Why is Gender Segregation So Extreme?
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Abstract

The "gender revolution" is now a half-century old and yet the workplace is still extremely segregated. We cast new light on the sources of extreme sex segregation by developing a model resting on the twin principles of queuing and gender essentialism. Using data from the O*NET archive, we show that much male-biased queuing remains after the physical, cognitive, and interactional forms of essentialism are exhaustively operationalized. We also find, however, that essentialism is an important force behind segregation, that the physical and interactional forms of segregation are especially strong, that the physical form of essentialism is one of the few examples of female-advantaging segregation, and that essentialism takes on a fractal structure that generates much micro-segregation at detailed occupational levels. We conclude by discussing how essentialist processes account for the intransigence of occupational sex segregation.

The rise of gender egalitarianism over the last half-century, while spectacular and unprecedented, is clearly an incomplete project in which pockets of spectacular resistance remain in evidence, especially within the workplace (e.g., England 2010; Gerson 2011; Huffman, Cohen, and Perlman 2010; Pettit and Hook 2009; Ridgeway 2011; Cotter, Hermsen, and Vanneman 2011). There has been much discussion, in particular, of the gender pay gap and how historic declines in this gap appear to have recently stalled (e.g., Stone 2009). It's equally striking, however, that women and men continue to work in vastly different occupations, with women still crowding into a relatively small number of female-typed occupations. It's perhaps surprising that we refer to a "gender revolution" even though a full 53 percent of the employed women in the United States would have to be shifted to a different occupational category to eliminate all segregation (e.g., Blau and Kahn 2011; Jacobs 2001; Levanon, England, and Allison 2009). In other countries, sex segregation is likewise very extreme, so much so that the contemporary occupational structure may be characterized as "hypersegregated" (Charles and Grusky 2004; 2011).

Although no one doubts that sex segregation lives on in extreme form, we know rather less about *why* it's so extreme and *what* makes it more extreme in some occupations than in others. Is there something special about gender inequality, as compared to racial or class inequality, that makes it more susceptible to extreme segregation in the workplace? Is there likewise something intrinsic to particular occupations (e.g., textile workers) that renders them especially susceptible to extreme segregation? Or do more contingent and idiosyncratic forces express themselves at those fateful moments when an occupation is established and determine the particular gender typing of an occupation? The purpose of this paper is to determine whether the structure of sex segregation can be successfully explained with a model that focuses on

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lawful rather than historically contingent forces. We proceed by building the first comprehensive model of segregation and then using it to cast light on the forces governing segregation and on possible futures for segregation.

It may reasonably be asked why, despite decades of intensive research on segregation, we still don't have a powerful explanatory model of it. The main problem is that much of our research has been focused on the prominent declines in segregation across big aggregate classes (e.g., professionals, clerks, craft workers, service workers). The ongoing influx of women into the professional sector is, for example, a conventional and important example of desegregation at the big-class level (Cotter, Hermsen, and Vanneman 2004). As important as big-class desegregation is, it has to be borne in mind that segregation *within* big classes has remained largely intact, and hence women and men continue to work in very different occupations even if increasingly in the same big class. The explanatory model of Charles and Grusky (2011), for example, works exceedingly well at the big-class level but explains only 3.3 percent of the residual association at the detailed occupational level, leading them to conclude that "disaggregate segregation is chaotic and idiosyncratic" (p. 395). This conclusion is premature, we think, because it has not been properly exposed to empirical test. The purpose of our paper is to develop a powerful model of the *full and detailed* segregation array and to use it to cast light on why sex segregation is so intransigent.

The foil around which we build our new segregation model is the distinction between essentialist and vertical sources of segregation. As Charles and Grusky (2004) have argued, two distinct cultural principles are interwoven to generate the contemporary pattern of sex segregation, the first being the essentialist presumption that women and men have fundamentally different tastes and proclivities and are accordingly best-suited for different types of occupations,

and the second being the vertical presumption that men are more competent and status worthy than women and accordingly well-suited for prestigious and high-paying positions that require the most substantial human capital investments (see Blackburn, Brooks, and Jarman 2001; Blackburn, Jarman, and Brooks 2000; Bridges 2003; Charles and Grusky 2011; Cotter, Hermsen, and Vanneman, 2011; Grusky and Levanon 2008; Semyonov and Jones 1999). Although a hybrid model of this sort has been proposed frequently, no attempt has been made to rigorously deploy it at a properly detailed level.

The distinction between essentialist and vertical segregation is accordingly central to our segregation model. The essentialist principle is expressed in supply and demand processes that allocate women into occupations with female-typed traits (e.g., nurturing) and men into occupations with male-typed traits (e.g., analytical). We can accordingly understand essentialism as a mechanism that legitimates gender inequality by representing (a) women as peculiarly suited for jobs that happen to be low in pay and prestige, and (b) men as peculiarly suited for jobs that happen to be high in pay and prestige. Because the vertical principle expresses, by contrast, the extent to which men are advantaged after all such essentialist effects are purged, it pertains to a rawer form of less deeply legitimated advantage. We will show that vertical segregation rests on the simple *presumption* that men are intrinsically more competent than women and hence more deserving of rewards (e.g., pay, prestige) that women and men equally value. This presumption has of course been called increasingly into question as egalitarianism spreads. Although vertical forms of segregation are therefore weakening, we will argue that gender inequality nonetheless remains extreme because the essentialist variant of segregation is alive and well. It's the continuing appeal of essentialism, therefore, that accounts for the intransigence of gender inequality.

We begin by reviewing the twin principles of essentialism and queuing and then showing how these principles have been unconvincingly and unsuccessfully operationalized in contemporary segregation models. We will show that segregation arrays are exceedingly rich and may be mined for evidence about the relative roles of essentialism and queuing in ways that haven't been adequately exploited to date. The models developed here will uncover not just the *extent* of essentialism and queuing but also the various *forms* of essentialism and queuing that are in evidence. We focus especially on showing that the distinction between female-advantaging and male-advantaging forms of essentialism, which has been ignored in past research, casts light on why segregation is still so extreme.

The essentialist roots of segregation

The starting point for our project is the striking correspondence between (a) the abilities that an occupation is presumed to require (e.g., nurses require nurturing abilities), and (b) the putative traits of the characteristic incumbents of that occupation (e.g., women are viewed as especially nurturing). This correspondence suggests an essentialist interpretation of sex segregation in which an occupation is matched to whatever gender is reputed to have the interests, skills, and proclivities that the occupation demands (see Charles and Bradley 2009; Charles and Grusky 2004). Additionally, the task requirements of an occupation may evolve over time to better reflect the presumed interests, skills, and proclivities of its incumbents, thereby further strengthening the association between the traits of the incumbents and the supposed needs of the occupation. This alternative causal pathway is no less an expression of essentialism. If, for example, an occupation first comes to be female-dominated and thereafter begins to incorporate tasks that are female-typed, this is simply yet another expression of the presumption that certain tasks are best suited to women. The underlying strength of the association between occupational

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tasks and occupational composition is, regardless of how that association is generated, indicative of how essentialist the labor market is.

There is of course much psychological and sociological research documenting that women and men are understood to have very different capabilities and tastes. That is, women are routinely represented as social, nurturing, and detail-oriented, while men are presumed to be strong and robust, mathematical and analytical, and well-suited to exercising authority (e.g., Reskin 2000; Ridgeway 2011; Ridgeway and Correll 2004). These presumptions about male and female characteristics are disseminated and perpetuated through popular culture and the media, through social interaction in which significant others (e.g., parents, peers, teachers) implicitly or explicitly support such interpretations, and through micro-level cognitive processes in which individuals pursue and remember evidence that is consistent with their preexisting stereotypes and ignore, discount, or forget evidence that undermines them (Correll 2001). By virtue of repeated telling, the essentialist narrative takes on a force that shapes labor market outcomes, indeed it may be understood as a classic example of the self-fulfilling prophecy (e.g., Ridgeway 2011; Keller 2005; see Williams and Eberhardt [2008] for a related application).

The main claim that we wish then to advance is that female-dominated occupations require abilities (e.g., nurturing) that are regarded as prototypically female, while male-dominated occupations require abilities (e.g., strength) that are regarded as prototypically male (e.g., Gorman 2005). This essentialist association is generated because employers internalize essentialist presumptions and allocate occupations to men and women in accord with them (i.e., essentialist discrimination), and because workers internalize the same essentialist presumptions and aspire to occupations that are in accord with them (i.e., essentialist preferences). It follows that essentialist segregation has both demand-side and supply-side sources. For example, the

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essentialist story that men are especially well-suited for jobs entailing strength is not just internalized by employees and revealed in their preferences for particular jobs (Marini et al. 1996; Beutel and Johnson 2004), but is also internalized by employers and revealed in their tastes for discrimination at the point of hiring, firing, and promotion (Bergmann 2011; Reskin and Maroto 2011).

Although the essentialist story is frequently rehearsed, it's striking that we know so little about (a) the *extent* to which the labor market is indeed essentialist in structure, and (b) the particular *form* of essentialism that's in play. There are five core questions about the extent and form of essentialism that remain unanswered and that we attempt to take on here.

Is the labor market truly rife with essentialism? It's perhaps surprising that the main proponents of an essentialist account (i.e., Charles and Grusky 2011) operate with a simple one-parameter representation of essentialism that distinguishes between occupations that are and are not strength-requiring (also see Charles and Grusky 2004; Grusky and Levanon 2008). We are, like Charles and Grusky (2011), impressed with the power of that single parameter. But even so our suspicion is that essentialism extends well beyond the simple presumption that men and women differ in their strength and in their "taste" to engage in strength-requiring pursuits. This suspicion can be straightforwardly tested by developing a comprehensive operationalization of essentialism that distinguishes between its physical, cognitive, and interactional variants. The resulting model will capture the effects of all the various essentialist processes at play, such as the presumption that women are endowed with fine motor skills, that men are especially well-suited to analytic tasks, that women are skillful nurturers, and that men are skillful leaders. Given how comprehensive our parameterization will be, we'll come close to exhausting the reach of essentialism in the workplace, a critical task in putting the essentialist approach to reasonable

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test. It's our hypothesis that a full essentialist model will prove powerful and assist in explaining why segregation is so extreme even a half-century after the gender revolution began.

How much female-advantaging essentialism is there? The conventional single-parameter operationalization is thus inadequate because it's unlikely to exhaust the forces of essentialism. The further problem with focusing exclusively on strength-based essentialism is that it's one of the relatively rare types that, by virtue of steering women away from low-paying jobs, may be understood as female-advantaging. By contrast, the presumption that men are suited to analytical or mathematical tasks is a male-advantaging variant, as occupations that rely on analytical or mathematical skills are typically higher in status and pay than those that do not. We suspect that the various types of essentialism that have typically been omitted from conventional analyses are likewise male-advantaging in their effects. The simple implication: Although most forms of essentialism are likely to be male-advantaging, the main occupational segregation models on offer simply ignore such essentialism and hence misrepresent the way in which essentialism operates to produce advantage and disadvantage.

Which types of essentialism are most important in propping up segregation? This multidimensional operationalization of essentialism allows us to assess which forms are especially important in generating sex segregation. Insofar as essentialism is under attack, it would appear to be a very partial and asymmetric attack (see England 2010), one in which women are opening up to some male-typed tasks (e.g., analytical, mathematical) without men in turn opening up to many female-typed tasks (e.g., nurturing). Additionally, there's good reason to believe that men may be gradually abandoning their commitment to strength-based essentialism, a development that, if indeed underway, pertains to one of the few types of essentialism that in fact serve women rather than men (by directing men to comparatively low-

paying occupations). The key question that then emerges, and one that our multidimensional model will answer, is whether those types of essentialism that are putatively weakening are all that important in maintaining sex segregation.

Is there much micro-essentialism? It's long been argued that the influx of women into professional and managerial occupations has precipitated a reactive resegregation process within those sectors (Cohen, Hoffman, and Knauer 2009; Jacobs 1992; Ku 2011). As the two genders come together in the workplace, deeply entrenched essentialist precepts may inform decisions about how tasks should then be divided among them, with the result being a strengthened "micro-essentialism" informed by presumed gender differences in skills, aptitudes, and tastes. There is much anecdotal and qualitative evidence supporting just such an account: (a) the rising number of female physicians appears to have generated new female-dominated ghettos in the medical profession (e.g., pediatrics); (b) the recent (minor) influx of U.S. women into road-construction occupations has been coupled with personnel practices that shunt new entrants into positions that are physically undemanding or people-oriented (e.g., "flagman"); and (c) the rising number of female lawyers has been accommodated by allocating them into family practice and other essentially female specialties. In each of these cases, initial headway has been made in reducing vertical segregation, only to find that the newly integrated occupations seemingly resegregate along essentialist lines at a lower sub-occupational level. However plausible and compelling the foregoing argument would seem, the evidence on its behalf remains largely anecdotal (but see Cohen et al. 2009). We will provide the first comprehensive quantitative estimates of the strength of such micro-essentialism in the professional sector and throughout the class structure.

Can we make essentialism go away? As a parallel line of evidence, one might ask whether social classes that have committed most explicitly to family-friendly policies, anti-discrimination legislation, and other forms of egalitarianism have made substantial headway in reducing essentialist segregation. If they have, it is suggestive that conventional egalitarian commitments, at least when carried out to their logical extreme, can serve to more quickly root out segregative processes. Because the professional class is the home ground of liberal egalitarian commitments (see Jackson 2008), we will pay particular attention to this class and to those types of essentialism, such as cognitive essentialism, that are especially inconsistent with a professional worldview. Although there is a long tradition of commentary emphasizing the inequality-reducing effects of egalitarianism, Jackson (2008) has been the most forceful exponent of this position, at least as it pertains to gender egalitarianism.

The essentialist narrative is in the end a story about how women and men end up in jobs for which they are deemed well-suited. It is a benign narrative in the sense that segregation partly becomes a reflection and expression of the differential tastes of women and men. To be sure, these preferences are frequently formed in reaction to the presumed essentialism of others, as is the case, for example, when women opt against becoming high-rise steelworkers out of a desire to avoid employer and coworker discrimination within that occupation. Moreover, some women will attempt to become high-rise steelworkers despite such opposition from employers, and insofar as they fail in their attempt (by virtue of the intransigent tastes of employers) then of course their utility is hardly being served. The supply-side variant of the essentialist story is, by contrast, a rather benign one, as it represents women and men alike as pursuing different occupations because they are satisfying their different tastes.

Queuing and segregation

The foregoing essentialist mechanism cannot, however, provide a complete account of sex segregation, as we well know that men also are disproportionately found in occupations that provide amenities (e.g., pay, prestige) that women and men seemingly value quite equally. How is it that men end up numerically dominating occupations that women and men alike prefer? It is here that we must make reference to those complex of social processes that serve to privilege men in the competition for the most desirable occupations (e.g., Reskin 2008; Strober and Catanzarite 1994). In accounting for such vertical segregation (or "queuing"), the main force at work is again cultural in form, but now the relevant cultural principle is the long-standing belief that men are more competent in the formal workplace and accordingly better suited for positions of high pay or prestige. Despite the rise of liberal egalitarianism, it is still commonly assumed (albeit rarely stated explicitly) that the formal labor market is a male province, with this presumption translating, through a variety of well-known mechanisms, into a vertical form of segregation in which men secure occupations that yield more pay and prestige (e.g., Ridgeway 2011). This presumption translates, for example, into employer decisions to privilege men in the competition for high-status occupations and to relegate women to a "mommy track" or other lesser positions (e.g., Correll and Benard 2006; Correll, Benard, and Paik 2007). It also translates into decisions on the part of women to self-select into a secondary track because (a) they are conditioning on the likely discrimination of employers, (b) they are deferring to the preferences of their partners (or others), or (c) they have internalized such presumptions themselves and therefore invest less in human capital or settle for less desirable positions even after making the requisite human capital investments (see Charles and Grusky 2004, pp.15-23, for further discussion of the mechanisms underlying these cultural principles).

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This complex of demand-side and supply-side processes come together to privilege men in the competition for the most desirable occupations. The vertical principle expresses, then, the extent to which men prevail over women in the competition for resources that men and women equally value (e.g., pay, prestige), whereas the essentialist dynamic operates to create gender differences in tastes (and presumed tastes) that generate uncompetitive sectors of the division of labor (Johnson 2001; Marini et al.1996). The contemporary segregation regime is therefore generated by three processes: (a) the vertical presumption that men are more competent in the formal workplace and accordingly better suited for positions of high pay or prestige; (b) the "female-advantaging" essentialist presumption that men are well-suited for occupations requiring strength or robustness, and (3) the "male-advantaging" essentialist presumption that men are well-suited for occupations requiring leadership or analytical skills and women are well-suited for occupations requiring nurturing or social interaction. The objective of this paper is to build a comprehensive segregation model that takes into account all three processes at once.

The virtue of doing so is that one can estimate the queuing effect after netting out potentially conflated essentialist processes. It's worth addressing this point in some detail because conventional segregation models don't net out these processes and hence can't estimate the true extent of queuing. In Figure 1, we present a hypothetical data set of ten occupations, with the circles and triangles representing nonmanual and manual ("strength-requiring") occupations respectively. Although our demonstration could be carried out with any measure of consensually valued resources (e.g., pay, status), the y-axis of Figure 1 pertains (arbitrarily) to status.

We couch our illustration around the following simple question: What happens when one attempts to assess the strength of queuing while ignoring the role of female-advantaging

essentialism? The simple answer, as shown in Figure 1, is that the strength of queuing will in this case be understated. The two columns on the left side of Figure 1 express the gender-by-status association when one naively estimates a model that does not purge female-advantaging essentialism. Under this model, the mean occupational status for females and males is shown to be approximately the same, implying that there is no gender-by-status association. This result arises, however, because (a) men are more likely than women to be allocated to strength-requiring occupations (i.e., an excess of male triangles), and (b) strength-requring occupations tend to be lower in status (i.e., the triangles fall below the circles). The disproportionate allocation of men to strength-requiring occupations may of course be understood as a form of essentialism. After that essentialism is purged (by fitting the gender-by-sector association), we can then properly estimate the net queuing as the within-sector slope shown on the right side of Figure 1, a slope that in this example is far steeper than that under the naive no-control model.

Although the data of Figure 1 are of course hypothetical, the naive slope will always be an underestimate of the true slope insofar as the omitted essentialism is of the female-advantaging variant. That is, insofar as the omitted essentialist process is working to allocate men into lower-status occupations, the queuing parameter will be biased downward because some portion of the male advantage is being concealed. Obversely, insofar as the omitted essentialism is of the male-advantaging variant, the bias will of course be in the opposite direction. The main reason why it's so important to build a model that fully represents all forms of essentialism is that we can then decompose the total observed segregation into a component that's legitimated by essentialist narratives and a component that is not. We will argue below that the former component is more resistant to change and thus accounts, in part, for the staying power of gender inequality.

Figure 1 about here

We will therefore focus principally on building a comprehensive representation of essentialism. There is, however, yet another source of bias that will arise whenever the vertical principle is incompletely represented. Namely, conventional assessments of queuing haven't distinguished between the (partly correlated) effects of pay and prestige, each of which is a distinct vertical dimension on which women are presumably disadvantaged. If the omission of male-advantaging essentialism leads to an overestimate of the queuing effect, the melding of pay and prestige into a single "socioeconomic dimension" will lead to an underestimate. We don't know which of these countervailing biases is more prominent and hence whether the vertical principle is weaker or stronger than we've long assumed. The conventional Charles-Grusky (2004) model is thus doubly problematic by virtue of representing both essentialism and the vertical principle incompletely.

The foregoing suggests, then, the following line of questioning: *Can we explain all segregation in essentialist terms once a more complete essentialist model is fit? Or does the vertical principle become even stronger when we allow for queuing by pay as well as prestige?* We simply don't know the answer to the latter two questions. The answer matters because the strength of the vertical principle speaks to the difficulty of bringing about further reductions in sex segregation. If the vertical principle is still strong, the spread of liberal egalitarianism can be expected to gradually weaken it and thereby reduce sex segregation via both supply and demand processes. On the supply side, the rise of liberal egalitarianism means that women will come to be more fully committed to the formal labor force and, by virtue of this commitment, decide to make human capital investments that qualify them for occupations that are similar in pay and

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prestige to "men's occupations." At the same time, demand-side discrimination against women should also weaken, not merely because employers will gradually shed their tastes for vertical discrimination against women but also because, in a society where egalitarianism has spread and become institutionalized, there are substantial legal, financial, and public-relations penalties imposed on discriminatory firms. These developments should in turn precipitate "feedback effects" (Blau, Ferber, and Winkler 2010) whereby new cohorts of women come to appreciate that vertical discrimination has receded and that substantial human capital investments are now more likely to yield a payoff.

If, alternatively, our results show that the vertical principle is quite weak, it follows that further declines in sex segregation must be secured by taking on essentialist processes. This is a more difficult task. After all, essentialism can readily adapt to liberal egalitarianism, transmuting itself into a conservative "different but equal" understanding of the aptitudes and abilities of women and men. Within the essentialist worldview, women and men are understood as having very different tastes, aptitudes, and aspirations, an understanding that can be reconciled with liberal egalitarianism insofar as the (relatively few) men and women with gender-atypical aspirations can compete fairly in a gender-neutral contest. For a liberal egalitarian, one must defend the right of women to freely compete for any occupation to which they aspire, but there is no corollary obligation to examine how those aspirations were formed or why they may putatively differ from those of men. On the supply side, liberal egalitarians will view aspirations as well beyond their purview, and the persistence of gender differences in such aspirations won't, as a result, be scrutinized or challenged to any great degree. On the demand side, the liberal egalitarian commitment delegitimates all forms of pure discrimination, but it does not as directly challenge statistical discrimination that rests on essentialist presumptions about gender

differences in aptitudes. In a world in which women have disproportionately invested in nurturance and service, essentialist stories about intrinsic gender differences in aptitudes have ample room to flourish, and employers may therefore reason that gender provides a good signal of capabilities in nurturing and service. It follows that essentialist forms of segregation may prove to be quite resistant to the spread of liberal egalitarianism (see Cotter, Hermsen, and Vanneman [2011] for a related discussion).

Measuring essentialism and the vertical principle

The two-step strategy behind our analysis entails (a) scaling detailed occupations in terms of three forms of essentialism (i.e., physical, cognitive, and interactional) and two vertical dimensions (i.e., pay and prestige), and (b) then modeling cross-occupational differences in the extent of segregation as a function of essentialism and queuing. We discuss each of these two steps in turn.

The centerpiece of our effort to build a comprehensive model of sex segregation is the underused O*NET database of worker attributes and job characteristics (Petersen et al. 1999). As the replacement for the *Dictionary of Occupational Titles* (DOT, see U.S. Department of Commerce 2000), O*NET is a rich resource that provides detailed information on worker characteristics (including abilities, interests and work styles), skill and experience requirements, and work activities and contexts. We rely here on the O*NET 4.0 ratings produced by occupational analysts and will apply them to the 468 occupations that can be identified in the Standard Occupational Classification (SOC) used in the 2000 U.S. Census. Because both O*NET and the 2000 U.S. Census are based on SOC, the conventional problem of linking two different occupational classification systems, which long plagued DOT users, has now been entirely eliminated.

The model that we're proposing stands or falls on our claim that the core essentialist processes invoked in the contemporary workplace are well captured in our models. Because gender essentialism is such a sprawling cultural construction, we well appreciate that this is an ambitious claim, if nothing else one that we hope will trigger efforts by others to disconfirm it. We've proceeded by carefully studying the vast literature on sex stereotypes and ferreting out those essentialist dimensions that are likely to be salient in the workplace (e.g., Cejka and Eagly 1999; Deaux and LaFrance 1998; Lueptow, Garovitch-Szabo, and Lueptow 2001; Spence 1993; Williams and Best 1990; Zemora, Fiske, and Kim 2000). In all cases, O*NET included seemingly strong measurements of the dimensions so identified, and we can't therefore blame any possible shortcomings of our essentialist measurements on problems with data availability. We have an extraordinary (and underused) data resource at our disposal and have fashioned it into an essentialist scheme that we're prepared to represent as comprehensive.

We've settled on a nine-dimension scheme in which each dimension is understood as capturing a form of physical, cognitive, or interactional essentialism (see Cjeka and Eagly 1999 for a similar set of umbrella categories). As shown in Table 1, only two of these nine scales is based on a single O*NET measurement (i.e., manual work, fine motor skills), while the remaining seven are composites that draw on a host of O*NET ratings. The scale for strength, for example, is a composite of five task measurements pertaining to the extent to which the occupation demands (a) general physical activities, (b) explosive strength, (c) dynamic strength, (d) trunk strength, and (e) static strength. We've opted for a composite measure not just because in this particular case the essentialist narrative is a unitary one about strength of all types, but also because our measurement models, which we describe below, support that composite. Whenever we were uncertain whether the narrative was indeed a unitary one, we carried out

exploratory analyses to reassure ourselves that a composite measure performed nearly as well as a disaggregated one in explaining occupational sex segregation. We also carefully examined the estimates from a host of exploratory and confirmatory factor models that tested the dimensionality of essentialism within the sample of 468 occupations included in our analysis. The simplest test of multidimensionality contrasts our preferred nine-factor model (as represented in Table 1) to a "conventional model" that constrains all of our O*NET indictors to load onto a single essentialist factor. The fit of the nine-factor model (L^2 = 8,329; df = 1,076; *bic* = 9,245) is far superior by any criterion to the fit of the one-factor model (L^2 = 20,572; df = 1,121; *bic* = 21,211). Although the latter result implies that the O*NET scales are tapping different essentialist dimensions, we've of course yet to establish that those dimensions in turn affect segregation differentially. We will turn to that segregation analysis below.

The final scheme, as represented in Table 1, includes measures of manual work, strength, robustness, mathematical skills, analytical skills, technical demands, exercise of authority, fine motor skills, and sociability. The first seven measures pertain to male-typed skills or demands, while the last two pertain to female-typed skills or demands. We applied the factor score weights (as shown in Table 1) from our nine-factor confirmatory model to construct the final measures of these nine essentialist dimensions.

Table 1 about here

The segregation model that we'll be estimating also includes two measures of the vertical principle. Although the vertical principle is typically measured unidimensionally (e.g., Charles and Grusky 2008), we've distinguished here between pay and prestige on the argument that different gender dynamics potentially underlie these two dimensions. In particular, the

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conventional argument is that women are more likely than men to trade off pay for prestige, a luxury that becomes possible insofar as women can rely upon their (male) spouses to deliver enough pay to meet household needs (Magnusson 2009). The tradeoff argument of course conditions on the premise that, because men are regarded as primary breadwinners, women have the freedom to consider high-prestige (but comparatively low-pay) occupations. Although the spread of liberal egalitarianism calls that premise increasingly into question, it's important to build a baseline model that captures the effects of possibly changing values on the segregation regime.

We have measured occupational prestige by exploiting a new O*NET scale pertaining to the degree to which occupational incumbents "are looked up to by others in their company and community" (Petersen et al. 1999; see Nakao and Treas 1994 for an overview of the measurement of occupational standing). Because O*NET does not provide good measures of pay, we've constructed our second vertical measure by analyzing the 2000 U.S. Census Public Use Microdata (one-percent sample). We've followed Hauser and Warren (1997) and their precursors (e.g., Blau and Duncan 1967) in using a wage threshold defined as the started logit of the percentage of workers (in the employed civilian labor force) within each occupation that earns $19.19 or more per hour.[1] Why settle on $19.19/hour? We've drawn on Hauser and Warren's (1997) result that the best scale derives from a $14.30 threshold for hourly occupational wage in 1989. After adjustment for price changes, this yields a $19.19 wage rate for our data.

The correlations among all essentialist and vertical scales are reported in Table 2. As shown here, the two vertical scales are strongly correlated (.71), and so too are the scales falling within the same essentialist class (i.e., physical, cognitive and interactional). The between-class

intercorrelations are, by contrast, often quite weak, a result that opens up the possibility that our multidimensional model will prove to be more powerful than conventional one-dimensional essentialist models.

Table 2 about here

Is there much female-advantaging essentialism?

Before we turn to our segregation results, it's useful to explore in more detail the structure of essentialism, especially the way in which its various forms are either male-advantaging or female-advantaging. We've made much of the striking tendency in the segregation literature (esp. Charles and Grusky 2004) to fixate on manual essentialism even though it's one of the very few examples of female-advantaging essentialism. As shown in Table 2, it's indeed the case that manual occupations are typically low in pay (r = -.32) and prestige (r = -.52), the implication being that women benefit from this particular form of essentialism. We've suggested that it's a peculiar form of essentialism precisely because, unlike most forms, it projects men into occupations that are *low* in status and pay.

But are we indeed right in claiming that other forms of essentialism are typically male-advantaging? We take on that question now by providing scatterplots pertaining to the purged relationship between occupational wages and the other essentialist dimensions (see Figures 2-4). The purged scatterplots pertain to the net effect of an essentialist trait and are formed by graphing wages against the residuals from the regression of the variable of interest on the remaining eight essentialist dimensions. These scatterplots allow us to assess, for example, whether an additional unit of nurturing, strength, or fine motor skills reduces wages when all other forms of essentialism are held constant.

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We've divided the scatterplots into female-advantaging (Figure 2), neutral (Figure 3), and

male-advantaging (Figure 4). As anticipated, the manual and strength dimensions are the *only*

female-advantaging forms of essentialism, with the negative gradient for strength proving to be

quite steep. Even so, Figure 2 does reveal a few outliers, most of which may be understood as

arising when a strength-requiring occupation (e.g., police officer) affords some opportunity for

promotion into a high-paying position (e.g., police chief). These counterexamples are

nonetheless rare (as Figure 2 reveals).[2] Because manual and strength-requiring occupations are

heavily male dominated (as we'll show subsequently), the implication is that women rely on

these forms of essentialism to improve their occupational pay and prestige. Although it's

conventional to view essentialism as harmful to women, Figure 2 makes it clear that women

benefit from the essentialist presumption that men are well-suited to strength-requiring

occupations.

The main conclusion, however, coming out of Figures 3 and 4 is that none of the other

forms of essentialism is likewise female-advantaging. This is not to suggest that all forms of

essentialism are straightforwardly male-advantaging. We instead find that three types of

essentialism (i.e., technical, fine motor, and authority) are approximately neutral in terms of

wages. Although it's unsurprising that technical and fine motor skills are wage neutral, one

typically assumes a substantial wage return to authority, if only because high-authority

occupations require either credentials or considerable work experience. The bivariate correlation

with wages is indeed strongly positive (r = .45, Table 2), but it bears noting that so too is the

bivariate correlation with analytic skill (r = .69, Table 2), which is itself strongly associated with

high wages (r = .69, Table 2). We have carried out side analyses that demonstrate that the presumed positive effect of authority (on wages) is in fact attributable to the correlation between authority and analytic skill. It follows that authority doesn't convey a wage advantage in and of itself. As Figure 3 reveals, there are of course *some* high-authority occupations that also come with high wages, indeed the upper-right quadrant of the authority scatterplot is well-populated. However, because the lower-right quadrant is also well-populated, the overall return to authority proves to be limited.[3]

The remaining forms of essentialism are all male-advantaging. The returns to analytical skills are especially strong, while the returns to mathematical skills and to robustness are more moderate but still positive. The first three graphs of Figure 4 thus pertain to traits that men are presumed to possess (Cjeka and Eagly 1999; Williams and Best 1990) and that, by virtue of this presumption, cast them into occupations that are highly paid. The final graph of Figure 4, which plots wages against sociability, reveals a rather sharp wage penalty for sociability-demanding occupations, a relationship that again harms women insofar as they're presumed to be sociable and hence opt for such occupations. Although some of our scatterplots in Figure 4 contain apparent outliers, we have carried out various side analyses establishing that the foregoing conclusions hold even after such outliers are excluded.[4]

These results make it clear that essentialism works mainly to segregate women into occupations that typically don't pay well. By contrast, the main form of essentialism that's been studied to date, that of "male physicality," is one of those rare examples of female-advantaging essentialism. We next ask whether models that incorporate *all* forms of essentialism, male-advantaging and female-advantaging alike, lead to new insights into how segregation is generated.

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A multidimensional segregation model

We have used the 2000 U.S. Census Public Use Microdata to construct a 468×2 sex segregation array for the employed civilian labor force. We then apply the following association model to this array:

$$m_{ij} = \alpha \, \beta_i \, \gamma_j \, \delta_1^{Z_i V_j} \, \delta_2^{Z_i E_j} \qquad (1)$$

where i refers to gender, j refers to occupation, m_{ij} refers to the expected value in the ijth cell, α refers to the main effect, β_i refers to the marginal effect for gender, γ_j refers to the marginal effects for occupation, Z_i is an indicator variable for gender (i.e., $Z_1=0$, $Z_2=1$), V_j is an illustrative vertical scale (e.g., prestige), E_j is an illustrative essentialist scale, and δ_1 and δ_2 are the parameters pertaining to the effects of those scales. We fit models that include as many as two vertical terms and as many as 9 essentialist terms.

The purpose of our multivariate association model is to identify the essentialist dimensions that are doing the main segregative work. Because these dimensions are sometimes quite intercorrelated (see Table 2), it's easy enough to be led astray by informal observation that focuses on a few prototypic occupations (e.g., nursing) and that explains the sex-typing of those occupations in terms of a few prototypic dimensions (e.g., nurturing). Worse yet, because our informal observations fixate on a small number of high-profile occupations, we may ignore the information conveyed by the hundreds of other occupations that are quite concealed from public view. It follows that an essentialist approach can't be rigorously evaluated without a formal multivariate model of the type represented by Equation 1 (see Charles and Grusky [2004] for a more detailed discussion of association models).

The fit statistics for models of this general class are presented in Table 3. As shown here, we first replicate the Charles-Grusky model by including a single vertical term (V^1) as well as the manual essentialist term (E^1), we next fit a comprehensive essentialist model, and we then fit a full model that includes the two vertical terms as well as all nine essentialist terms. We also fit the model of independence as a baseline measure of association in the segregation array.

The parameter estimates for the full model are presented in Figure 5 (in additive form). We have standardized the coefficients of Figure 5 by fixing the mean of the independent variables at zero and their variance at one (except for the dummy-variable coefficient pertaining to the manual-nonmanual contrast). The interpretation of coefficients is therefore straightforward. The prestige coefficient, for example, implies that female representation is reduced by a factor of .81 (i.e., $e^{-.21}=0.81$) for every standard deviation increase in occupational prestige (with a standard deviation of prestige equaling, for example, the difference between bank tellers and financial advisors). Whereas the prestige effect is relatively weak, the sociability effect is quite strong and implies that female representation rises by a factor of 1.65 (i.e., $e^{.50}=1.65$) for every standard deviation increase in sociability (with a standard deviation of sociability equaling, for example, the difference between an accountant and a librarian). When the full set of coefficients in Figure 5 is examined, we find that those pertaining to robustness, fine motor skills, and sociability are especially large, while those pertaining to authority, math, and analysis are comparatively small.

The implications of these results are best understood by addressing the questions that we earlier laid out in our introductory comments. We will take on each of these questions in turn by referring to the results of Table 3, Figure 5, and related supplementary analyses that will be introduced as necessary.

Is the segregation regime rife with essentialism? We led off by asking whether an essentialist account, once properly implemented, can succeed in explaining contemporary patterns of sex segregation. Although Charles and Grusky (2004) were unable to explain detailed sex segregation very successfully, they relied on a simple one-dimensional model of essentialism that may have failed not because essentialism is a weak force but because it was so poorly operationalized. In Table 3, we find that our more comprehensive essentialist model (i.e., Model 3), one that simultaneously fits effects for physical, cognitive, and interactional essentialism, can explain a full 62.5 percent of the association in the sex segregation array. The likelihood ratio test statistic for our full essentialist model, $L^2 = 199,476$, is much reduced relative to the corresponding statistic for the model of independence ($L^2 = 531,733$), all with an expenditure of just 9 degrees of freedom. The power of this essentialist account is equally revealed by plotting the observed sex ratios for each occupation against those predicted under the full model (i.e., Model 3, Table 3). [5] As Figure 6 shows, there is a close correspondence between the observed and predicted ratios, indeed the underlying correlation is as high as 0.79. The simple conclusion: We can quite successfully predict the sex composition of an occupation knowing only its scores on our nine essentialist dimensions.

How much queuing is there? We've stressed that there are two very distinct ways in which men may be advantaged in contemporary segregation regimes. If segregation were *entirely* essentialist in form, the tendency of men to secure more desirable occupations (i.e., those high in

pay and prestige) would arise because such occupations "happen" to be ones that require attributes (e.g., authoritativeness, analytic skills) that men are understood to be more likely to hold. This form of inequality is especially pernicious, we've argued, because it's more readily legitimated as an efficient outcome of individual tastes, capacities, and choices. Although our full essentialist model might conceivably provide this complete account of segregation, it's also possible that, even after applying a full set of essentialist controls, men still have a substantial net advantage that cannot be legitimated in essentialist terms.

We can address this question by examining whether the two vertical terms, when added to our full essentialist model, yield a substantial improvement in model fit. As shown in Line 4 of Table 3, the likelihood ratio test statistic is indeed reduced by about 8.6 percent when the two vertical terms are added (from 199,476 to 182,357), surely a nontrivial improvement. If the parameter estimates are considered (results not shown but available upon request), one sees only a slight decline in the parameter estimate for pay when the full complement of essentialist terms is included, a result that again implies that essentialism, even our quite exhaustive specification of it, cannot completely account for male advantage. Moreover, the estimates of Figure 5 show that women are disadvantaged in terms of prestige as well as pay, with their disadvantage in pay slightly more prominent. Although our results can't reveal *why* the prestige effect is weaker, it's at least plausible that some women are trading off pay for prestige, thus reducing the extent of male advantage on the prestige dimension. Taken together, the total disadvantage on the two vertical dimensions is nonetheless sizable (under Model 4), and our main conclusion must therefore be that segregation is driven by strong essentialist *and* queuing processes. The essentialist dimensions are clearly powerful (as argued above), but their power partly arises

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because they're working on the non-vertical component to segregation. The vertical component thus remains strong even when essentialist processes are fully incorporated.

Which types of essentialism are most important? We next ask which forms of essentialism are especially important in generating sex segregation. The estimates of Figure 5 show that the physical dimension is, just as Charles and Grusky (2004, pp. 15-16) assumed, an extremely strong segregating force, although we also find that this dimension incorporates a wider range of effects than has typically been assumed. As Figure 5 reveals, the well-appreciated effects of manual skill and strength are indeed quite strong, yet the effects of robustness and fine motor skills, which are typically ignored, are yet stronger. The results presented in Figure 5 also clarify that some types of physical labor are the province of women (i.e., fine motor skills), other types are more integrated (i.e., strength), and yet other types are very much the province of men (i.e., robustness). It's not simply the case, then, that men work with their hands and women with their "heart." In the latter stages of industrialization, some types of physical labor have been opened up to women, a dynamic that we'll discuss in more detail subsequently.

The more important point, however, is that the physical dimension hardly exhausts the forces of essentialism. The effects of interactional essentialism, especially sociability, are also quite strong, a result that again hasn't been properly incorporated into prior quantitative segregation models. The effects of cognitive essentialism are, by contrast, surprisingly weak: We find that men are only slightly advantaged in the competition for analytical and mathematical occupations. As indicated in Figure 5, an increase of a full standard deviation in analytic demands reduces female representation by a factor of only 0.94, hardly a sea change (i.e., $e^{-.06} = 0.94$). Although we can't of course speak directly to trend, the relatively weak effects for analytical and mathematical essentialism are at least consistent with the argument that, insofar as

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essentialism has been called into question, it's been a very partial and asymmetric questioning in which women are pursuing *some* male-typed tasks (e.g., analytical, mathematical) without men in turn pursuing *any* female-typed tasks (e.g., sociability, fine motor). The weakness of cognitive essentialism suggests, then, that at least some forms of essentialism may be vulnerable to egalitarian drift. The cognitive variant of essentialism appears to be weakening as some liberal parents encourage their daughters to become mathematicians, engineers, scientists, and other professions that draw heavily on mathematical or analytical skills. Within this vanguard population of anti-essentialists, it would appear that daughters aren't simply being encouraged to invest heavily in human capital, but additionally they're being especially encouraged to target such investments in mathematical or analytical skills.

How much male-advantaging essentialism is there? We next consider whether conventional quantitative segregation models have failed to appreciate the extent of male-advantaging essentialism. If the objective is to identify which forms of essentialism are most responsible for generating male advantage, then one needs to know (a) which forms are most strongly associated with wages (or status), and (b) which forms are most strongly associated with gender. To this point, we've only examined the first of those two conditions, and hence we're turning now to the second.

It may be recalled that we found an especially steep wage payoff to analytical skill (see Figure 4). However, Figure 5 now reveals that women are only slightly disadvantaged in securing analytic occupations, with the implication that, despite the steep wage payoff to analytic skills (i.e., condition a), analytic essentialism is not an important contributor to male advantage. Are there any examples of conditions (a) and (b) *both* operating in ways that advantage men? Indeed there are. The coefficients from Figure 5 also imply that a main contributor to male

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advantage, at least as regards wages, is interactional essentialism, in particular the sociability variant of such essentialism. We previously reported that the wage penalty for sociability-requiring occupations is quite substantial (see Figure 4), and we now can additionally report that women are much more likely than men to bear this penalty (see Figure 5). As Figure 5 additionally shows, women are also very likely to end up in fine motor occupations but the wage penalty for such occupations proves in this case to be quite trivial (i.e., condition (a) isn't met). We can conclude, then, that the sociability variant of essentialism is the main form producing male advantage.

But what about female advantage? Do any forms of essentialism assist females? As we've noted, there's a steep wage penalty to strength and to manual labor, and Figure 5 now further reveals that men are especially likely to be found in manual and strength-requiring occupations. Because conditions (a) and (b) are both met, we can conclude that physical essentialism is an inequality-reducing form by virtue of lowering the standing of men relative to women. The upshot is that physical essentialism works mainly to assist women while interactional essentialism works mainly to assist men. Whereas the Charles-Grusky model implied that essentialism is entirely female-advantaging, our far more comprehensive model shows that in fact essentialism works both to advantage *and* disadvantage women.

Is there much micro-essentialism? We ask next whether segregation and essentialism are as prominent at the detailed occupational level as they are at more aggregate levels. There are two equally plausible hypotheses on this point. The "selection hypothesis" suggests that essentialism will attenuate at more detailed levels because incumbents of detailed occupations have been so aggressively selected and trained as to eliminate most gender differences in tastes or proclivities. We might imagine, for example, that law or medical students are so highly culled

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and so homogenously trained that any residual gender differences among them will be quite minor and will generate only correspondingly minor forms of micro-segregation within the law or medical professions. The fractal hypothesis, by contrast, has it that essentialism reasserts itself in all contexts, that it capitalizes on even minute sex-typed differences, and that it accordingly regenerates itself even in the context of extreme selection and homogenous training (see Ku 2011; Cohen et al. 2009).

We can address such hypotheses by nesting our 468 detailed categories into 85 "micro-classes" that represent deeply institutionalized occupations (see Jonsson et al. 2009; Weeden and Grusky 2005). The micro-class scheme, which we've presented in the Appendix, includes such occupations as architect, lawyer, financial clerk, cook, carpenter, printer, and construction laborer. Within each of these occupations, the SOC of course carries out further disaggregations, indeed on average there are 5.5 detailed sub-occupations to be found within each of them (i.e., $468/85 = 5.5$). The key question: Does essentialism express itself just as forcefully at this very detailed micro-level? This question is of interest because some scholars have suggested that, as the occupational structure integrates at the aggregate level, the forces for segregation have simply reasserted themselves at the disaggregate level (esp. Cohen et al. 2009).

We can measure the extent of such disaggregate segregation by refitting our preferred models after first purging all association between gender and micro-class (see Table 4). This approach entails estimating 84 parameters pertaining to the association between gender and micro-class while, at the same time, including the 11 vertical and essentialist terms represented in Equation 1 and allowing them to affect segregation *within* micro classes. The resulting estimates, which are presented in Figure 7, now pertain to the extent of micro-essentialism and micro-queuing at the very detailed level.

The first conclusion to be drawn is that our full model, which includes the nine essentialist variables and the two queuing variables, explains 40.7 percent of the association at the detailed level (see Line 4, Table 4). By contrast, Charles and Grusky (2011) explained only 3.3 percent of such detailed association, a result that led them to conclude that segregation at the detailed level is "idiosyncratic" (p. 395). We've shown to the contrary that even the most detailed occupational assignments conform to simple rules of queuing and essentialism.

The parameter estimates from our full model bear out this conclusion. The coefficients in Figure 7 show, quite strikingly, that there's much micro-essentialism at work in the contemporary labor market. The effects of strength, robustness, technical skills, and sociability are all quite strong, although in some cases the estimates are weaker than the corresponding ones in Figure 5. It bears repeating that this essentialism is surfacing *within* such detailed categories as doctor, lawyer, carpenter, or printer and hence speaks to the way in which highly specialized occupational assignments are being made. In a follow-up paper, we'll be asking whether such micro-essentialism has been increasing or diminishing in recent decades, but regardless of the trend one has to be struck by the sheer amount of micro-essentialism that is in play in the contemporary segregation regime.

Can we make essentialism go away? The final model we fit allows essentialism to vary in strength across the professional and non-professional sectors of the labor market. We do so to test the standard claim that the professional class tends to be more egalitarian and thus less essentialist than other social classes. Because essentialism is so important in maintaining segregation, we naturally want to ask whether there are any circumstances under which it might

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disappear, a crucial question given that the future of extreme segregation rests in large part on our success or failure in finding a way to dismantle essentialism. If we can find evidence of reduced essentialism among professionals, it would of course call into question our argument that egalitarianism tends to coexist with essentialism.

We present the coefficients for this elaborated model in Figure 8. The first conclusion revealed here is that there's no obvious weakening of essentialism among professionals, indeed some of the essentialist effects (e.g., strength, math, technical, sociability) are, if anything, strengthened. Although there's not a simple across-the-board weakening of essentialism, this is not to suggest that there are no sectoral differences of any kind. We find, for example, further evidence of an asymmetric brand of egalitarianism in which professional women are pursuing classically male skills (e.g., math) without professional men in turn pursuing classically female skills (e.g., sociability). The sociability effect is in fact *more* female-biased in the professional sector than in the non-professional sector.

The second main sectoral difference is an apparent weakening among professional men in the taste for strength-based jobs. We find that professional women are *more* likely than professional men to show up in strength-requiring occupations, a result that must of course be carefully interpreted given the relatively moderate demands for strength within this sector. There are nonetheless some professional occupations, such as veterinarian or chiropractor, that do entail non-trivial strength requirements; and it's revealing that women are disproportionately found in such occupations. If all men, even professionals, were truly committed to conventional essentialist representations, we'd expect a male strength bias to surface here, just as it does in other social classes. But the bias in fact now works in the opposite direction.

Figure 8 about here

Does this surplus of professional women in strength-requiring occupations imply that professional women have suddenly embraced the notion that women are more physical than men? If this were the case, it would be yet another instance of women increasingly pursuing male-typed occupations, although it's a bit surprising that professional women haven't merely caught up with men on the strength dimension but have instead surpassed them. The latter result in fact suggests that men in the professional class may have distanced themselves from the male physicality assumption and, insofar as physical occupations (e.g., chiropractor) have extra openings, it's increasingly women who are left to fill them. This line of reasoning implies a "relegation" account of segregation in which males dominate those occupations within each class that best embody the values of that class. The latter account, although clearly speculative, does at least accord with the facts of Figure 8.[6] We will comment further on the implications of a relegation account in the concluding section.

Conclusions

We have developed a comprehensive model of occupational sex segregation that provides new insights into both the reach and limits of essentialism. Although essentialism is a core mechanism underlying segregation, the available quantitative models have failed to operationalize it convincingly. We have built a model that distinguishes between three fundamental sources of segregation: (a) a "female-advantaging" form of essentialism that works to protect women from entering poorly-paid occupations requiring male-typed skills (e.g., manual skills, strength), (b) a "male-advantaging" form that projects men into well-paid occupations requiring male-typed skills (e.g., robustness, analytic skills) and protects them from

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poorly-paid occupations requiring female-typed skills (e.g., sociability), and (c) a vertical principle that represents the net tendency of men to secure occupations that are high in pay or prestige. The resulting model, which fits only 11 parameters, explains 66 percent of the association in the full segregation array and 41 percent of the association once we "drill down" to the most detailed occupational level. Although essentialist effects are very strong and can account for a large share of the association, the vertical principle also remains strong even when our full complement of essentialist variables is fit.

We led off our paper with the promise that a comprehensive model of this sort would yield new insights into why occupational sex segregation in the early 21st century is so extreme even after nearly a half-century of "gender revolution." The foregoing results indeed suggest a partial solution to this puzzle: We suspect that a main reason why segregation is extreme is that (a) much of it is essentialist in its sources, and (b) the essentialist variant is durable because the spread of liberal egalitarianism can so readily coexist with it. The first part of this account is a straightforward descriptive finding and has surfaced time and again in our analyses. Most obviously, we find that a comprehensive operationalization of essentialism, one that captures its physical, cognitive, and interactional forms, can explain the vast majority of segregation in the full segregation array (i.e., 62.5 percent). We've been especially critical of the past literature's focus on male-advantaging physical essentialism (esp. Charles and Grusky 2011) and have further shown that female-advantaging forms, especially those pertaining to sociability, are important sources of segregation. The power of essentialism is additionally revealed in its tendency to express itself at a very detailed level. We've not only demonstrated that there's much segregation *within* quite detailed occupations (e.g., doctor, lawyer, carpenter) but also that such segregation has an essentialist signature.

The second part of our account is a more speculative claim to the effect that essentialist segregation is especially durable because it's consistent with liberal egalitarianism (see also Cotter, Hermsen, and Vanneman 2011). The essentialist form involves assigning workers to occupations in ways that can be represented as the operation of gender-specific tastes and that can thereby be partly legitimated as freely-made choices. For a liberal egalitarian, one must defend the right of women to freely and fairly compete for any occupation to which they aspire, but there is no corollary obligation to examine how those aspirations were formed or why they may differ from men's. Although radical egalitarians may complain, for example, about the disproportionate number of female pediatricians and their relatively low pay, their concerns are unlikely to gain traction because of the compelling essentialist story that legitimates such segregation as well as the inequality in remuneration that so often goes with it. Namely, liberal egalitarians will understand essentialist segregation as arising, in part, from the exogenous tastes of women, implying that the wage penalty they suffer is compensated by the extra utility they derive from realizing their tastes for sociable or nurturant work. These liberal egalitarian defenders will also be attracted to the virtues of matching women to occupations that appear to exploit their talents. By liberal egalitarian logic, the right of women to exploit their competencies and realize their aspirations should be vigorously defended, whereas the social processes that shape and form these aspirations and competencies are regarded as well beyond the proper purview of policy.

We appreciate that this second piece of our explanation remains speculative. In a follow-up analysis, we plan to examine trends in segregation, an exercise that will speak to the relative durability of essentialist and vertical segregation. This is a complicated task given that (a) trends in occupational traits will have to characterized with incomparable metrics (i.e., DOT and

O*NET), and (b) the U.S. occupational classification scheme has likewise changed quite fundamentally in recent decades. Insofar as these problems can be overcome, our working hypothesis is that essentialist segregation will be resistant to change, whereas vertical segregation will be less so and will therefore account for most of such change as has been observed.

We have so far suggested that a main reason why segregation is so extreme is that it's largely essentialist in its sources. But this is not, of course, to suggest that it's *exclusively* essentialist in its sources. The queuing principle also remains very fundamental to contemporary labor markets and should be understood as an important secondary mechanism behind extreme segregation. If segregation were fully essentialist in form, the tendency of men to secure more desirable occupations would arise entirely because such occupations were ones requiring skills that men are understood as holding (e.g., robustness). We find that male advantage cannot be fully explained in this fashion: That is, even when a comprehensive battery of essentialist processes are controlled, men still end up holding a substantial vertical advantage. This advantage is especially strong for pay but is present for prestige as well.

What do these results imply for the future of gender segregation? We've stressed that essentialist segregation is an especially pernicious form because it matches workers and occupations in ways that can be presumed to be the outcome of differential tastes and choice. The vertical component to segregation, which we've shown to be strong and persisting, cannot be legitimated in this fashion and may instead be understood as quite vulnerable to liberal egalitarian critique. By this argument, nothing could be more favorable for the egalitarian project than to find a strong vertical component to segregation, precisely because that component hasn't an essentialist legitimation propping it up. It might be added that our results are also inconsistent

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with the related claim (see England 2010) that sex segregation trends have recently "stalled out" because the easy reductions in vertical discrimination have been creamed off and left us with nothing but the more pernicious essentialist variant. We've shown, to the contrary, that there's a strong vertical residual even after every possible essentialist legitimation has been incorporated into the model.

Although the best bet for change may well be a withering-away of the residual vertical component, we can't rule out a complementary change in the way in which essentialism expresses itself. Indeed, even if some form of essentialism is a durable feature of inequality, this doesn't preclude important changes in the way in which it is revealed. There have clearly been non-trivial shifts over the last half-century in the types of traits that are regarded as essentially male or female (see Diekman and Eagly 2000). The question that then emerges is whether we should anticipate further changes in the content of our essentialist beliefs and hence the structure of essentialist segregation.

The case of cognitive essentialism is instructive in addressing this question. As we've noted before, the current fashion among egalitarian parents is to emphasize the cognitive or analytic abilities of their daughters, a commitment that leads them to press their daughters to become engineers or scientists and thereby call cognitive essentialism into question (see Grusky and Levanon 2008). Will this dynamic, insofar as it's indeed underway, lead to much change in segregation? The main point that should be made in this regard is that cognitive essentialism is *already* very weak (see Figure 5) and may not allow for much in the way of further change. The desegregation narrative can of course be rescued insofar as the sex bias reverses in direction (rather than disappears). If the payoff to cognitive skills remains large despite the influx of

women into the cognitive-skills sector (see Figure 4), a sign reversal of this sort could substantially reduce the pay gap (see England 2010).

We'd be remiss, however, if we didn't point out that our results are equally consistent with a less optimistic inequality-increasing narrative. This "pessimistic narrative" builds on our result that professional women, unlike women in other social classes, are disproportionately found in strength-requiring occupations (see Figure 7). Although the latter finding obtains solely within the professional sector, it nonetheless suggests that men may not be all that committed to preserving the classic essentialist view of men as strong and robust. This particular variant of essentialism developed in an especially prominent way during a period of history, that of early industrialism, in which manual labor was a central factor of production (see Milkman 1987; Kessler-Harris 1982). By contrast, manual labor is now becoming a less fundamental part of production, particularly in late-industrial economies that are experiencing deindustrialization through labor-reducing technological change and the globalization of production. Over the next half-century, the transition to a post-manual system may begin to reduce male commitment to those pieces of the essentialist package, especially an emphasis on male physicality, that assign males to increasingly devalued pursuits.

If men are able to gradually disown such female-advantaging essentialism, they would succeed in harnessing essentialism to work almost entirely on their behalf. Although progressives and other "gender egalitarians" might assume that *any* breakdown in essentialist beliefs should be applauded, a decreasing emphasis on male physicality will harm women because it undermines one of those relatively rare manifestations of essentialism that benefits women rather than men. If the male physicality assumption breaks down, this female-advantaging effect is lost; and the remaining forms of essentialist segregation will disadvantage

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women (in terms of pay and prestige) quite systematically. The simple moral here is that, much as we think of essentialism as regressive, in fact its female-advantaging variant plays an important role in reducing the pay gap. This variant appears to have already been abandoned in the professional sector and may come to weaken in other sectors as well. It is hardly implausible, after all, to suppose that men will successfully shake off disadvantaging definitions of masculinity and adopt new definitions that bring more power, prestige, and rewards.

References

Bergmann, Barbara. M. 2011. "Sex Segregation in Blue-collar Occupations: Women's Choices or Unremedied Discrimination?: Comment on England." *Gender and Society*, 25: 88-93.

Blackburn, Robert M., Bradley Brooks, and Jennifer Jarman. 2001. "Occupational Stratification: The Vertical Dimension of Occupational Segregation." *Work, Employment and Society* 15:511–538.

Blackburn, Robert M., Jennifer Jarman, and Bradley Brooks. 2000. "The Puzzle of Gender Segregation and Inequality: A Cross-National Analysis." *European Sociological Review* 16: 119-135.

Blau, Peter and Otis D. Duncan. 1967. *The American Occupational Structure.* New York: John Wiley & Sons.

Blau, Francine D., Marianne A. Ferber, and Anne E. Winkler. 2010. *The Economics of Women, Men, and Work,* Boston: Prentice Hall.

Blau, Francine D., and Lawrence M. Kahn. 2011. "The Gender Pay Gap: Have Women Gone as Far as They Can?" Pp. 549-66 in *The Inequality Reader: Contemporary and Foundational Readings in Race, Class, and Gender,* Edited by David B. Grusky and Szonja Szeléni. Boulder, CO: Westview Press.

Bridges, William P. 2003. "Rethinking Gender Segregation and Gender Inequality: Measures and Meanings." *Demography* 40: 543–568.

Beutel, Ann M. and Monica K. Johnson. 2004. "Gender and Prosocial Values During Adolescence: A Research Note." *The Sociological Quarterly* 45: 379-393.

Cejka, Mary Ann and Alice H. Eagly. 1999. "Gender-Stereotypic Images of Occupations Correspond to the Sex Segregation of Employment." *Personality and Social Psychology Bulletin* 25:413–423.

Charles, Maria and Karen Bradley. 2009. "Indulging Our Gendered Selves? Sex Segregation by Field of Study in 44 Countries." *American Journal of Sociology* 114:924-76.

Charles, Maria and David B. Grusky. 2004. *Occupational Ghettos: the Worldwide Segregation of Women and Men*. Stanford, CA: Stanford University Press.

Charles, Maria, and David B. Grusky. 2011. "Egalitarianism and Gender Inequality." Pp. 327-42 in *The Inequality Reader: Contemporary and Foundational Readings in Race, Class, and Gender.* Boulder, CO: Westview Press.

Cohen, Philip M. Matt. L. Hoffman and Stefanie Knauer. 2009."Stalled Progress? Gender Segregation and Wage Inequality Among Managers, 1980-2000." *Work and Occupations* 36:318-342.

Correll, Shelley J. 2001. "Gender and the Career Choice Process: The Role of Biased Self-Assessments," *American Journal of Sociology* 106: 1691–1730.

Correll, Shelley J. and Stephen Benard. 2006. "Biased estimators? Comparing status and statistical theories of gender discrimination." Pp.89-116 in *Advances in Group Processes,* Volume 23, edited by Shane R. Thye, Edward J. Lawler.Oxford: Emerald Group Publishing Limited.

Correll, Shelley J., Stephen Benard, and In Paik. 2007. "Getting a Job: Is There a Motherhood Penalty?" *American Journal of Sociology* 112:1297-1338.

Cotter, David A., Joan M. Hermsen, and Reeve Vanneman. 2004. *Gender Inequality at Work.* New York: Russell Sage Foundation.

-----. 2011. "The End of the Gender Revolution? Gender Role Attitudes from 1977 to 2008."
    American Journal of Sociology 117: 259-89.

Deaux, Kay and Marianne LaFrance. 1998. "Gender." Pp. 982-1026 in *The Handbook of Social
    Psychology,* edited by Daniel T. Gilbert, Susan T. Fiske, and Gardner Lindzey. New
    York: McGraw-Hill.

Diekman, Amanda B. and Alice h. Eagly. 2000. " Stereotypes as Dynamic Constructs: Women
    and Men of the Past, Present, and Future." *Personality and Social Psychology Bulletin* 26:
    1171-1188.

England, Paula. 2010. "The Gender Revolution: Uneven and Stalled." *Gender and Society*
    24:149-166.

Gerson, Kathleen. 2011. *The Unfinished Revolution: How a New Generation is Reshaping
    Family, Work, and Gender in America*. Oxford: Oxford University Press.

Gorman, Elizabeth H. 2005. "Gender Stereotypes, Same-Gender Preferences, and Organizational
    Variation in the Hiring of Women: Evidence From Law Firms." *American Sociological
    Review* 70: 702-728.

Grusky David B. and Asaf Levanon. 2008. "Four Gloomy Futures for Sex Segregation." Pp.
    812-825 in *Social Stratification: Class, Race, and Gender in Sociological Perspective*,
    3rd edition, edited by David B. Grusky, Manwai C. Ku and Szonja Szelényi. Boulder,
    CO: Westview Press.

Hauser, Robert M. and John Robert Warren. 1997. "Socioeconomic Indexes for Occupations: A
    Review, Update, and Critique." *Sociological Methodology* 27:177–298.

Huffman, Matt. L. Philip N. Cohen and Jessica Perlman. 2010. "Engendering Change:
    Organizational Dynamics and Workplace Gender Desegregation, 1975-2005."
    Administrative Science Quarterly 55: 255-277.

Jacobs, Jerry A. 1992. "Women's Entry into Management: Trends in Earnings Authority and
    Values among Salaried Managers." *Administrative Science Quarterly* 37:282-301

------. 2001. "Evolving Patterns of Sex Segregation." Pp. 535-550 in *Sourcebook of Labor
    Markets: Evolving Structures and Processes,* edited by Ivar Berg and Arne L. Kalleberg
    New York: Kluwer Academic.

Jackson, Robert M. 2008. "Opposing Forces: How, Why, and When Will Gender Inequality
    Disappear?" Pp. 215-44 in *The Declining Significance of Gender?*, edited by Francine D.
    Blau, Mary C. Brinton, and David B. Grusky. New York: Russell Sage Foundation.

Jackson, Robert M. 1998. *Destined for Equality: The Inevitable Rise of Women's Status,*
    Cambridge, MA: Harvard University Press.

Johonson, Monica K. 2001. "Job Values in the Young Adult Transition: Change and Stability
    with Age." *Social Psychology Quarterly* 64: 297-317.

Jonsson, Jan O., David B. Grusky, Matthew Di Carlo, Reinhard Pollak, and Mary C. Brinton.
    2009. "Micro-Class Mobility: Social Reproduction in Four Countries." *American Journal
    of Sociology* 114: 977-1036

Keller, Johannes. 2005. "In Genes We Trust: The Biological Component of Psychological
    Essentialism and its Relationship to Mechanisms of Motivated Social Cognition."
    Journal of Personality and Social Psychology 88: 686-702.

Kessler-Harris, Alice. 1982. *Out to Work: A History of Wage-Earning Women in the United-
    States* Oxford: Oxford University Press.

Ku, Manwai C. 2011. "When Does Gender Matter? Gender Differences in Specialty Choice
    among Physicians." *Work and Occupations* 38: 221262.

Levanon, Asaf, Paula England, and Paul Allison. 2009. "Occupational Feminization and Pay: Assessing Causal Dynamics Using 1950-2000 Census Data." *Social Forces* 88: 865-892.

Lueptow, Lloyd B., Lori Garovich-Szabo, and Margaret B. Leuptow. 2001. "Social Change and the Persistence of Sex Typing: 1974-1997." Social Forces 80:1-36.

Magnusson, Charlotta. 2009. "Gender, Occupational Prestige, and Wages: A Test of Devaluation Theory." *European Sociological Review* 25: 81-101.

Marini, Margaret M., Pi-Ling Fan, Erica Finley, and Ann M. Beutel. 1996. "Gender and Job Values." *Sociology of Education* 69: 49-65.

Milkman, Ruth. 1987. *Gender at Work: The Dynamics of Job Segregation by Sex During World War II* Urbana, IL: University of Illinois Press.

Nakao, Keiko and Judith Treas. 1994. "Updating Occupational Prestige and Socioeconomic Scores: How the New Measures Measure Up." *Sociological Methodology* 24: 1–72.

Peterson, Norman. G. Michael D. Mumford, Walter C. Borman, P Richaerd Jeanneret and Edward A. Fleishman. 1999. *An Occupational Information system for the 21st Century: The Development of O*NET*. Washington, DC: APA Books.

Pettit, Becky and Jennifer L. Hook. 2009. *Gendered Tradeoffs: Family, Social Policy, 2nd Economic Inequality in Twenty-One Countries,* New York: Russell Sage Foundation.

Reskin, Barbara F. 2000. "The Proximate Causes of Employment Discrimination," *Contemporary Sociology*, 29: 319–328.

Reskin, Barbara F. 2008. "Rethinking Employment Discrimination and its Remedies." Pp. 37888 in *The Inequality Reader*, edited by David B. Grusky and Szonja Szelényi. Boulder: Westview Press.

Reskin, Barbara F. and Michelle L. Maroto. 2011. "What Trends? Whose Choices?" *Gender and Society*, 25: 81-87.

Ridgeway, Cecilia. 2011. *Framed by Gender: How Gender Inequality Persists in the Modern World.* Oxford: Oxford University Press.

Ridgeway, Cecilia L. and Shelley J. Correll. 2004. "Unpacking the Gender System: A Theoretical Perspective on Gender Beliefs and Social Relations." *Gender and Society* 18: 510-531.

Semyonov, Moshe and Frank L. Jones. 1999. "Dimensions of Gender Occupational Differentiation in Segregation and Inequality: A Cross-National Analysis." *Social Indicators Research* 46:225–247.

Spence, Janet T. 1993. "Gender-Related Traits and Gender Ideology: Evidence for a Multifactorial Theory." *Journal of Personality and Social Psychology* 64:624-635.

Stone, Pamela. 2009. "Getting to Equal: Progress, Pitfalls, and Policy Solutions on the Road to Gender Parity in the Workplace." *Pathways* (Spring): 3-7.

Strober, Myra H., and Lisa M. Catanzarite, 1994. "The Relative Attractiveness Theory of Occupational Segregation by Gender." Pp. 116-39 in *Beiträge zur Arbeitsmarkt- und Berufsforschung* [*Labor Market and Occupational Research.*] edited by Petra Beckmann and Gerhard Engelbrech. Nuremberg, Germany: Institute for Employment Research.

U.S. Department of Commerce. 2000. *Standard Occupational Classification Manual* Springfield, VA : National Technical Information Service.

Weeden Kim and David B. Grusky. 2005. "The Case for a New Class Map." *American Journal of Sociology* 111: 141-212.

Williams, John E. and Deborah L. Best. 1990. *Measuring Sex Stereotypes: a Multination Study*. Newbury Park, CA.: Sage.

Williams, Melissa J., and Jennifer L. Eberhardt. 2008. "Biological Conceptions of Race and the Motivation to Cross Racial Boundaries." *Journal of Personality and Social Psychology* 94: 1033-47.

Zemore, Sarah E., Susan T. Fiske, and Hyun-Jeong Kim. 2000. "Gender Stereotypes and the Dynamics of Social Interaction." Pp. 207-241 in The *Developmental Social Psychology of Gender*, edited by Thomas Eckes and Hanns M. Trautner. Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.

Table 1. Descriptions and Factor Loadings for Gradational and Essentialist Measures

Factor	Indicator	Loading
A. Gradational		
Wage (V1)	Proportion Hourly Earnings > $19.19	1.00
Prestige (V2)	Occupational Prestige	1.00
B. Physical Essentialism		
Manual (E1)	Manual vs. Non-manual	1.00
Strength (E2)	Performing General Physical Activities	.84
	Explosive Strength	.92
	Dynamic Strength	.92
	Trunk Strength	.76
	Static Strength	.91
Robustness (E3)	Outdoors or Exposed to Weather	.68
	Noise Levels Are Distracting	.86
	Very Hot or Cold Temperatures	.88
	Extremely Bright or Inadequate Lighting	.85
	Exposed to Whole Body Vibration	.74
	Exposed to High Places	.59
	Exposed to Hazardous Conditions	.71
	Exposed to Hazardous Equipment	.80
Fine Motor (E4)	Finger Dexterity	1.00
C. Cognitive Essentialism		
Mathematical Skills (E5)	Mathematical Reasoning	.95
	Number Facility	.92
	Using mathematics to solve problems	.81
	Processing Information	.71
Analytical Skills (E6)	Critical Thinking	.93
	Judgment and Decision Making	.92
	Systems Analysis	.96
	Systems Evaluation	.96
	Making Decisions and Solving Problems	.82
D. Interactional Essentialism		
Technical (E7)	Equipment Selection	.62
	Installing Equipment	.82
	Equipment Maintenance	.92
	Repairing	.95
	Maintaining Mechanical Equipment	.88
	Maintaining Electronic Equipment	.60

Table 1 (cont.)

Factor	Indicator	Loading
Authority (E8)	Authority	.89
	Management of Personnel Resources	.92
	Coordinating Work of Others	.93
	Developing and Building Teams	.90
	Guiding, Dir., Motivating Subordinates	.94
	Coaching and Developing Others	.87
	Coordinating or Leading Others	.89
Sociability (E9)	Actively Looking for Ways to Help People	.81
	Social Service	.84
	Assisting and Caring for Others	.75
	Social Occupations	.87
	Active Listening	.85
	Talking with Others	.89
	Communicate Outside Org.	.88
	Maintaining Interpersonal Relationships	.87
	Contact with Others	.93
	Working Directly with the Public	.80

Note: The source for all variables, except occupational wages, is O*NET. The occupational wages were calculated with data from the One-Percent Micro-Data sample of the 2000 Census. Factor loadings were obtained from confirmatory factor analysis using maximum likelihood estimation.

Table 2. Correlation Matrix for Gradational and Essentialist Variables

	V1	V2	E1	E2	E3	E4	E5	E6	E7	E8	E9
A. Gradational											
Wage (V1)	1.00										
Status (V2)	.71	1.00									
B. Physical Essentialism											
Manual (E1)	-.32	-.52	1.00								
Strength (E2)	-.41	-.47	.64	1.00							
Robustness (E3)	-.20	-.38	.66	.77	1.00						
Fine Motor (E4)	-.23	-.24	.50	.52	.34	1.00					
C. Cognitive Essentialism											
Mathematical Skills (E5)	.47	.42	-.40	-.44	-.39	-.19	1.00				
Analytical Skills (E6)	.69	.76	-.44	-.40	-.24	-.30	.50	1.00			
D. Interactional Essentialism											
Technical Skills (E7)	-.16	-.33	.71	.62	.61	.59	-.26	-.22	1.00		
Authority (E8)	.45	.63	-.45	-.37	-.24	-.39	.40	.69	-.31	1.00	
Sociability (E9)	.22	.53	-.76	-.50	-.58	-.45	.26	.46	-.58	.56	1.00

Table 3. Fit Statistics for Baseline Models

Model	L-square	df	delta	BIC	% exp.
1. Independence O+G	531,733	467	26.8	525,195	100.0
2. Charles-Grusky O+G+V1+E1	309,621	465	18.6	303,112	41.8
3. Disaggregated essentialism O+G+E1–E9	199,476	458	14.3	193,064	62.5
4. Full O+G+V1+V2+E1–E9	182,357	456	13.7	175,973	65.7

Note: O=Occ.; G=Gender; P= Prof.-Nonprof.; V1=Economic; V2=Prestige; E1=Manual; E2=Strength; E3=Robustness; E4=Fine motor; E5=Analytical; E6=Math; E7=Technical; E8=Sociability; E9=Authority

Table 4. Fit Statistics for Disaggregate Segregation Models

Model	L-square	df	delta	BIC	% exp.
1. Independence O+(M*G)	109,623	383	9.2	104,261	100.0
2. Charles-Grusky O+(M*G)+V1	103,734	382	8.7	98,387	5.4
3. Disaggregated essentialism O+(M*G)+E1–E9	75,592	375	7.4	70,342	31.0
4. Full O+(M*G)+V1+V2+E1–E9	65,056	373	6.7	59,834	40.7

Note: O=Occ.; G=Gender; M=Micro class; P= Prof.-Nonprof.; V1=Economic;
V2=Prestige; E1=Manual; E2=Strength; E3=Robustness; E4=Fine motor; E5=Analytical;
*   6=Math; E7=Technical; E8=Sociability; E9=Authority*

Figure 1. Vertical Segregation is Downwardly Biased when Female-Advantaging Essentialism is Omitted from Model
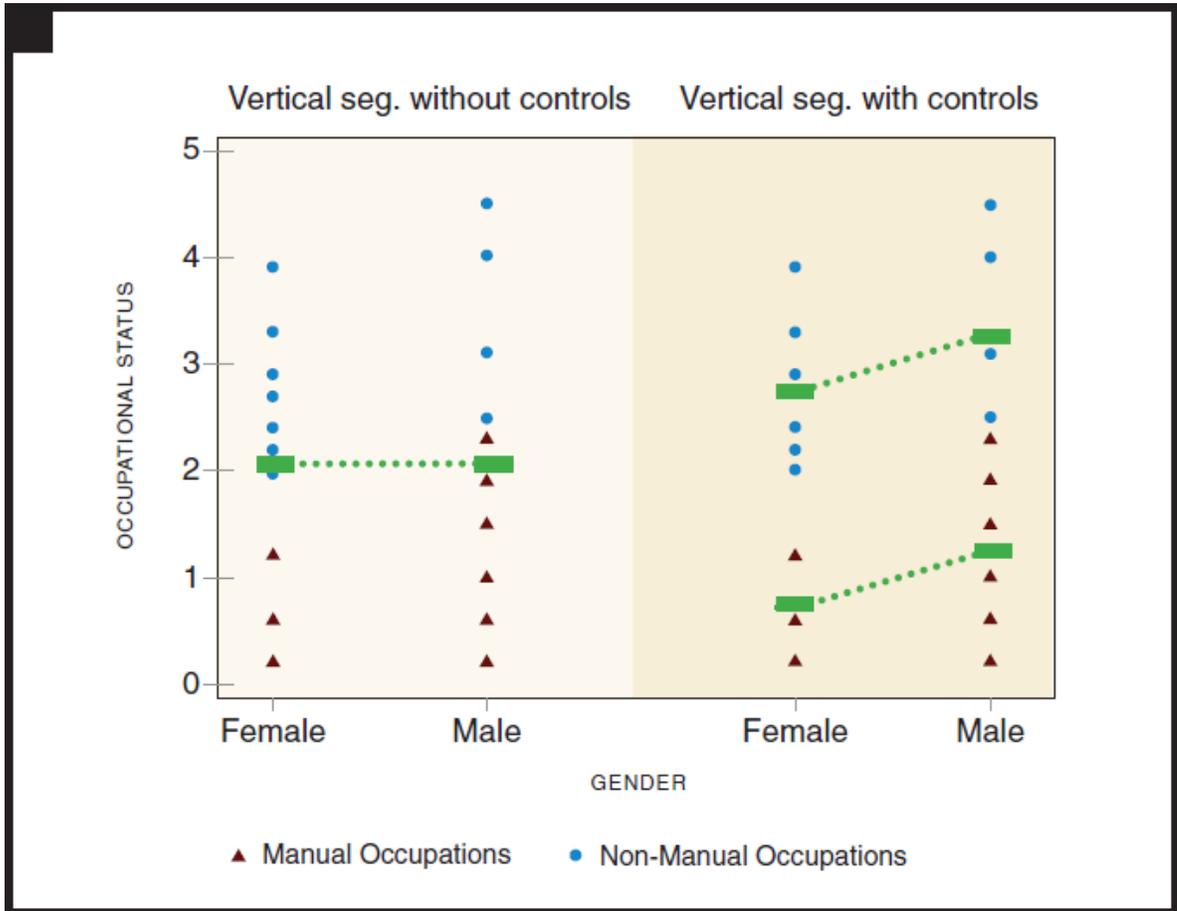
Figure 2. Scatterplot of Female-Advantaging Essentialism Against Occupational Wages
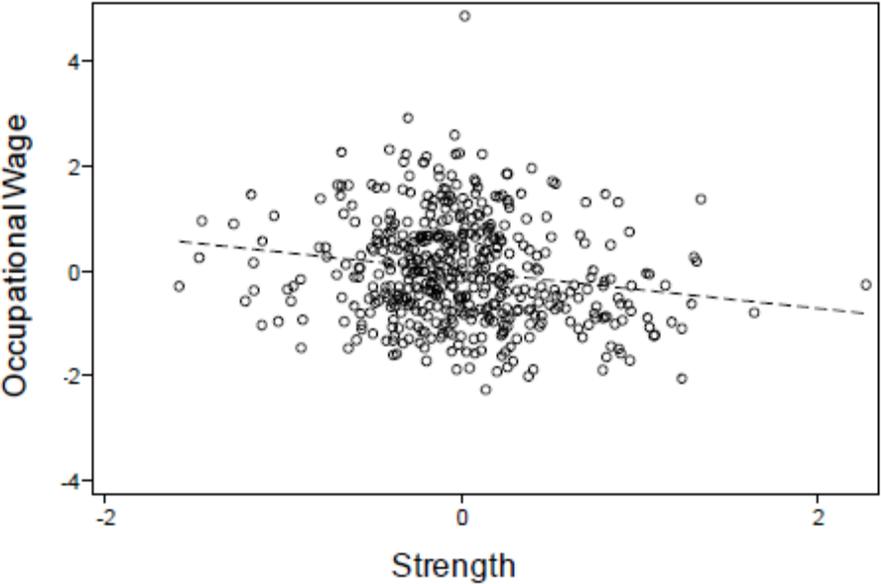
Figure 3. Scatterplots of Neutral Essentialist Dimensions Against Occupational Wages
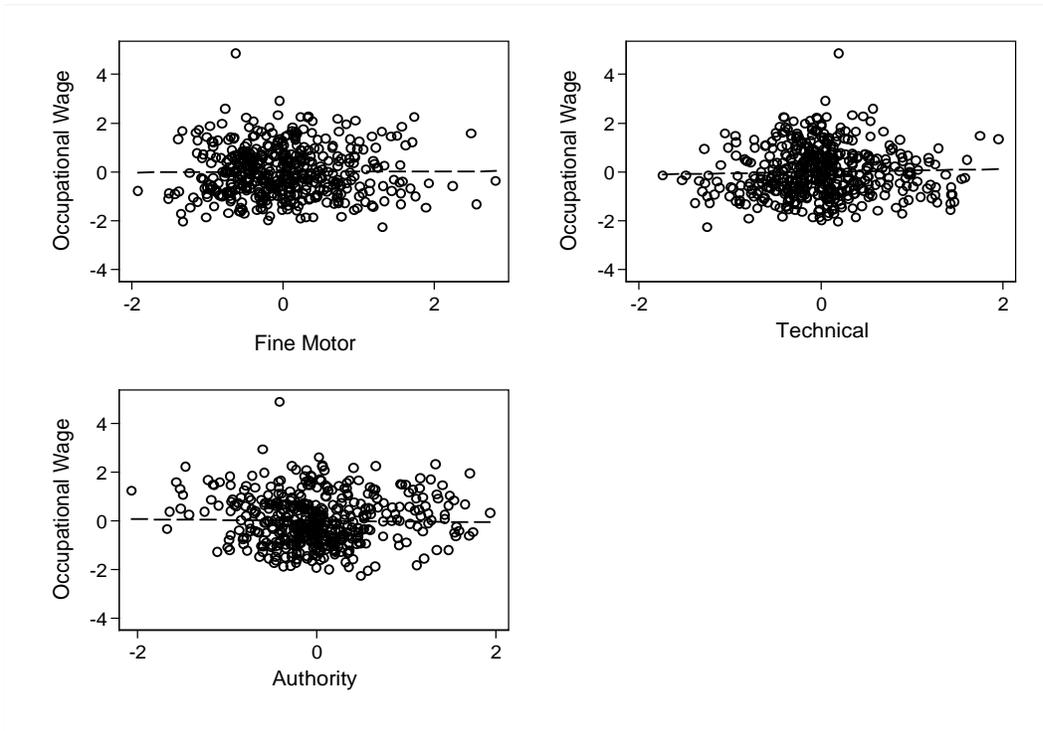
Figure 4. Scatterplots of Male-Advantaging Essentialist Dimensions Against Occupational Wages
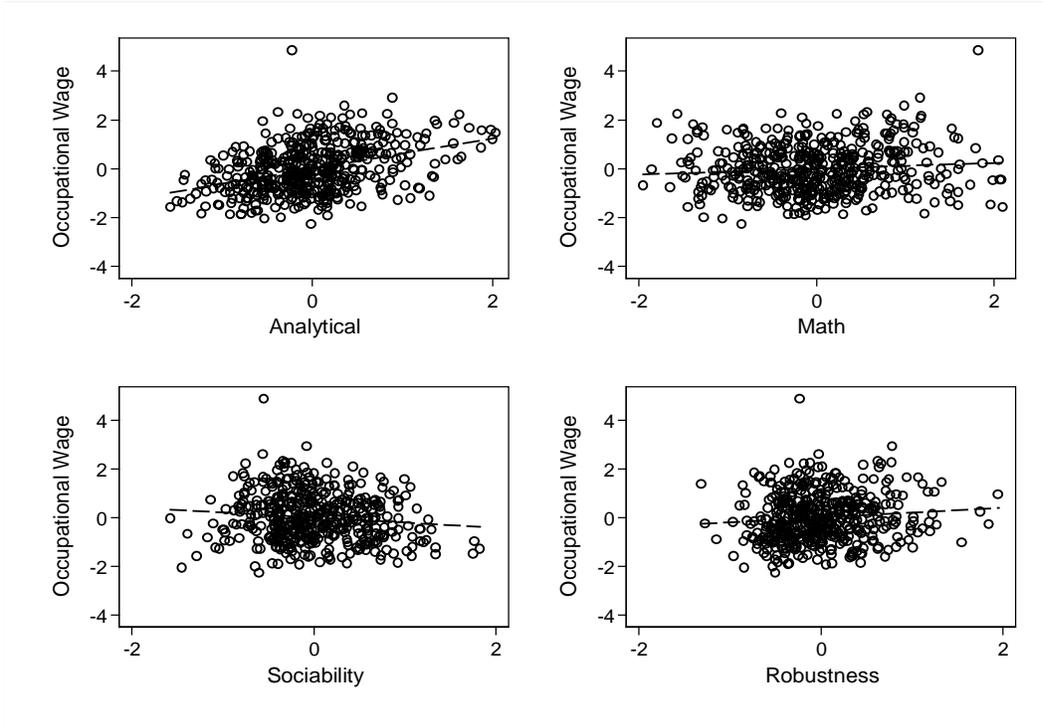
Figure 5. Parameter Estimates for Full Baseline Segregation Model (Table 3, Model 4)
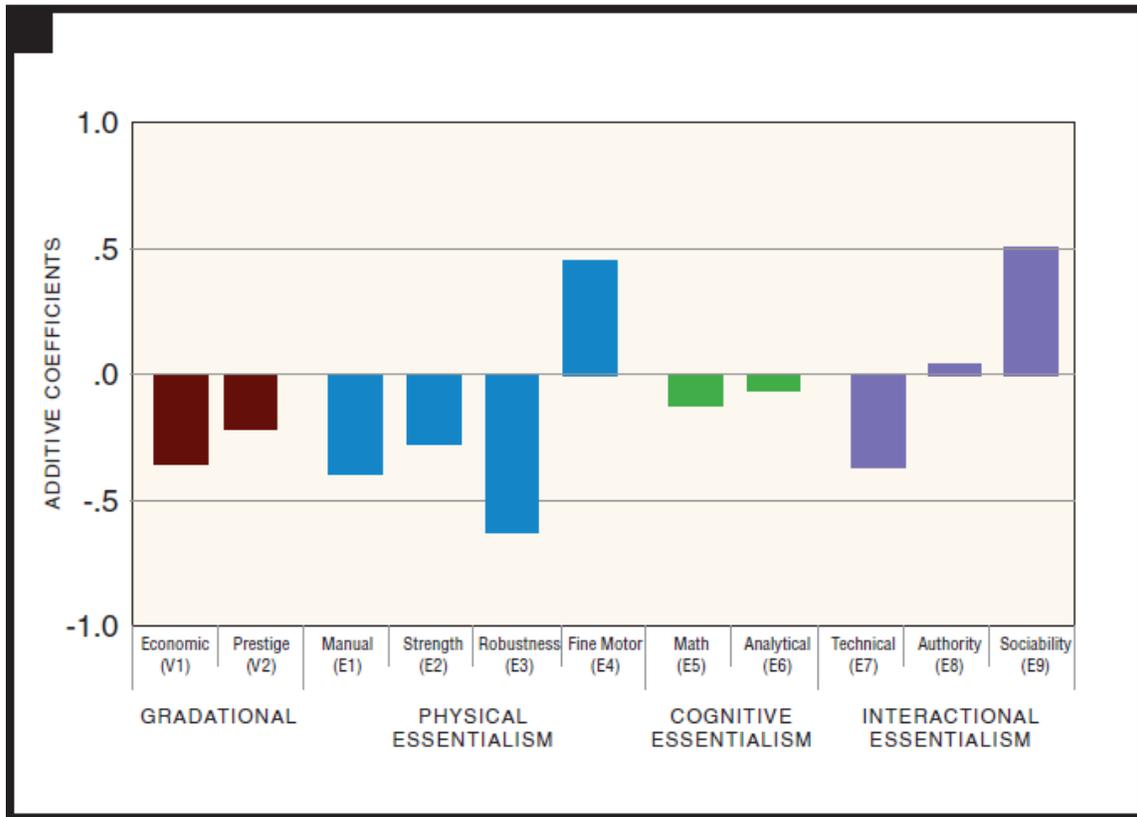
Figure 6. Scatterplot of Predicted Sex Composition Against Observed Sex Composition
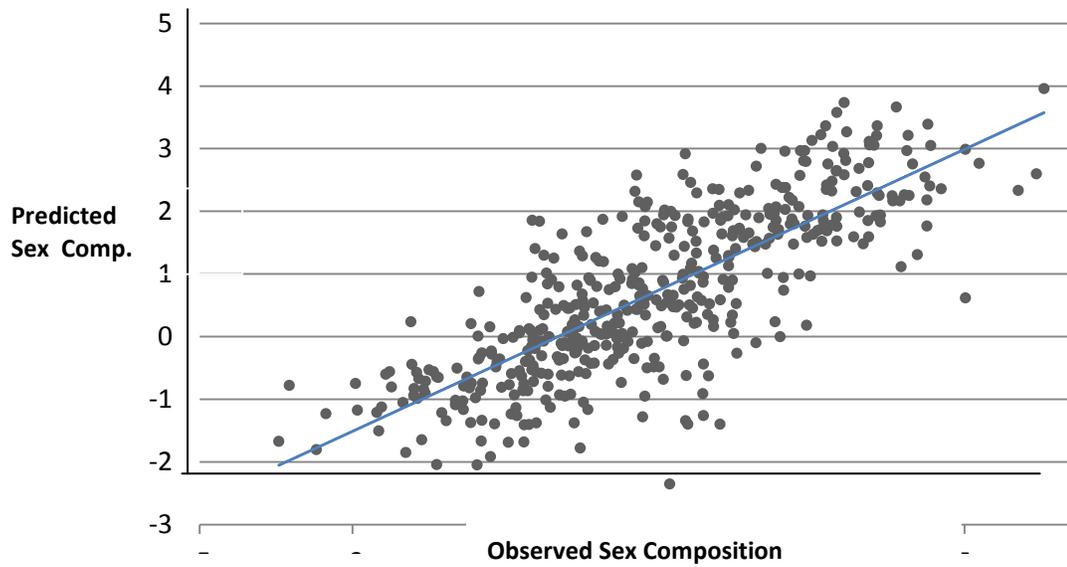
Note: We have taken the natural log of both the observed and expected ratios. The expected ratios are calculated under Model 3 (Table 3).

Figure 7. Parameter Estimates for Disaggregate Segregation Model (Table 4, Model 4)
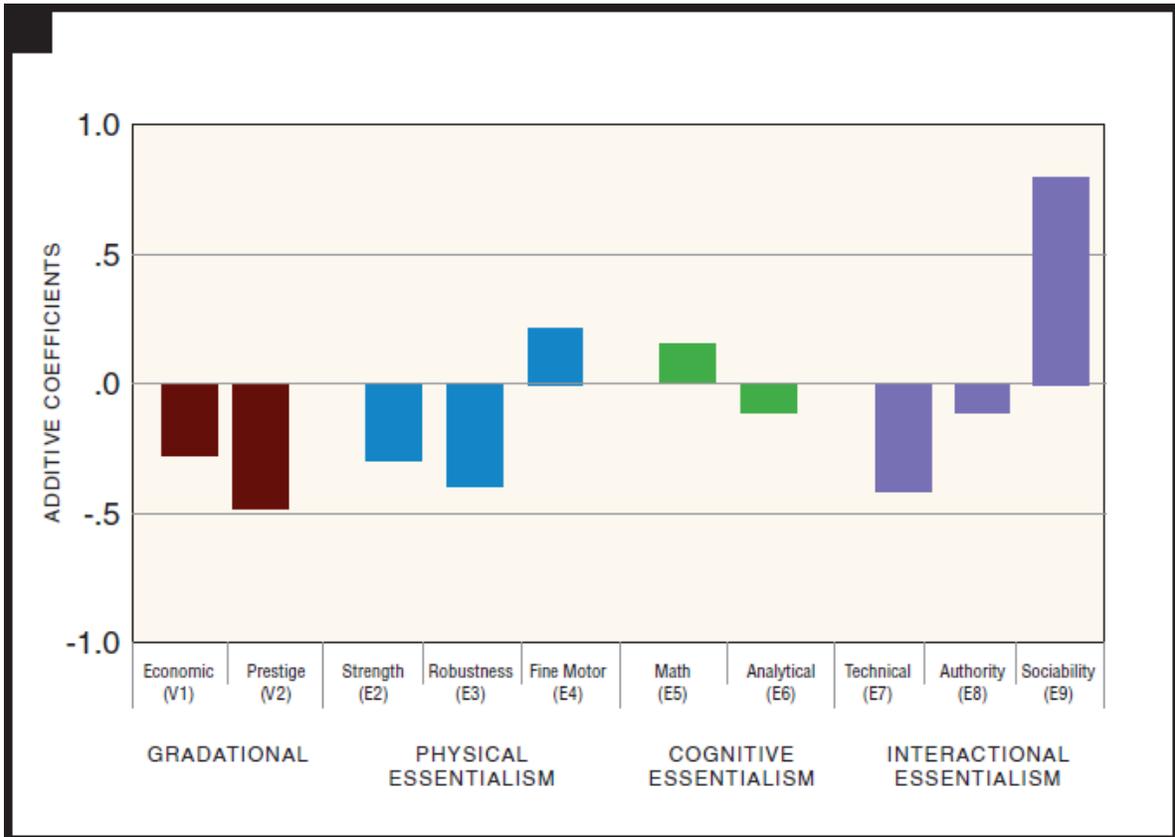
Note: All of the coefficients are significant at α = .01.

Figure 8. Parameter Estimates for Professional and Non-Professional Essentialism and Queuing
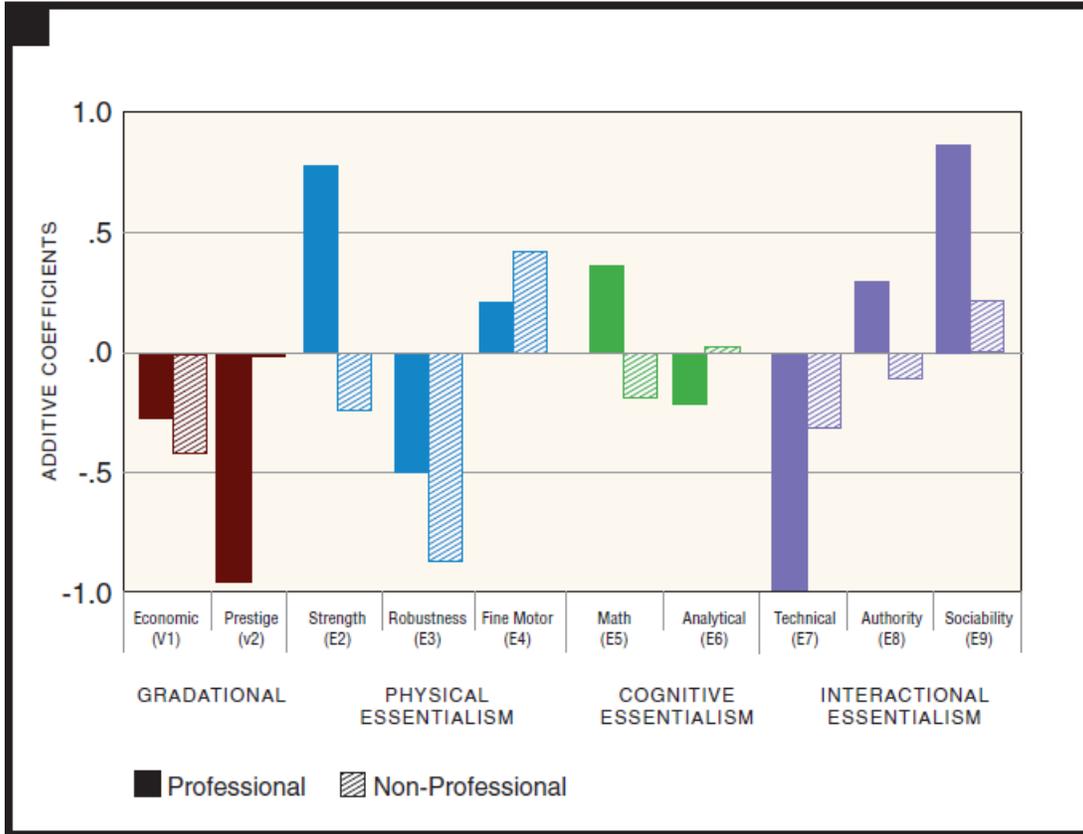
Note: All of the coefficients are significant at α = .01.

Appendix. Nested Occupational Structure (Micro Classes Nested within Classes)

| *Class*	*Micro Class*
A. Managers	1. Top Executives, Advertising, Marketing, Promotions, Public Relations, Sales, and Operations Specialties Managers
	2. Other Management Occupations
	3. Business Operations Specialists
	4. Financial Specialists
B. Professionals	5. Computer Specialists
	6. Mathematical Science Occupations
	7. Architects, Surveyors and Cartographers
	8. Engineers
	9. Life Scientists
	10. Physical Scientists
	11. Social Scientists and Related Workers
	12. Counselors
	13. Religious Workers
	14. Lawyers, Judges, and Related Workers
	15. Education and Training Occupations
	16. Library Occupations
	17. Art and Design Occupations
	18. Entertainment and Sport Occupations
	19. Media and Communication Workers
	20. Media and Communication Equipment Workers
	21. Health Diagnosing and Treating Practitioners
C. Routine Non-Manual	22. Drafters, Engineering, and Mapping Technicians
	23. Life, Physical, and Social Science Technicians
	24. Health Technologists and Technicians and Other Healthcare Practitioners and Technical Occupations
	25. Sales Supervisors
	26. Retail Sales Workers
	27. Sales Representatives
	28. Other Sales and Related Workers
	29. Legal Support Workers
	30. Library Technicians
	31. Administrative Support Supervisors and Workers
	32. Communication Equipment Operators
	33. Financial Clerks
	34. Information and Record Clerks
	35. Material Recording, Scheduling, Dispatching, and Distributing Workers
	36. Other Office and Administrative Support Workers
D. Service	37. Occupational and Physical Therapist
	38. Nursing, Psychiatrics, and Other Healthcare Support Occupations
	39. Protective Service Supervisors
	40. Fire Fighting and Prevention Workers
	41. Law Enforcement Workers
	42. Other Protective Service Workers
	43. Supervisors of Food Preparation and Serving
	44. Cooks and Food Preparation Workers
	45. Food and Beverage Serving Workers

	46. Other Food Preparation and Serving Workers
	47. Building, Cleaning, and Pest Control Workers
	48. Personal Care Supervisors
	49. Entertainment Attendants
	50. Personal Appearance Workers
	51 Transportation, Tourism, and Lodging Attendants
	52. Other Personal Care and Service Workers
E. Craft	53. Supervisors of Construction and Mechanical Occupations
	54. Construction Trade Workers
	55. Other Construction Trade Workers
	56. Extraction Workers
	57. Electrical and Electronic Equipment Mechanics, Installers, and Repairers
	58. Vehicle and Mobile Equipment Mechanics, Installers, and Repairers
	59. Other Installation, Maintenance, and Repair Occupations
	60. Machinists, Model Makers (Metal and Plastic), Structural Metal Fabricators, Tool Makers, and Layout Workers (Metal and Plastic)
	61. Bookbinders and Prepress Technicians
	62. Shoe and Lather Repairers, Tailors, Dressmakers and Upholsters
	63. Carpenters, Cabinetmakers, and Furniture Finishers
	64. Plant and System Operators
	65. Other Craft Occupations
	66. Material Moving Trade Occupations
F. Routine Manual	67. Supervisors of Production and Transportation Workers
	68. Assemblers and Fabricators
	69. Food Processing Workers
	70. Metal and Plastic Workers
	71.Printers
	72. Textile, Apparel, and Furnishings Workers
	73. Woodworking Machine Setters
	74. Other Production Occupations
	75. Bus and Truck Drivers
	76. Rail Transportation Workers
	77. Water Transportation Workers
	78. Other Transportation Workers
	79. Material Moving Workers
	80. Supervisors of Farming, Fishing, Forestry, Landscaping, and Grounds keeping workers
	81. Grounds Maintenance Workers, Animal Caretakers, and Agricultural Workers
	82. Hunting and Fishing Workers
	83. Forest, Conservation, and Logging Workers
	84. Construction Laborers
	85. Material Moving Laborers

Endnotes

[1] This transformation $[\ln(y_i+1/100- y_i+1)]$ is recommended by Hauser and Warren (1997) because it eliminates extreme or undefined values of the log transform that would otherwise occur when the observed percentage is at or near 0 or 100.

[2] There are only two occupations that exceed the mean by one standard deviation on both wages and strength.

[3] We have identified 33 occupations that exceed the mean by one standard deviation on both wages and authority, technical skills, or fine motor skills. Of these 33 occupations, approximately half are managers or professionals.

[4] The results are similar after eliminating, for example, the data point (i.e., mathematicians) that shows up in the far upper-right quadrant of the math scatterplot and the upper-left quadrant of the sociability scatterplot. We have also identified about 20 occupations in the sociability scatterplot that exceed the mean by one standard deviation (on both sociability and wages). These aberrant occupations tend to be associate professional and technical occupations in the health care sector (e.g., nurses, occupational therapists, speech-language pathologists). Finally, we have replicated most of our analyses after replacing occupational wages with occupational prestige, as doing so allowed us to identify which forms of essentialism are male-advantaging across both dimensions. For the most part, the wage and prestige results were very similar, and we haven't therefore reported both sets of results here. The most notable difference is that the prestige returns to authority and fine motor skills exceed the corresponding wage returns.

[5] We have taken the natural log of both the observed and expected ratios (thus rendering the relationship linear).

[6] The relegation hypothesis, as described here, implies that men tend to dominate women in the competition for desirable occupations. Indeed, insofar as men begin to lose interest in strength-demanding occupations, it's assumed that they can readily pursue other occupations and thereby relegate women to the occupations they've abandoned. The enlarged prestige effect in the professional sector is strikingly consistent with just this interpretation.