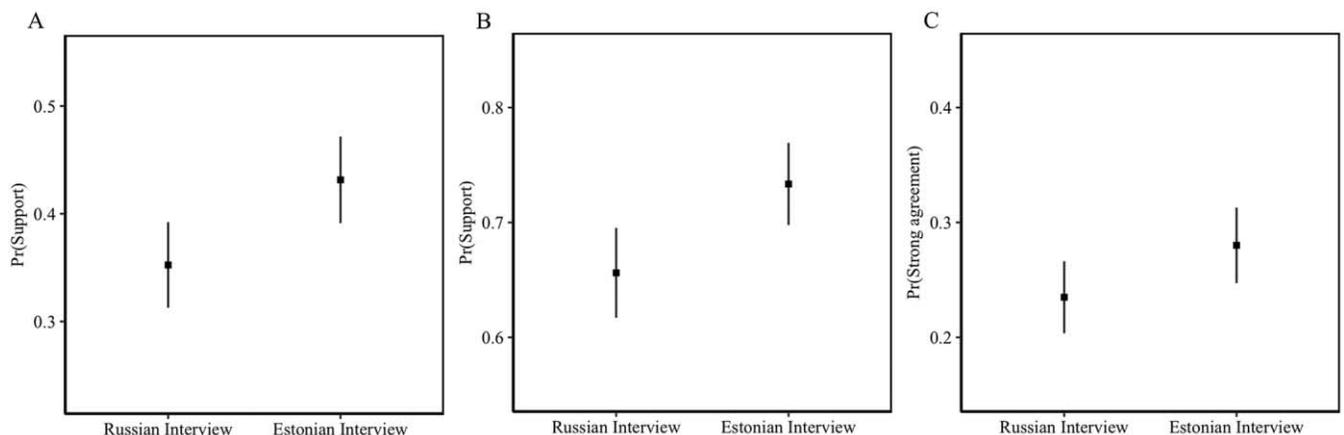


Figure 1. Probability of support for political efforts addressing gender inequality. A, Support for paternity leave policy; B, support for female defense minister nominee; C, strongly agree with increasing female political recruitment.

geneous survey sample for which the treatment was administered by phone. That we observe language's influence on political thinking in this new research setting enhances the external validity of prior language effects research (Campbell and Stanley 1963), thus bolstering the claim that language can affect human cognition.

We further assessed our results' robustness in three ways. First, we show that our estimated language effects are unaltered if we adjust them for subjects' preferred interview language (table OA.3.1). This further suggests that our language effects are situational, arising from random assignment to interview in a certain language, independent of any influence brought to bear by subjects' inclination to interview in a specific tongue. Second, prior research suggests that respondents' expressed opinions can sometimes vary depending on characteristics that they (do not) share with interviewers (e.g., race, gender, language; Davis 1997; Huddy et al. 1997; Lee and Pérez 2014). Since all of our interviewers were female (see sec. OA.1), our respondents might feel obliged to give pro-woman responses to female interviewers. Of course, randomization ensures that any such bias will be equal across our language conditions. Moreover, such pressure is likely to work against finding opinion differences between our interview groups: if all respondents feel obliged to give pro-women responses, then any opinion gap between interviewees will be smaller than what would emerge in the absence of social desirability, thereby making our estimates conservative ones. Finally, section OA.4 reports evidence suggesting the effect of speaking a genderless tongue stems from de-emphasizing male/female distinctions, rather than promoting females or devaluing males (i.e., pro-female bias).

STUDY 2: REPLICATION AND EXTENSION OF LANGUAGE EFFECTS

Building on our first study, we conducted a second experiment with three goals in mind. First, we sought to replicate our core finding. Second, we included a placebo test to demonstrate that language fails to affect opinions that do not evoke gender distinctions. Third, we aimed to illuminate a possible boundary condition for our language effect.

The setting, recruitment, and type of participant for study 2 were the same as in study 1, save for a revised instrument and smaller sample ($N = 262$). Our sample size here comes with a reduction in statistical power, from study 1's bountiful 0.90 to a more modest 0.60 in this new study. This decrease is partly offset by the results of study 1, which yield directional hypotheses that we test here with one-tailed significance tests (cf. Hopkins 2015). At this power level, then, detecting mean differences with Cohen's $d = 0.20$ and one-tailed $p < .10$ requires $N = 238$.

Study 2 readministered our *Paternity leave*, *Female Defense Minister*, and *Female political recruitment* items, thus ensuring a fresh test of study 1's core results. To this slate, we added a placebo item asking respondents to indicate how justifiable they think suicide is, with 1 being "never justifiable" and 10 being "always justifiable." Since gender is not referenced by this item, we do not expect language to matter here.¹¹ This item also lets us probe an alternative explanation for our language effects: that speaking a language activates ideological thinking. For example, one might argue that respondents assigned to speak Estonian support gender equality more, not because of the grammar distinction we propose but because speaking Estonian primes respondents to think in more socially liberal terms. If this is the case, then respondents interviewing in Estonian should also be more likely to find suicide justifiable—a position that is opposite to the religious-conservative stance against suicide.

Finally, apart from outlining how language might affect attitudes toward gender equality, we also wanted to explore when its influence is weaker; that is, what are its boundary conditions? This is important because language itself, particularly structural features such as the presence or absence of grammatical gender, is very difficult to change. Therefore, investigating when language does and does not lead to gender bias in people's views opens a door for devising policy solutions to help overcome language effects.

Existing literature has paid little attention to identifying conditions under which language effects are less likely to emerge. To develop our expectations about a possible boundary condition, we draw on work suggesting that language has a stronger grip on thinking if the domain in question is more abstract—that is, if sensory information is constrained or inconclusive (Boroditsky 2001; Echterhoff 2008; Winawer et al. 2007). We interpret this to mean that clear and widely shared cues provide additional nonlinguistic information that can drown out language effects (Boroditsky 2001). Adapting these insights to politics, we hypothesize that language will weakly affect opinions about gender equality when norms exist about socially acceptable behaviors or beliefs. We construe social norms as widely recognized prescriptions about individual behavior, that is, as shared expectations about what ought (not) to be done in different types of social situations (Bicchieri and Muldoon 2014). Social norms combine expectations about what others want an individual to do and whether others are likely to do so themselves. Such norms should thus equip people with more information about a topic (i.e., provide a common

11. As tables OA.6.1 and OA.6.2 show, we again find evidence suggesting an effective randomization and a lack of large and systematic imbalances in pretreatment covariates.

Table 2. Effect of Genderless Language on Opinions toward Gender Equality (Study 2)

	Replication			Placebo Test	Social Norms Experiment	
	Model 1: Paternity Leave (Probit)	Model 2: Female Defense Minister (Probit)	Model 3: Female Political Recruitment (Ordered Probit)	Model 4: Suicide Placebo Item (OLS)	Model 5: Run for Office, No Norm (Ordered Probit)	Model 6: Run for Office, with Norm (Ordered Probit)
Estonian interview	.41** (.16)	.26* (.19)	.01 (.14)	.15 (.28)	.36** (.21)	.22 (.22)
Constant	-.20 (.11)	.74** (.12)		2.14** (.19)		
N	251	248	253	243	134	123

Note. Dependent variables are indicated in column headings. OLS = ordinary least squares.

* $p < .10$, one-tailed tests.

** $p < .05$.

understanding), leaving less space for language to affect people's judgments. When social norms are absent, language should shape one's political thinking to a greater degree by filling these information gaps.¹²

To test this proposition, study 2 included a question-wording manipulation. This experiment contained two conditions. In the first, subjects were asked their degree of agreement with "calling on party leaders to encourage more women to run for office" (*Run for office*).¹³ This item is similar in spirit to the items where we have so far found effects, and we expect to find one here. The second condition is identical in wording to the first, except that it concludes by describing this effort as "a proposal that about 80% of the people in Estonia favor." If our reasoning is correct, then any language difference that we observe in the first condition should weaken in this second condition, which makes a social norm salient.¹⁴

12. How social norms are developed in specific nations is a question beyond this project's scope. Nevertheless, available research points to several interrelated channels, including greater socioeconomic development and coordination by political elites (e.g., Inglehart and Norris 2003).

13. The response options were (1) strongly disagree, (2) somewhat agree, (3) somewhat agree, and (4) strongly agree. See sec. OA.1 for precise question wording for the new items in study 2.

14. Study 1 included a less direct test of our social norms hypothesis, which motivated our question-wording experiment here. Specifically, study 1 fielded four items that directly queried bilinguals about traditional gender roles across varied domains. Since gender roles are less hierarchical in Estonia than in other settings (Roosalu 2014), we expected language to trivially affect these items: a plausible sign that social norms can overwhelm language effects. Consistent with this reasoning, language weakly and unreliably influences these questions. Section OA.5 discusses those results and explains how they led to our question-wording manipulation here.

RESULTS FROM STUDY 2

Table 2 reports study 2's results. Consider, first, the columns under the label "Replication." The evidence there is generally consistent with our main hypothesis: being assigned to interview in Estonian increases support for policies and efforts to address gender inequality. In particular, assignment to interview in Estonian significantly boosts support for a more flexible paternity leave policy (0.41, $p < .05$, one-tailed); reliably increases respondents' backing of a female defense minister (0.26, $p < .08$, one-tailed); and also appears to bump up support for greater female political recruitment, although this last effect is small and unreliable (0.01, $p < .48$, one-tailed). Crucially, this general trend is robust to an alternative configuration of these three indicators. If we combine these items into a counter variable for which a score of 1 is assigned to a liberal response that respondents give to each of these three questions, we find that interviewing in Estonian still positively and reliably boosts scores on this omnibus measure (0.41, $p < .01$, one-tailed).¹⁵ We interpret this collection of results as additional evidence that language meaningfully influences attitudes toward gender equality.¹⁶

The "Placebo Test" column in table 2 contains the results for our item gauging opinions toward suicide. There we can see that our language effect is sensitive to the topic as expected. Unlike those items for which gender is clearly implicated, we find that here, interviewing in Estonian has no reliable in-

15. The correlations between these indicators are positive and modest (average $p = .16$), but their magnitude is likely larger in the absence of measurement error, which is present here. For this exercise, the item *Female political recruitment* was dichotomized to align with the structure of the other two items.

16. Table OA.6.3 reveals that our treatment effects are substantively unchanged if we adjust them for respondents' preferred interview language.

fluence on whether one deems suicide to be justifiable (0.15, $p > .30$, one-tailed)—a domain we hardly see as evoking gender distinctions. Moreover, this test suggests that speaking Estonian does not simply prompt people to give more liberal answers.

The last two columns in table 2, under the label “Social Norms Experiment,” report the results of the question-wording manipulation that tests our social norms proposition. There we see that in the baseline condition, in which normative information is absent, those who are assigned to interview in Estonian are, just as we predict, reliably more supportive of “calling on party leaders to encourage more women to run for office” (0.36, $p < .05$, one-tailed). However, in the condition in which normative information is present—that is, when respondents are told that 80% of Estonians favor this proposal—the effect of interviewing in Estonian drops in size and significance (0.22, $p > .16$, one-tailed).¹⁷ Thus, salient social norms seem to undercut the impact language would have had on people’s opinions about gender equality.

All in all, study 2’s results corroborate and extend those in study 1. We find that speaking a genderless language increases support for gender equality and that this language effect arises only in domains that evoke gender distinctions. These results indicate that differences in grammatical gender across languages can shift speakers’ attitudes toward gender equality. We also provide some evidence about when language effects are less likely. We show that the effect of language is dampened by social norms, which paves the way for finding additional ways to mitigate language-induced gender bias in public attitudes.

STUDY 3: CROSS-NATIONAL EVIDENCE OF LANGUAGE EFFECTS

We designed our experiments to detect language’s causal effect, thereby achieving a high degree of internal validity. But this also restricted us to a specific national context and a particular type of respondent, which leads our experiments to attain a relatively lower degree of external validity. The goals of study 3, then, were to explore whether genderless languages are associated with more gender-balanced attitudes in contexts beyond Estonia (e.g., Hicks, Santacreu-Vasut, and Shoham 2015; Prewitt-Freilino, Caswell, and Laakso 2012; Santacreu-Vasut, Shoham, and Gay 2013) and among respondents who are not necessarily bilingual. To this end, we used the WVS waves 3–6 (1995–2014),¹⁸ to conduct a cross-national analysis of language

effects that spans about 90 countries and, depending on the model, up to 170,000 individuals. These extensive survey data furnish us an unrivaled opportunity to replicate our main experimental findings in a global context.

We rely on the following four items to reassess our experimental results: (1) *Women jobs* is a binary variable coded 1 if the respondent disagrees that “when jobs are scarce, men should have more right to a job than women,” and 0 otherwise; (2) *Women political leaders* inquired whether respondents strongly agreed (4), agreed (3), disagreed (2), or strongly disagreed (1) with the statement that “on the whole, men make better political leaders than women do”; (3) *University for girls* uses a similar four-point scale to measure respondent’s agreement with the statement that “university is more important for a boy than for a girl”; (4) *Women business executives*, again, uses a similar four-point scale to measure respondent’s agreement with the statement that “on the whole, men make better business executives than women do.”

These items broadly resemble our main outcomes in studies 1 and 2, making them useful measures for validating our experimental results.¹⁹ We note, however, that a perfect match with our outcomes in studies 1 and 2 is impossible here because the measures in our experimental analyses were designed specifically with the Estonian case in mind. Across these WVS outcomes, higher values indicate more gender-equal responses.

We rely on the question “What language do you normally speak at home?” to identify respondents’ language (e.g., Garcia 2009; Lee and Pérez 2014; Pérez and Tavits 2017). In order to measure the genderedness of the language spoken at home, we use data from WALS (Dryer and Haspelmath 2013), the most comprehensive data source on language structures. The indicator of gender intensity of a language that has the best coverage is one that relies on “gender distinctions in independent personal pronouns” (Dryer and Haspelmath 2013). Following prior work (Santacreu-Vasut et al. 2013), we use this indicator from WALS and code it into a binary variable, which equals 0 for the gendered languages, that is, those that make gender distinctions in third-person pronouns and in the first or the second person. All other languages are coded as *Genderless languages* and keyed as 1.²⁰

17. The difference between these coefficients is statistically significant. Since our social norms manipulation is specific to the *Run for office* item, we have unpacked these two conditions and tested for a language effect in each one.

18. Earlier waves of WVS do not include information about the language spoken at home, which we need to perform our analysis of language effects.

19. Furthermore, the first three items are included in all of the WVS waves covered in our study; the last item is included in waves 5 and 6. Collectively, these are the gender items that have the best coverage across the different waves of the WVS.

20. This coding scheme contrasts strongly gendered languages with the weakly gendered and genderless ones. Our results also hold when we use a more nuanced coding with three categories of languages: genderless (2), weakly gendered (1), and strongly gendered (0). The details on this alternative measure and the corresponding robustness tests are presented in sec. OA.7.3..

Our analyses also include a number of individual-level covariates to assess the robustness of any language influence we uncover: education (*Education*), income (*Income*), unemployment status (*Unemployed*), marital status (*Married*), gender (*Sex*), and age (*Age*).²¹ All of our models also include fixed effects for survey waves and countries. In at least one-third of the countries included in our analysis, some respondents speak a gendered tongue at home, while others speak a genderless language. The country fixed effects allow using this within-country variance to better identify language's influence. As such, we compare the attitudes of individuals who are identical on the demographic variables listed above as controls, are interviewed as part of the same survey wave, and reside in the same country but speak a different (gendered vs. genderless) language. All models use robust standard errors clustered on country.

RESULTS FROM STUDY 3

The results from this cross-national analysis are presented in table 3. The first model under each dependent variable reports our most basic finding: the coefficient on *Genderless language* captures the average difference in people's propensity to express gender-equal attitudes between speakers of gendered and genderless languages. The coefficient is correctly signed and statistically significant, such that individuals who speak a genderless language are more likely to express gender-equal attitudes. This result broadly mirrors our main experimental findings.

This basic pattern is robust to several controls (the second model under each dependent variable). In the ordinary least squares models, the coefficients run from a low of 0.12 to a high of 0.32, which implies shifts of about 3%–8% in those dependent variables. In order to interpret the implied language effect in the logit model (dependent variable = *Women jobs*), we calculated the respective predicted probabilities. A respondent who reports speaking a genderless language at home has a 68% probability of disagreeing with this statement. The predicted probability drops to 57% for speakers of gendered languages, for a reliable 11 percentage point shift (FD = 0.11, CI: 0.07, 0.15). These types of findings are consistent with cross-national analyses of nonattitudinal outcomes suggesting that countries that speak a gendered tongue experience greater levels of gender disparities in society (Prewitt-Freilino et al. 2012).

In sum, our cross-national analysis corroborates our experimental results. We interpret this as important evidence about the robustness of our argument regarding the effect of language on attitudes toward gender equality. While we attempted to keep study 3 as comparable as possible to studies 1

and 2 by maximizing similarities between the dependent variables and using binary coding of language spoken at home, our design here is limited by the nature of the available data. It is therefore important to recognize that study 3 is different in key ways. We already noted the differences in the outcome variables and the fact the respondents are likely monolingual. We also rely on a different operationalization of relevant language nuances (the presence or absence of gendered pronouns), and the analyses include a wide range of countries that are culturally, politically, and developmentally very different from Estonia. Even though an observational analysis of survey data is not equivalent to a tightly controlled experiment, the fact that we were able to replicate our basic finding despite these differences enhances the external validity and generalizability of our experimental results.

CONCLUSION

Our experiments and observational analysis reveal that speaking a genderless language boosts mass support for efforts to combat gender inequality, implying that structural nuances between tongues explain some of the persistence in gender disparities. But if something so fundamental as language affects people's views about gender equality, how can gender bias really be reduced? Two important points are in order here. The first is that the language effects we uncover are not deterministic because they are generated by a belief-sampling mechanism that is often behind survey response (Lodge and Taber 2013; Tourangeau et al. 2000; Zaller 1992). This means that opinions about gender equality are constructed with the help of language, rather than being inflexibly determined by it. Equally important, we have provided some evidence that social norms moderate language effects, which highlights a role for political elites to structure mass opinion in this realm (Achen and Bartels 2016; Lenz 2012). Here, we believe subsequent work can serve scholars well by clarifying how elite (in)action might promote norms about more (less) desirable initiatives targeting gender imbalances.

Our results also bear lessons for what type of policy interventions might galvanize greater public support for gender equality in specific settings. For example, in nations where a gendered tongue prevails—and thus where gender distinctions are stressed—it might pay to advocate for policies like quotas, which seize on women's perceived relative strengths in politics to enhance female representation (e.g., “having more female legislators improves the articulation of women's interests”; Mansbridge 1999). But in states where a genderless tongue reigns—and thus where gender distinctions are softer—it might make more sense to champion initiatives that emphasize women's parity with men as a way to improve female representation (e.g., “females can competently execute traditionally male posts

21. The details on these measures are presented in sec. OA.7.

Table 3. Effect of Genderless Language on Opinions toward Gender Equality, World Values Survey, 1995–2014 (Study 3)

	Women Political Leaders		University for Girls		Women Business Executives		Women Jobs	
	Model 1 (OLS)	Model 2 (OLS)	Model 1 (OLS)	Model 2 (OLS)	Model 1 (OLS)	Model 2 (OLS)	Model 1 (Logit)	Model 2 (Logit)
Genderless language	.204*** (.046)	.178*** (.057)	.324*** (.111)	.263*** (.092)	.149** (.057)	.119** (.054)	.611*** (.071)	.468*** (.093)
Sex		.279*** (.014)		.233*** (.018)		.325*** (.022)		.549*** (.041)
Age		-.002*** (.000)		-.002*** (.001)		-.002*** (.000)		-.007*** (.001)
Unemployed		.020* (.011)		-.027*** (.009)		.013 (.014)		-.077** (.035)
Married		-.026*** (.008)		-.009 (.008)		-.015 (.010)		-.154*** (.031)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wave FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Education		Yes		Yes		Yes		Yes
Income		Yes		Yes		Yes		Yes
Constant	2.173*** (.041)	1.973*** (.053)	2.656*** (.067)	2.480*** (.082)	2.506*** (.037)	2.285*** (.051)	-.635*** (.080)	-.873*** (.133)
N	168,903	140,677	172,828	143,680	100,373	84,724	176,939	146,597
N (countries)	90	90	90	90	75	74	90	89
R ²	.004	.041	.005	.040	.001	.049		

Note. Dependent variables are indicated in column headings. Robust country-clustered standard errors in parentheses. OLS = ordinary least squares; FE = fixed effects.

* $p < .1$.

** $p < .05$.

*** $p < .01$.

in politics”). Our findings generally suggest that there is more need for corrective policy intervention in countries with gendered rather than genderless languages. However, sorting out how attractive specific policy initiatives are, under varied language conditions, is a longer-run enterprise we highly encourage.²²

While we have trained a spotlight on structural features between languages that persist over long temporal stretches, we realize that the use of specific words within languages often evolves. Consider that some nations have legislated the public’s use of gender-neutral terms like “police officer” versus “policeman” (Milles 2011). Prior work reveals that short-term shifts in word use within languages can meaningfully affect people’s behavior and choices (Pérez 2015). Hence, efforts promoting the use of gender-neutral terms may amount to more than cosmetic changes in language, influencing how salient gender categories are to speakers and their attitudes about gender equality. While a fuller assessment of how short-term shifts in vocabulary affect mass opinion about gender equality is beyond the scope of our efforts here, we consider this a crucial step in strengthening political scientists’ understanding of language effects more generally.

Finally, although we have mainly focused on political attitudes, our findings about gender stereotypes reveal that the language one speaks can also influence what one believes about, and feels toward, males and females. This insight calls for wider investigation of language’s impacts on affective, cognitive, and behavioral political outcomes (Taber and Young 2013). With respect to actual behavior, observational analyses already suggest that a nation’s use of a genderless tongue is reliably associated with reduced gender gaps in earned income and legislative posts (Prewitt-Freilino et al. 2012). Hence, the language-opinion connection we have unearthed is more than a psychological curiosity, for it coincides with decreases in actual gender disparities in many nations. True, exactly how gender-balanced attitudes translate into gender-balanced outcomes is less understood. Yet only additional carefully designed studies can gradually clarify this blind spot, and we hope that other scholars will engage in this endeavor.

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22. See Santacreu-Vasut et al. (2013), who report that political gender quotas are more likely to be adopted in countries where the dominant language is gendered.

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