

# Gender Stereotypes Have Changed: A Cross-Temporal Meta-Analysis of U.S. Public Opinion Polls From 1946 to 2018

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This meta-analysis integrated 16 nationally representative U.S. public opinion polls on gender stereotypes ( $N = 30,093$  adults), extending from 1946 to 2018, a span of seven decades that brought considerable change in gender relations, especially in women's roles. In polls inquiring about communion (e.g., affectionate, emotional), agency (e.g., ambitious, courageous), and competence (e.g., intelligent, creative), respondents indicated whether each trait is more true of women or men, or equally true of both. Women's relative advantage in communion increased over time, but men's relative advantage in agency showed no change. Belief in competence equality increased over time, along with belief in female superiority among those who indicated a sex difference in competence. Contemporary gender stereotypes thus convey substantial female advantage in communion and a smaller male advantage in agency but also gender equality in competence along with some female advantage. Interpretation emphasizes the origins of gender stereotypes in the social roles of women and men.

*Keywords:* gender stereotypes, public opinion polls, communion, agency, competence

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Since the mid-20th century, dramatic change has taken place in gender relations in the United States, as illustrated by women's labor force participation rising from 32% in 1950 to 57% in 2018 and men's falling from 82% to 69% (U.S. Bureau of Labor Statistics, 2017, 2018b). Women also now earn more bachelor's, master's, and doctoral degrees than do men, unlike decades ago (Okahana & Zhou, 2018). Given such shifts, consensual beliefs about the attributes of women and men—that is, gender stereotypes—should have changed. Testing this proposition required assembling a

unique data set that consists of assessments of stereotypes in nationally representative public opinion polls.

Gender stereotypes are ubiquitous because the social category sex, which divides most humans into two groups based on their reproductive functions, is fundamental to human cognition and social organization. Even young children recognize this grouping (Martin & Ruble, 2010). They then begin to understand the meaning of these categories through observation of the behaviors and events linked with each sex. Throughout their lives, individuals receive extensive information about women and men from direct observation as well as indirect observation through social sharing and cultural representations. As a result, most people acquire some version of their culture's gender stereotypes.

The importance of stereotyping in theories of gender (e.g., Bem, 1993; Deaux & Major, 1987; Eagly & Wood, 2012; Eccles, 1994; Ridgeway, 2011; Spence, 1993) has inspired much research. However, with few exceptions, this research has consisted of small-scale studies of college undergraduates (e.g., Lueptow, Garovich-Szabo, & Lueptow, 2001) or other nonrepresentative samples (e.g., Haines, Deaux, & Lofaro, 2016; Prentice & Carranza, 2002). These sampling limitations have compromised external validity,

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especially given the overrepresentation of college students from introductory psychology classes (Henry, 2008).

This project instead relied on public opinion polls that surveyed large, nationally representative samples. Specifically, between 1946 and 2018, several respected polling organizations surveyed U.S. adults' beliefs about the attributes of women and men. These data offer a valuable opportunity to study gender stereotypes across a span of decades that brought fundamental changes in relationships between women and men.

### **Gender Stereotypes: Their Content and Origins**

Most research on the content of these stereotypes has found two themes, which, following Bakan (1966), are typically labeled *communion* and *agency* (e.g., Diekmann & Eagly, 2000; Rucker, Galinsky, & Magee, 2018; Sczesny, Nater, & Eagly, 2019; Williams & Best, 1990). Communion orients people to others and their well-being (e.g., compassionate, warm, expressive), whereas agency orients people to the self and one's own mastery and goal attainment (e.g., ambitious, assertive, competitive). Communion prevails in the female stereotype, and agency in the male stereotype. Notably, some researchers have emphasized competence (e.g., intelligent) rather than agency as fundamental to stereotyping, and these two qualities tend to be correlated (Cuddy, Fiske, & Glick, 2008). Nonetheless, agency and competence should show different trends, given that agency is a much stronger theme than competence in the male stereotype (Sczesny et al., 2019).

Like other stereotypes, gender stereotypes reflect *essentialism*, or the tendency to infer essences, often taking the

form of traits underlying individuals' behaviors (Prentice & Miller, 2006). Although some people ascribe such trait essences to biology, others instead ascribe them to socialization and social position in society (Rangel & Keller, 2011). For example, in U.S. public opinion poll data (Pew Research Center, 2017), among the 87% of respondents who indicated that men and women are different rather than similar on "how they express their feelings," 58% ascribed these differences mainly to "society," and 42% to "biology."

### **Origins of Gender Stereotype Content in Social Roles**

According to social role theory (Eagly & Wood, 2012; Koenig & Eagly, 2014), gender stereotypes stem from people's direct and indirect observations of women and men in their social roles. Role-constrained behavior provides crucial information because most behavior enacts roles. Moreover, people spontaneously infer individuals' social roles (e.g., student) from their behaviors (e.g., studied in the library), with downstream consequences of ascribing role-consistent traits to them (e.g., hardworking; Chen, Banerji, Moons, & Sherman, 2014). When people observe members of a group (e.g., gender, race) occupying certain roles more often than members of other groups do, the behaviors usually enacted within these roles influence the traits believed to be typical of the group. To the extent that people in the same society have similar observations, these beliefs become shared cultural expectations.

Relevant to possible shifts in gender stereotypes, the social roles of women and men have changed since the mid-20th century (for causes, see Blau & Winkler, 2018). Female and male labor force participation has converged considerably in the United States, as in many other nations (Ortiz-Ospina & Tzvetkova, 2017). Nevertheless, a common arrangement is a neotraditional division of labor (Gerson, 2017), whereby women perform the majority of the domestic work and men have more continuous employment with longer hours and higher wages (e.g., Bianchi, Lesnard, Nazio, & Raley, 2014; U.S. Bureau of Labor Statistics, 2018a).

As women entered the labor force in large numbers, occupational sex segregation declined (Blau, Brummund, & Liu, 2013). In particular, women entered many male-dominated occupations that require higher education and offer relatively high prestige (Lippa, Preston, & Penner, 2014). Nevertheless, at least half of U.S. female and male employees would have to exchange jobs to produce a fully integrated labor force (Hegewisch & Hartmann, 2014). This segregation is patterned *vertically* and *horizontally* (e.g., Lippa et al., 2014). Vertical segregation places more men than women in positions with higher pay and authority, whereas horizontal segregation concentrates women and



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men in occupations requiring different skills and facilitating different personal goals.

Demonstrating horizontal segregation, women and men are concentrated in occupations with different attributes. According to two U.S. studies based on the extensive occupational data available from the Occupational Information Network (O\*NET: [www.onetonline.org](http://www.onetonline.org)), women's representation was predicted by occupations' requirements for social skills and opportunities for social contribution (i.e., helping others) and workplace flexibility, whereas men's representation was predicted by occupations' requirements for physical strength; competition; interaction with things; and analytical, mathematical, and technical skills (Cortes & Pan, 2018; Levanon & Grusky, 2016; see also Baker & Cornelson, 2018, for analysis of occupations' demands for sensory, motor, and spatial aptitudes).

Occupational sex segregation based on these predictors is intact, despite the desegregation that has followed mainly from educated women entering male-dominated professional and managerial occupations. Yet, many of these occupations have resegmented internally by developing female-dominated subfields (Levanon & Grusky, 2016). Replicating the familiar macrolevel themes, such female specializations include pediatrics and gynecology in medicine and human resources and public relations in management.

### **Implications of Role Changes for Stereotype Content**

Women's increased labor force participation should have boosted their perceived competence because employment ordinarily requires complex task coordination and adher-

ence to bureaucratic constraints such as performance evaluations. Moreover, women's educational gains have fostered their entry into occupations with cognitive demands and prestige similar to men's occupations (Cortes & Pan, 2018; Lippa et al., 2014).

Despite these substantial changes in employment and education and the egalitarian attitudinal shifts that have accompanied them (e.g., Donnelly et al., 2016), gender stereotypes would continue to follow from persisting occupational segregation as well as the uneven division of wage labor and domestic work between men and women (Gerson, 2017). Specifically, vertical segregation would further the stereotype of men's agency because of the agency ascribed to leadership and authority roles (Koenig, Eagly, Mitchell, & Ristikari, 2011). Following from horizontal segregation, (a) men's agency would also be conveyed by their presence as families' main provider and in occupations requiring competitiveness, physical prowess, and robustness, and (b) women's communion would be conveyed by their presence as families' main homemaker and in occupations requiring social skills and yielding social contribution (Cortes & Pan, 2018; Levanon & Grusky, 2016).

In summary, for communion, there is little reason to expect that women's advantage over men has lessened, given their continuing concentration in communal roles. In fact, Lueptow et al. (2001) reported a strengthening of the female communal stereotype between 1974 and 1997, based on his surveys of U.S. sociology students at the University of Akron. For agency, it might seem that men's advantage would decrease, given increases of women in leadership roles and in occupations such as lawyer and manager (Carli & Eagly, 2017). However, any such influence on agency would be attenuated by the fine-grained internal resegmentation of such occupations. For competence, women should gain relative to men because of their increased education and employment, especially in higher prestige jobs. Therefore, public opinion data on gender stereotypes should reveal continuing advantage for women in communion and men in agency but gains for women relative to men in competence.

## **Method**

### **Search for Polls and Inclusion Criteria**

**Searches.** Between 2010 and 2018, we searched for public opinion polls in multiple databases, including Roper Center for Public Opinion Research (inclusive of iPOLL), Polling the Nations, PollingReport.com, Gallup Analytics and World Poll, Pew Research Center, National Opinion Research Center, General Social Survey, American National Election Studies, Interuniversity Consortium for Political and Social Research, World Values Survey, Google, and Google Scholar. Keywords included (a) *stereotype*



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paired with *gender, sex, male, female, men, or women*; (b) *gender or sex* paired with *attitudes, beliefs, or opinions*; (c) *women or men*; and (d) *gender, sex, men, or women* paired with traits such as *intelligent, aggressive, and romantic*, which were frequent in the polls initially identified.

**Inclusion criteria.** The included polls were nationally representative for the United States, which is the normative practice for polling organizations (see Gallup Organization, 2019). Searching in archives found 24 national U.S. polls that included one or more items assessing descriptive gender stereotypes, at least one of which pertained to communion, agency, or competence. The 15 included polls asked about the distribution of each trait between the sexes (e.g., “In general, do you think each of the following characteristics is more true of women or men, or equally true of both?”). The nine excluded polls asked about only one sex ( $k = 5$ ), asked about women and men in separate items ( $k = 1$ ), or used a different answer format ( $k = 3$ ). To supplement the 15 included polls with current data, we contracted the polling organization GfK to collect a nationally representative U.S. sample using their Government & Academic Omnibus panel in April 2018. In total, the final set of 16 polls included 30,093 adults sampled from 1946 to 2018 (see Table 1).

Polling organizations disseminate their survey results at their websites and in written reports and press releases. Most of these polls are subsequently archived, predominantly at the Roper Center. Although private polls about consumer and political issues may not be made public, these are unlikely to have surveyed gender stereotypes. Given the practice of archiving surveys regardless of their results, publication bias is not relevant to this meta-analysis.

**Classification of stereotypical traits.** Guided by earlier analyses (e.g., Diekmann & Eagly, 2000; Koenig & Eagly, 2014, Study 4), three of the authors independently classified the polls’ traits into the categories *communal, agentic, and competent*. The overall interrater reliability (Fleiss kappa) was  $\kappa = .81$ , with  $\kappa = .93$  for communion,  $\kappa = .77$  for agency, and  $\kappa = .92$  for competence. Based on at least two raters’ classifying an item into the same category, the result was (a) 13 communal items: ability to handle people well, affectionate, compassionate, emotional, generous, honest, nurturing, outgoing, patient, polite and well-mannered, romantic, sensitive, and unselfish; (b) 17 agentic items: ability to make decisions, aggressive, ambitious, arrogant, calm in emergencies, confident, courageous, critical, decisive, demanding, hardworking, independent, possessive, proud, selfish, strong, and stubborn; and (c) 10 competent items: ability to create or invent new things, creative, innovative, intelligent, level-headed, logical, organized, smart, thorough in handling details, and willing to accept new ideas. Because *intelligent* was the item most repeated across the polls, its data also appear in a separate analysis, along with the similar item *smart* from Gallup (1989). Items that did not fit the categories (e.g., *cautious, happy*) were discarded.

## Meta-Analytic Procedures

**Effect size calculations.** The main outcome variable was the percentage of respondents who ascribed a trait more to women than men (excluding equal responses). For each trait, for example, if 300 of 1,000 respondents indicated that *ambitious* is truer of women and 500 that it is truer of men, that percentage was 37.5% (i.e., 300 of the 800 who chose men or women, among the 1,000 respondents). An additional effect size was the percentage of respondents indicating that women and men are equal on a trait, as opposed to more true of one sex. In this example, in which 200 of the 1,000 respondents answered *equally true*, that percentage was 20% (i.e., 200 among the 1,000). Aggregated across traits within each dimension, these percentages were converted to log odds for statistical analysis and converted back to the more intuitive percentage metric for descriptive statistics (see Borenstein, Hedges, Higgins, & Rothstein, 2009, p. 312). Most polls (12 of 16) provided survey weights to adjust for unequal sampling probabilities and nonresponse bias. To ensure national representativeness, effect size calculations incorporated these weights, using the *survey* package in R (Lumley, 2017). In the polls lacking such weights, all respondents were weighted equally. Design-based standard errors adjusted for correlated responses and survey weights (McNeish, Stapleton, & Silverman, 2017).

Analyses conducted separately for each stereotype dimension averaged effect sizes within polls for each of the three stereotype domains (e.g., for competence, averaging *creativity* and *intelligence*). Alternative analyses accounted for



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such dependent effect sizes by using robust variance estimation where it was appropriate (Tanner-Smith, Tipton, & Polanin, 2016; Appendix S2 in the online supplemental materials details the preregistered analytic strategy for handling effect size dependencies).

**Statistical models.** Focal analyses modeled the log odds of ascribing traits to women versus men for each stereotype dimension, while ignoring equal responses. Additional analyses modeled another effect size, the log odds of *equal* responding. Also, multinomial logistic regression analyses examined how all response categories changed relative to each other (Begg & Gray, 1984; see Appendix S3 in the online supplemental materials; Figure S2 and Appendix S3 also describe an analysis that assigned numeric values to the response options). Mixed-effects meta-regression models assumed that the observed effect size variation was due to fixed effects of moderators (e.g., survey year), random effects of residual between-poll heterogeneity, and within-poll sampling error (Borenstein et al., 2009). Between-poll heterogeneity was quantified by 90% prediction intervals (a measure of the estimated dispersion of true underlying effects) and  $I^2$  statistics (percentage of total variability in effect sizes due to true between-poll heterogeneity rather than chance). The *metafor* R package calculated these models using restricted maximum likelihood estimation and the Knapp–Hartung adjustment to account for uncertainty in estimating between-poll heterogeneity (Viechtbauer, 2010). The online supplemental materials and Open Science Framework site (<https://osf.io/g98c6/>) contain the data files and R code needed to reproduce all analyses including figures and tables.

**Tests of robustness.** Four robustness checks examined the trends over time while either controlling for covariates or removing the polls from the 1940s and 1950. The first robustness check controlled for the polling method, which was a particularly stringent test given that polling switched over the years from face-to-face to phone polling and then to online panels (see Table 1). The second robustness check controlled for the presence of the equal option of *same/equally true of both* in the poll. Although an explicit *equal* option was missing from 10 of the face-to-face and phone surveys, respondents were free to volunteer this answer, which interviewers recorded. The third robustness check controlled for the log odds of respondents indicating *same/equally true of both*, either by choosing this provided alternative or spontaneously giving this answer when it was not provided. This control for *equal* responses, which are presumably more politically correct than is choosing one sex, should account for confounds due to potential changes in social desirability over time (e.g., Krupnikov, Piston, & Bauer, 2016). The fourth robustness check excluded the two 1946 polls and the 1950 poll, which might have disproportionately influenced regression models because all other polls were from 1974 or later. Furthermore, results of these earliest polls might reflect the sharp rise in women’s labor force participation during World War II and its subsequent partial fall (Goldin & Olivetti, 2013). Therefore, an analysis omitted these polls to examine whether historical trends were due to these possibly anomalous early data points.

**Evaluative content of stereotypical traits.** Another potential confound follows from traits’ evaluative content, which differed across the items (e.g., *courageous* is more positive than *arrogant*) and might have changed over time. Such a confound could have contributed to the historical trends if increasing pressures for political correctness encouraged ascribing more desirable traits to women. For each dimension, these analyses tested whether the items’ positivity predicted ascribing traits more to women than men.

Assessment of the items’ evaluative content relied on prior research on the likability of person-descriptive words. Beginning with Anderson (1968), researchers repeatedly obtained likability ratings of many such words. The latest study (Chandler, 2018) did the following: (a) extended this effort to ratings (on 7-point scales) of 1,048 words by college students and Mechanical Turk workers and (b) determined whether traits’ likability had changed over time (the only change was on *aggressive*, which became more negative). Our procedure matched each poll attribute to its likability value in Chandler’s study or, for *aggressive*, its average value across the surveys. For 26 attributes, an exact word match was possible; for 12 attributes, the match was to a close synonym; and for one attribute (*calm in emergencies*), no match was possible. See Table S1 in the online supplemental materials for items and means.



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## Subgroup Analyses

The raw data were available for 15 of the 16 polls (Fox News, 2006, was missing), allowing for analyses of the demographic variables of respondent sex ( $k = 15$  polls), age ( $k = 15$ ), college education ( $k = 12$ ), race-ethnicity ( $k = 14$ ), marital status ( $k = 13$ ), and employment status ( $k = 13$ ); Table S2 in the online supplemental materials lists the polls included in these analyses. We preregistered several hypotheses for these analyses on the Open Science Framework website (<https://osf.io/kmwg8>). For instance, one such prediction was that female respondents would ascribe greater competence to women more often than would male respondents, due to ingroup preference. Analyses also explored whether historical trends varied in magnitude across demographic subgroups.

## Results

The analyses addressed two main questions: (a) How have gender stereotypes changed across a span of decades (1940s to 2010s) that brought considerable change in women's roles? and (b) Did respondent demographic variables moderate the changes over time?

### Analyses for Responding That Traits Are More True of One Sex

**Meta-analytic means.** Table 2 presents the mean percentages of respondents ascribing stereotypical qualities to

women rather than men, along with associated distributional statistics. A percentage of 50% means that the numbers of "more true of women" and "more true of men" responses were equal. These percentages varied considerably across the dimensions, in the female direction for communion (85%), competence (64%), and the item *intelligent* (66%) and in the male direction for agency (32%). Hence, the female communion stereotype showed the largest consensus among respondents. Nearly all variability in observed effect sizes could be attributed to between-poll heterogeneity rather than chance ( $I^2 \geq 97.85$  for all stereotype domains), suggesting that moderators should help explain differences across polls.

**Simple regression analyses over time.** These models used the poll year to predict the log odds of respondents indicating that women, rather than men, have more of the relevant attribute (see Figure 1). Communion showed a significant increase over time ( $b = .037$ ,  $SE = .008$ ,  $p < .001$ ). For instance, among respondents stating a sex difference, 54% indicated that women are more communal in Roper's (1946) poll, but 83% did so in the 1989 poll and 97% in the 2018 poll. In contrast, agency showed no significant trend ( $b = -.008$ ,  $SE = .005$ ,  $p = .140$ ). Competence ( $b = .025$ ,  $SE = .005$ ,  $p < .001$ ) and its intelligence component ( $b = .024$ ,  $SE = .006$ ,  $p = .009$ ) also showed a significant increase. The direction of the competence stereotype reversed over time; for instance, 34% of respondents indicated that women are more intelligent than men in Gallup's (1946) poll, but 65% did so in the 2018 poll.

**Tests of robustness.** Multivariable meta-regression models tested whether the predicted effects of historical time remained after controlling separately for each of the following three covariates: (a) polling method (two dummy codes comparing online panels and face-to-face vs. phone polling), (b) equal alternative (dummy code comparing the presence vs. absence of the *equal* response alternative), and (c) log odds of respondents responding *equal* versus different. The fourth robustness check tested whether the trends over time remained after removing the three polls from the 1940s and 1950s. Figure 2 displays the regression coefficients for poll year using each of these four robustness checks.

These analyses showed that the historical trends were sensitive to the robustness check of polling method for communion ( $p = .147$ ) and the item *intelligent* ( $p = .229$ ), perhaps due to the statistical difficulties in partitioning variance due to polling method versus polling year (consistent with the wide 95% confidence intervals [CIs] for the blue bars [the second bar in each group] in Figure 2). Nevertheless, the trend over time remained significant for competence ( $p = .001$ ). No conclusions changed when controlling for whether an *equal* alternative option was provided (green bars [the third bar in each group]) or for the proportion of *equal* answers (purple bars [the fourth bar in

Table 1  
 Descriptive Information for U.S. Polls of Communion, Agency, and Competence Stereotypes

Source	Data collection year	Sample size	Method	Equal alternative <sup>a</sup>	Dimension and items		
					Communion	Agency	Competence
Roper (1946)	1946	5,027	Face-to-face	Present	Ability to handle people well, polite and well-mannered, unselfish	Ability to make decisions	Ability to create or invent new things, willing to accept new ideas, thoroughness in handling details
Gallup (1946)	1946	3,226	Face-to-face	Absent	—	—	Common sense, intelligent
Gallup (1950)	1950	1,351	Phone	Absent	—	Courageous	Level-headed
Virginia Slims (1974)	1974	3,880	Face-to-face	Present	Romantic	—	—
Roper (1977)	1977	2,006	Face-to-face	Absent	Romantic	—	—
New York Times (1983)	1983	1,309	Phone	Absent	Honest	—	Logical
Roper (1985)	1985	1,997	Face-to-face	Present	—	Calm in emergencies	—
U.S. News (1987)	1987	1,005	Phone	Present	Romantic	—	—
Gallup (1989)	1989	1,234	Phone	Absent	Affectionate, emotional, honest, patient, romantic, sensitive	Aggressive, ambitious, confident, courageous, critical, demanding, independent, possessive, proud, selfish, strong	Creative, level-headed, logical, organized, smart
Gallup (1995)	1995	1,020	Phone	Absent	Affectionate, emotional, patient	Aggressive, ambitious, courageous	Creative, intelligent
Gallup (2000)	2000	1,026	Phone	Absent	Affectionate, emotional, patient	Aggressive, ambitious, courageous	Creative, intelligent
Fox News (2006)	2006	900	Phone	Absent	—	—	Intelligent
Pew (2008)	2008	2,250	Phone	Absent	Compassionate, emotional, outgoing	Ambitious, arrogant, decisive, hardworking, stubborn	Creative, intelligent
Pew (2015)	2014	1,835	Online panel	Present	Compassionate, honest	Ambitious, decisive	Intelligent, innovative, organized
CBS News (2015)	2015	1,018	Phone	Absent	Romantic	—	—
Eagly et al. (2018)	2018	1,009	Online panel	Present	Affectionate, compassionate, sensitive, emotional	Ambitious, aggressive, courageous, decisive	Creative, intelligent, innovative, organized

<sup>a</sup> Same/equally true response alternative was present or absent in the question format.

each group]). The only conclusion that changed when removing the 1940s and 1950s polls was the historical trend for the single item *intelligent* ( $p = .629$ ; orange bars [the fifth bar in each group] in Figure 2). This item was present in 1946 and subsequently only from 1989 to 2018, a period in which women were stably favored over men (see also Figure 1). In summary, trends for competence were robust to all four checks, whereas trends for communion and intelligence showed some sensitivity. Trends for agency remained nonsignificant.

**Evaluative content of stereotypical traits.** To examine whether the items' evaluative content was a confound (consistent with a political correctness interpretation of ste-

ereotype change over time), secondary analyses tested whether the traits' likability ratings or their interaction with poll year predicted the effect sizes (see the Method section). Items' likability did not significantly predict effect sizes for agency ( $p = .624$ ) or competence ( $p = .169$ ) but did for communion ( $b = -.428$ ,  $SE = .051$ ,  $p < .001$ ); unexpectedly, respondents overall ascribed communal traits more often to women than to men for less positive items. It is important to note, however, that the historical trends for communion and competence remained significant when items' likability was included as a covariate (communion,  $p = .016$ ; competence,  $p = .017$ ), and the trend for agency remained nonsignificant

Table 2  
Mean Effect Sizes for Percentage of Respondents Choosing Women in U.S. Polls of Communion, Agency, and Competence Stereotypes

Stereotype measure	<i>k</i>	Mean <sup>a</sup>	90% prediction interval	<i>t</i>	$\tau^2$	$I^2$
Communion	12	85%	[56, 96]	6.62***	.84	99.52
Agency	9	32%	[20, 47]	-5.76***	.15	98.53
Competence	11	64%	[33, 87]	2.40*	.63	99.58
Intelligence	8	66%	[41, 85]	2.96*	.41	97.85

Note. *k* = number of polls; mean = random-effects weighted mean of the percentage of respondents choosing women as possessing more of the attribute; prediction interval = the middle 90% of the true underlying effects; *t* = test statistic for the mean being different from 50%;  $\tau^2$  = tau-squared, the estimated between-poll variance of effect sizes on a log odds scale;  $I^2$  = percentage of total variability in effect sizes due to true between-poll heterogeneity rather than chance. Heterogeneity (*Q*, not displayed) was significant for all stereotype measures (all *ps* < .001).

<sup>a</sup> A mean of 50% signifies that the percentage of respondents indicating that women have more of the attribute was equal to the percentage indicating that men have more. Higher numbers indicate more ascription of the attribute to women, and lower numbers indicate more ascription to men.

\* *p* < .05. \*\* *p* < .01. \*\*\* *p* < .001.

(*p* = .317). In addition, items' likability did not interact with poll year to predict effect sizes for any stereotype dimension (all *ps* > .082), meaning that historical trends did not significantly differ for more versus less positive items.

## Analyses for Responding That Traits Are the Same or Equally True of Women and Men

The analyses presented so far predicted responding *more true of women* versus *more true of men*, excluding responses that the sexes are equal or the same. However, the proportion of this *equal* responding could also have changed over time. Therefore, all prior analyses were repeated using a secondary effect size metric: the odds of responding *equal* versus different.

**Meta-analytic means.** Communion produced the smallest percentage of respondents responding *equal* (24%), agency (33%) and competence (39%) were moderate, and intelligence produced the largest percentage (59%). Hence, most participants differentiated women and men (i.e., expressed gender stereotypes), although not on intelligence. Nearly all variability in observed effect sizes could be attributed to between-poll heterogeneity rather than chance (all  $I^2$  > 99.59%; see Table S3 in the online supplemental materials for details).

**Simple regression analyses over time.** These models revealed that only competence (*b* = .021, *SE* = .007, *p* = .016) increased significantly over the years in respondents indicating that women and men are equal (vs. different). For instance, 25% indicated competence equality in the Roper

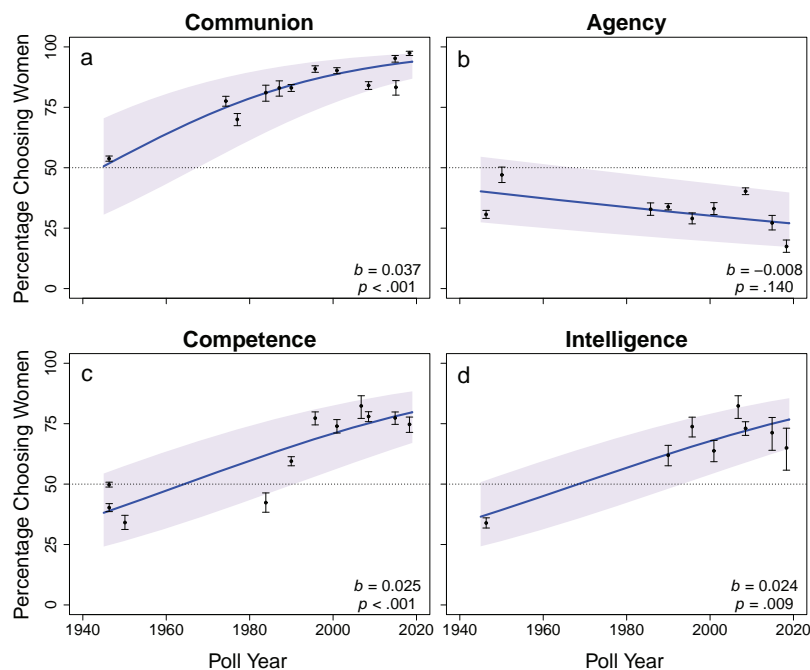
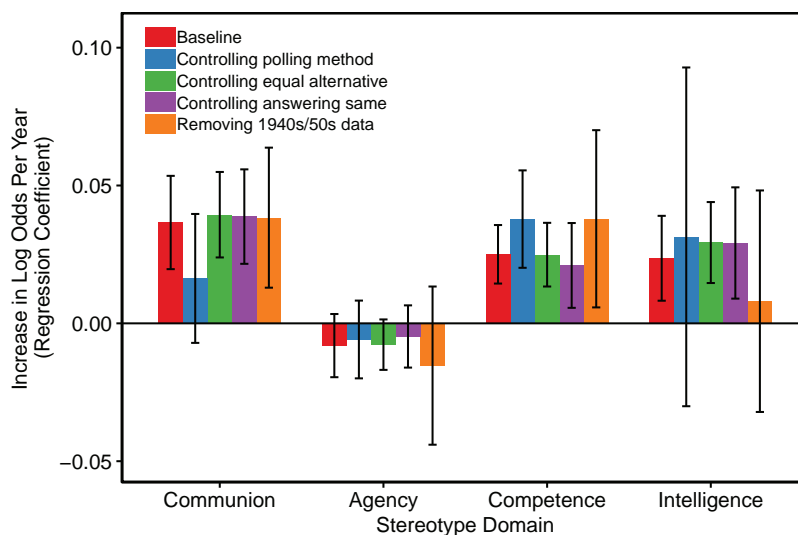


Figure 1. Change over historical time in the mean percentage and 95% confidence intervals of respondents choosing women as more communal (Panel a), agentic (Panel b), competent (Panel c), and intelligent (Panel d) than are men in U.S. polls. The regression coefficients (*bs*) and *p* values are from the simple meta-regression models. The blue (thick dark lines) represent average model predictions converted from log odds to percentages. The shaded blue (gray) regions indicate 90% prediction intervals based on average model predictions and residual between-poll heterogeneity; on average, 90% of true poll averages will fall within these regions. A value of 50% indicates that the number of respondents selecting the *women more* option equaled the number selecting the *men more* option. See the online article for the color version of this figure.





*Figure 2.* Regression coefficients and 95% confidence intervals for the change over historical time for each stereotype dimension and the item *intelligent*. Positive values indicate that a dimension was ascribed to women (vs. men) more often over time. The bars (from left to right) indicate regression coefficients without controls, with controls for each of three potential confounds, and with the removal of data from the 1940s and 1950s. See the online article for the color version of this figure.

(1946) poll, whereas 70% provided this answer in the 2018 poll. See Figure S1 in the online supplemental materials for robustness checks.

### Multinomial Analyses

Figure 3 displays analyses that simultaneously took into account three responses: *women more*, *men more*, and *equal*. Of most interest is the analysis on competence, which showed a significant increase over time in the percentage answering *equal*. The responses indicating that either sex is more competent than the other declined, but choosing men declined more sharply than did choosing women. Thus, women's competence advantage over men increased, even though paradoxically both types of sex-differentiated responses declined in absolute terms. The likelihood of responding same versus different did not change significantly for agency or communion. For details, see Appendix S3 and Figure S1 in the online supplemental materials.

### Subgroup Analyses for Respondent Demographic Characteristics

Subgroup analyses of the focal effect sizes comparing women versus men (excluding *equal* responses) examined variation in stereotypes across respondent sex, college education, employment status, marital status, race–ethnicity, and birth cohort. These analyses served as both further robustness checks of the main findings and tests of specific preregistered hypotheses.

**Historical trends and current stereotypes.** Historical trends were similar across demographic subgroups. In total, 28 tests determined whether respondent demographics moderated historical trends in gender stereotyping. Although four of these 28 exploratory tests were significant, even in these cases, the significant trends persisted for each subgroup. In other words, across demographic subgroups, the increase in ascribing communion and competence to women versus men was robust.

In addition, the subgroups generally agreed on the direction of the stereotypes in recent years. Figure 4 shows the predictions of simple regression models for the stereotypes in the year 2018 (see also Figure S3 in the online supplemental materials for the stereotype means averaged across poll years). In general, gender stereotypes for communion, agency, and competence were widely shared, given that none of the confidence intervals crossed 50% for any subgroup. The percentages for intelligence ratings were less precise (note the wider CIs) and sometimes did not differ significantly from 50%, although point estimates always exceeded 50%. Notable are the consistently extreme percentages of respondents in all subgroups indicating that women are the more communal sex.

**Confirmatory tests of preregistered hypotheses.** Consistent with preregistered hypotheses, results showed an in-group preference for competence and intelligence. Specifically, the odds of respondents ascribing competence and intelligence to women versus men were higher among female than male respondents, when analyzing both overall means (competence, mean  $OR = 2.50$ ,  $p < .001$ ; intelli-

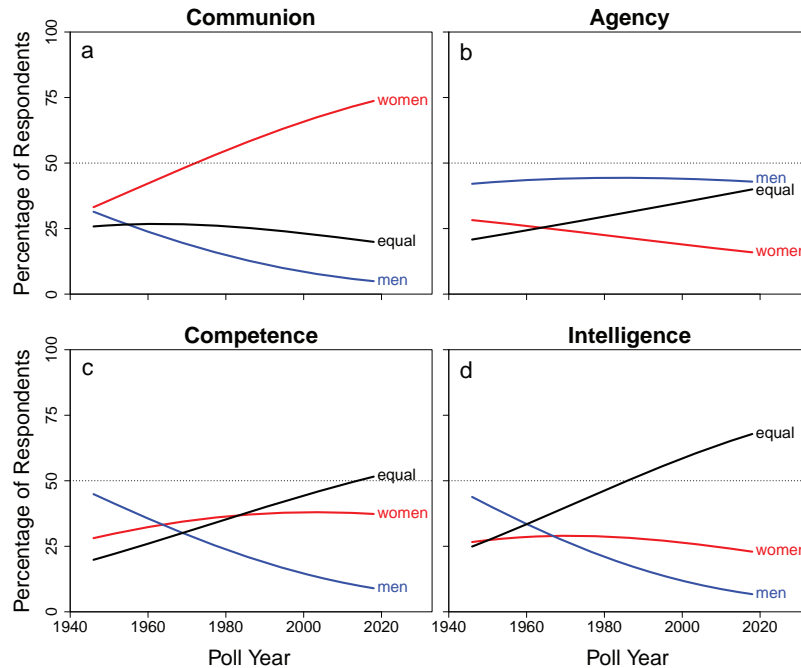


Figure 3. Stereotypes displaying change over historical time in the mean percentage of respondents indicating more true of women, more true of men, or equal/same on communal (Panel a), agentic (Panel b), competent (Panel c), and intelligent (Panel d). The percentage of missing responses is not shown but was always less than 10%. See the online article for the color version of this figure.

gence, mean  $OR = 2.37, p = .007$ ) and the predictions for the year 2018 shown in Figure 4 (competence, mean  $OR = 2.46, p = .002$ ; intelligence, mean  $OR = 2.56, p = .039$ ). Nevertheless, in 2018, even male respondents ascribed competence more often to women than men, despite ingroup preferences. Predictions that were not confirmed are that the odds of ascribing competence and intelligence to women (vs. men) would be higher among college-educated than less educated respondents ( $ps > .25$ ) or higher among younger than older respondents within the same poll ( $ps > .21$ ). Instead, respondents now ascribe competence in general and intelligence more often to women than men, regardless of college education and birth cohort.

**Exploratory analyses of other demographic differences.** These analyses found that the overall odds of ascribing traits to women versus men were higher for female than male respondents for agency (mean  $OR = 1.67, p < .001$ ) and communion (mean  $OR = 1.49, p = .002$ ); the same differences were also found for the predicted means for year 2018 ( $p = .049$  and  $p = .008$ , respectively). Hence, respondent sex differences (i.e., higher odds of women assigning traits to women vs. men) were similar for all stereotype domains although largest for competence in general and intelligence. Results also suggested racial differences. For instance, the odds of ascribing agency and intelligence to women versus men were higher among Black than White respondents (agency, mean  $OR = 1.72, p = .005$ ; intelli-

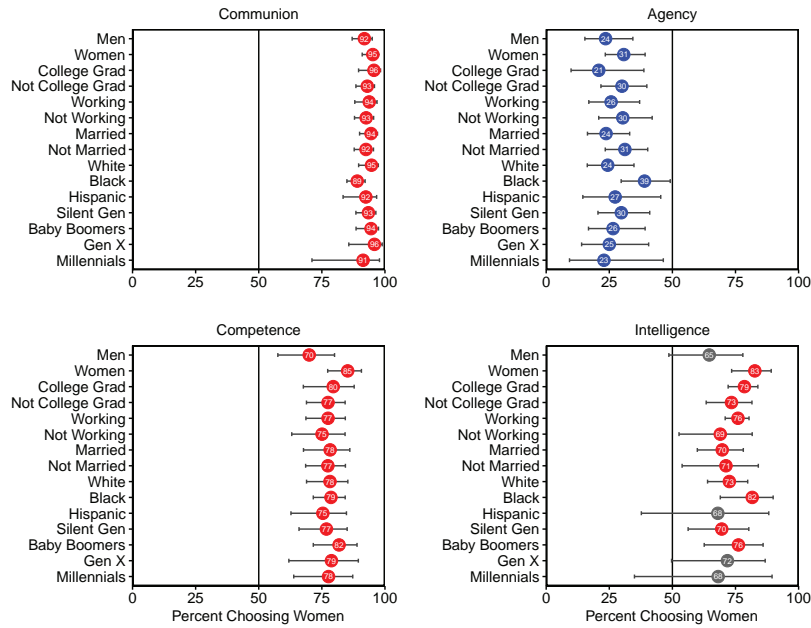
gence, mean  $OR = 1.85, p < .001$ ); the same differences were also found for the predicted means for year 2018 ( $p = .026$  and  $p = .004$ , respectively).

## Discussion

Challenging traditional claims that stereotypes of women and men are fixed or rigid, our study joins others in finding stereotypes to be flexibly responsive to changes in group members' social roles (e.g., Koenig & Eagly, 2014). As the roles of women and men have changed since the mid-20th century, so have consensual beliefs about their attributes.

These conclusions derive from national public opinion polls conducted in the United States with over 30,000 adult respondents. Although such polls are limited in number, they are sufficient to demonstrate clear increases in the ascription of communion to women relative to men but a lack of change in agency. Although women also gained in competence relative to men, belief in competence equality has increased over time as well.

As demonstrated by Diekmann and Eagly's (2000) research on *dynamic stereotypes*, people generally think that gender stereotypes on agency have converged and will continue to do so because of the growing similarity in the employment and domestic commitments of women and men. Contrary to this propositional reasoning, our meta-analysis showed that these socioeconomic changes are as-



*Figure 4.* Subgroup analysis for demographic variables. Values displayed are predictions of the simple regression models (see Figure 1) for the year 2018 for each demographic subgroup. Values indicate the percentages of *women more* responses among the *women more* and *men more* responses. The dots indicate that participants ascribed traits more to women (red [top left, bottom left, and most of bottom right panels]) or men (blue [top right panel]) or that their responses did not significantly favor either sex (gray [1st, 11th, 13th, and 14th dots in bottom right panel]). Error bars denote 95% confidence intervals. Coll. = college. See the online article for the color version of this figure.

sociated with stereotypic increases in women's communion and competence but not in their agency. The flaw in people's reasoning likely flows from their lack of conscious awareness of the extent of sex segregation of the labor force, as demonstrated by Beyer's (2018) findings of systematic underestimation of occupational segregation. Thus, women's increasing employment has crowded them mainly into jobs emphasizing social skills and social contribution (Cortes & Pan, 2018), often in the expanding service, education, and health care sectors of the economy. Because people have increasingly observed women in such jobs, the associative processes of stereotype formation following from observations of women's paid work have more strongly linked them with communion, supplementing observations of women's enduring, albeit diminished, domestic specialization (see Gawronski & Bodenhausen, 2006, for discussion of propositional and associative processing).

Two other psychological processes may also have fostered women's communal stereotype. One is that, whereas women's earlier domestic role may have seemed obligatory, people likely believe that women now have substantial choice about the occupations they pursue, thus increasing the strength of their inference to corresponding traits (Jones & Davis, 1965). Yet another process contributing to the escalation of women's communion may follow from its being the strongest gender stereotype. Its salience may have

fostered its accentuation as it became the most conspicuous quality differentiating women and men (see Eyal & Epley, 2017).

Even though women are overrepresented in communal roles, occupational sex segregation did decrease, mainly in the late 20th century (Hegewisch & Hartmann, 2014). This shift drew women into many male-dominated occupations; however, many of these are not particularly agentially demanding (e.g., veterinarian, dentist; Roos & Stevens, 2018). Moreover, even within the more agentic roles that women entered, such as lawyer and manager, internal segregation tended to put women into the more communal variants of these roles (Levanon & Grusky, 2016). In some instances, new female ghettos emerged through the redesign of jobs to have lower authority and reward social skills (e.g., bank branch manager; Skuratowicz & Hunter, 2004). For all of these reasons, women's increasing employment has likely driven the stereotype of women toward gains in communion but not agency even while yielding gains in competence.

Our findings reveal gender stereotypes' remarkable consistency across respondent sex, education, employment, marital status, race—ethnicity, and generation. Sex of respondent did reveal some ingroup favoritism, with women, relative to men, rating women more favorably (cf. Rudman & Goodwin, 2004). Nevertheless, women and men gener-

ally agreed with the overall patterns on communion, agency, and competence, as did the subgroups based on other demographics. For instance, in recent polls, among those noting a sex difference in competence, even male respondents shared the belief that women are the more competent sex.

The competence findings challenge the assumption that women, as a lower status social group, are accorded less competence than are men (e.g., Ridgeway, 2014). This assumption neglects women's educational attainments and entry into high-prestige occupations (e.g., physician, education administrator), which diminished men's once-strong advantage in occupational prestige (Lippa et al., 2014; see also Kleinjans, Krassel, & Dukes, 2017). Occupational prestige may have a greater influence on competence beliefs than do other status indicators (income and hierarchical power), on which women remain more disadvantaged.

Interpretations of our findings should consider that social movements organized to lessen group disadvantage usually challenge cultural stereotypes about the group. With feminist activism, gender stereotypes thus tended to become politically incorrect, and belief in gender equality became more correct (Eagly, 2018). To address this potential source of bias, the analysis of equality responses to the poll items found a significant increase only in competence. Moreover, the increase in female advantage in both communion and competence remained intact when controlled for equality responding. A related consideration is that increasing pressures for political correctness may have fostered the ascription of positive traits to women. However, the analysis of traits' evaluative content did not support this supposition.

Another limitation is that our project could not explore stereotypes resulting from sex intersecting with other categories (e.g., stereotypes about women and men differing in race and ethnicity; Ghavami & Peplau, 2013). Yet, given that people's observations should be somewhat weighted toward their own social group, decomposition of the poll data by respondents' demographic groups yielded findings suggestive of intersectionality (e.g., Whites, more than Blacks, found agency more true of men than women).

Measurement limitations included the categorical form of the items (i.e., more true of women or men, or equal), which did not allow expression of the magnitude of perceived sex differences. Yet, Lueptow et al.'s (2001) report of trends from 1974 to 1997, based on respondents' separate ratings of men and women on 7-point scales, revealed findings very similar to those in our data: an increase in the communion of women relative to men and little change in agency. Another limitation is that the polls did not include implicit measures of stereotypes, thus limiting understanding of whether change over time might differ between the two types of measures (Lemm & Banaji, 1999; Rudman & Goodwin, 2004).

Yet another limitation is that the polls did not administer consistent sets of items. In 10 instances, a dimension was represented by only a single item, a practice that tends to lower measure reliability but does not necessarily compromise validity (Gardner, Cummings, Dunham, & Pierce, 1998). Variation in the items representing a dimension is tolerable given that research has demonstrated that traits are correlated within clusters of communal, agentic, and competent items (e.g., Koenig & Eagly, 2014), lending legitimacy to treating similar items as assessing these dimensions. Nevertheless, item responses did vary within dimensions, as illustrated by the 2018 poll, which revealed some item variability in responses to the four competence traits (see Figure S4 in the online supplemental materials). To address this item inconsistency issue for competence, we also analyzed the trend over time in the intelligence item. The similarity of its findings to those for competence in general suggests that the gain in women's stereotypical competence is robust. Moreover, this gain persisted even after controlling for items' evaluative content. Nevertheless, the direction of gender stereotyping no doubt varies across domains of competence such as verbal, quantitative, and technical skills.

Despite the project's large, nationally representative samples extending over seven decades, another limitation is the unfortunate lack of poll data between 1950 and 1974, a period of limited public interest in gender issues. However, women's gains relative to men's in competence and communion were not solely dependent on the possibly anomalous post-World War II data but remained significant even after the elimination of these data points. All in all, despite some limitations, this project is the first to recognize the profound social trend of increasing belief in the competence equality of women and men, combined with a decided edge of women over men among those who perceive competence inequality.

Why haven't women's competence gains propelled them to the top of hierarchies? The reasons probably reside in the lesser agency ascribed to women, given that leadership is imbued with this quality (Koenig et al., 2011). Consider also that the female stereotype of high competence and communion combined with low agency likely makes women suitable for workplace tasks that Babcock, Recalde, Vesterlund, and Weingart (2017) have labeled *low promotability*. Such tasks demand competence, but ambitious employees avoid them (e.g., routine committee service) because they seldom further advancement. Indeed, Babcock et al. showed that women are preferentially chosen for such tasks and are more likely to accept them.

Despite these concerns about promotability, women's advantage over men in communion is likely beneficial for employment in general. The reason is that analyses of the labor market over time revealed that jobs increasingly require high levels of social skills (Deming, 2017). Given also

that in general jobs' cognitive demands have increased as their physical strength demands have decreased, women's gains in perceived competence should favor increased access to employment (Rendall, 2017).

In sum, U.S. poll data show that it is only in competence that gender equality has come to dominate people's thinking about women and men. For qualities of personality, the past 73 years have produced an accentuated stereotype of women as the more communal sex, with men retaining their agency advantage. These personality findings challenge people's everyday assumptions about changes in gender stereotypes (see Diekmann & Eagly, 2000). These results also call for correction of many social scientists' claims that gender stereotypes are unchanging (e.g., Haines et al., 2016) and that a group's lower status necessarily implies a stereotype of lesser competence (e.g., Fiske, Cuddy, Glick, & Xu, 2002; Ridgeway, 2014). Instead, despite—or because of—the massive flow of women into paid employment, people's beliefs about the sexes are predominantly of personality difference but competence equality.

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