



Constructions of Gender in Three Campaigns to Recruit Women to Engineering: Is Outreach Combatting or Reinforcing Gender Inequality?

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Abstract

This paper explores the ways in which three prominent engineering outreach campaigns portray gender in relationship to engineering in order to appeal to women to pursue the discipline. Utilizing theories from both feminist theory and sociology, I examine in detail the messaging present in these campaigns. I consider the ways in which outreach categorizes and understands women, and the manner in which they convey information about engineering. In this paper, I argue that many recruitment strategies aimed at incorporating more women may be well intentioned, but may in actuality be perpetuating many of the cultural stereotypes that lead to the pronounced gender inequality in engineering to begin with.

Introduction

Over the past decades, women have made dramatic progress in education in the United States. Today, women persist at higher rates than men in educational institutions, earn better grades than men at all levels of education, and outpace men in terms of the undergraduate and graduate degrees they earn at colleges and universities. Yet, in spite of such advances, most science, technology, engineering and math (STEM) fields still remain sharply gender segregated, with men making up the majority.¹ This is nowhere more evident than in engineering. According to statistics, women earn 57% of undergraduate degrees, but only 18% of baccalaureates in engineering.²⁻³ These trends are a cause for concern because occupational gender segregation fuels the wage gap between men and women, which perpetuates gender inequalities.⁴ Additionally, a dearth of women in engineering represents the potential loss of human capital that could help to advance scientific and technological discovery.⁵

In response to this situation, coupled with the growing demand for a technically skilled labor force, business leaders, policymakers, educational institutions, and activists have responded by crafting numerous outreach campaigns to appeal to women to become engineers. For the most part, there has been a tendency to see any effort to recruit women to engineering as positive, with little consideration given to the manner in which such campaigns are designed to achieve their goals. In this paper, I offer a critical examination of three prominent outreach strategies and how they present ideas about how best to engage women in engineering. I argue that the messaging in all of these programs characterizes women as a homogenous entity, without considering questions of women's diversity, much less the varied social contexts that shape and define their identity. This essay also finds that these campaigns rarely attempt to deconstruct representations of engineering as naturally associated with masculinity. Instead, they organize around a vision of a normative woman, who through the enactment of "feminine" values and self-expression can be incorporated into engineering, often in certain distinct ways. In

constructing outreach in this manner, these efforts have the potential to further perpetuate segregation patterns rather than equalize opportunities.

To begin, I provide a review of the literature on women's underrepresentation in engineering with a focus on theories that consider how gender helps elucidate this issue. I then review feminist theories that help to shed light on why it is important to consider how women are categorized for such campaigns. Next I provide in depth analysis of three outreach campaigns drawing on the literature presented. The first is the building toy, Goldieblox, which was initially marketed in 2013 to introduce women to engineering. The second is the 2008 National Academy of Engineering report titled, "Changing the Conversation: Messages for Improving the Public Understanding of Engineering." The third is the Nerd Girls, an organization of female engineers that attempts to break down stereotypes of engineers as socially awkward and male. I hope that through a rich analysis of such campaigns, this paper may stimulate further discussions and future empirical and evaluative research on outreach programs and how they impact women's involvement.

Background

The participation of women in engineering and science professions has long been the topic of a great deal of scholarly and popular attention.⁶⁻⁹ While the intrinsic aptitudes of women and men are often discussed as an underlying cause, recent changes in women's achievement and educational performance has led increasing attention to understand how women's slow entrance and exit from engineering is the result of discrimination and gender socializing processes.⁶⁻⁷ Xie and Shauman (2003) have demonstrated that one reason the distribution of women and men is largely uneven in most STEM fields, is due to the fact that despite being qualified, considerably fewer women than men choose such disciplines as a college major. As laws prohibiting discrimination and barriers to women's entrance into engineering have slowly been dismantled, scholars have examined how subtle, often taken for granted, ideas surrounding the nature of symbols, practices, identities, and structures present in engineering present barriers to women.¹⁰⁻¹⁸ Many of them posit that we can better understand women's underrepresentation in engineering through a more in depth knowledge of how both gender and technology are socially constructed and shape and influence one another.¹¹⁻¹⁶ Engineering is symbolically associated with normative ideas about masculinity, thereby creating a climate of exclusion and gender mismatch for many women.¹⁰⁻¹⁸ For example, boys are socialized to build and tinker (often with their fathers) with machines computers, or cars^{15,17, 19, 20} and many speak of the pleasure they derive from engaging in such activities.¹⁹ Engineering, in many contexts, also demands masculine typed traits, such as an aggressive presentation of self, and displays of hands on technical expertise.^{17,21} This can prove difficult for women who may not be accustomed to such practices, as a result of norms they have learned, and those imposed on them by others, surrounding their behavior.¹⁷ Furthermore, women in engineering may doubt their own ability to be successful and often have a high burden to prove to their colleagues that they are competent due to engineering's masculine typed identity.^{17,18, 21}

Detailed ethnographic work on practicing engineers, which involves interviews and observation in various workplaces to understand their day to day experiences, has documented how they construct their identities in relation to gender.¹²⁻¹³ Engineers often have a dualistic style of thought about their work, that forms a cultural ideology within the profession. For example, most engineers tend to ascribe to ideas about what constitutes “real or actual” engineering, conceptualizing this as being technical, hard or abstract, often linking this to tasks such as calculations, drawings, or mathematics.¹²⁻¹³ Being technical is often deemed the most valuable way of being an engineer and is highly esteemed in the profession. Yet, engineering requires other professional tasks and activities that are considered social, soft, or applied in nature, such as managing projects, working in teams, or interfacing with clients. Important to note, as well, is that within engineering, technical and social dualisms are also often presumed to be mutually exclusive. The technical side is often thought to be the something that men excel at, while the social side is seen as being particularly suited to women, as the result of widespread cultural stereotypes about masculinity as being connected to instrumentalism and femininity to expressiveness.¹²⁻¹³ In reality engineering encompasses heterogeneous dimensions of work that require a range of technical and social skills, which both women and men often engage in equally, with both groups taking pleasure in both sets of skills.¹²⁻¹³

Because engineering (and in Faulkner’s analysis so called “real” engineering) continues to be so strongly aligned with masculinity and thus by implication men, a key aim of outreach is often to inform women about the various ways they can succeed in engineering.²² From this perspective, outreach campaigns that seek to identify women as an underrepresented group, require women to be grouped together as a collective unit with some type of shared properties in order to appeal to them. Interestingly, however, people responsible for recruiting women may be failing to ask key questions that are at the center of feminist theorizing. Namely, whether and how it is possible to define women as a homogenous group and if we ought to.²³ Many feminist philosophers interrogate this issue carefully because they are concerned about the implications of such classifications. For example, if we agree that there is an innate or biological basis that all women share, the traits that women presumably possess can easily be used to justify or naturalize unequal power dimensions in society that impact women’s opportunities and social standing. Today gender scholars largely reject determinist or essential claims based on biology, and make distinctions between sex as a biological property and gender, which encompasses social understandings of what it means to be a woman. Yet even upon making this distinction, there remains debate about whether women can be defined as a social kind, or on these social understandings, as they too may perpetuate inequality and misrepresentations.²³ Judith Butler has most prominently made the claim that in creating the category of woman we stabilize a set of identities or norms to which women must cohere, while at the same time creating marginalized “others” who then must find a way to belong or risk invisibility.²⁴ In a somewhat related vein, Patricia Hill Collins (2004) has also elucidated on black women’s experiences as quite distinct than those put forth by white feminists, theorizing that there are various status characteristics such as race and social class, which intersect with one another to influence women’s lives in qualitatively different ways.²⁵ Collins (2004) argues that whole groups of women, such as women of

color, are often excluded from more normative and commonly held definitions of what and who women are.

In the case of engineering, without categorizing women, it would certainly be hard to craft strategies to recruit them. Realizing this predicament, feminist philosophers have argued that it is possible to resolve this issue of defining women, without necessarily prescribing certain ways of being women or excluding those who may not fit certain definitions.²⁶⁻³⁰ I am unable to review all such arguments in detail here, but I focus on a few key scholars that provide a starting point for such ideas. For example, Linda Martin Alcoff (1988, 2000) claims that being a woman is a positional, relational, fluid identity situated within a historical context. She believes identity is not arbitrary or indefinable and politically necessary. Women can and should act politically as women based on a definition of their social position, without prescribing any essential characteristics to all women.²⁶⁻²⁷ Allison Stone (2004) also provides the concept of a genealogy or a history of ideas and norms that create the concept of women. She explains how women acquire femininity by reworking normative interpretations to fit their own situation, which is positioned in a history of overlapping chains of interpretation.²⁸ Charlotte Witt (2011) also puts forward uniessentialism, in which she argues that gender is a negotiated social position but also a key element to our identity and is constitutive of who we are based on our lived experiences. It defines and unifies all of our social roles and is therefore essential to creating the individual who would be incomplete without it, but at the same time it does not create the entire group.²⁹ The thrust of such arguments is to emphasize the complex nature of gender and identity in its social context, while also offering a way for to women to organize for desirable social outcomes, such as their incorporation into engineering.

While these finer nuances of gender may seem abstract, these philosophical debates are also important for the field of engineering. The ways in which gender is conceptualized can have real implications for the outcomes that play out in our social institutions.³¹⁻³² For example, in the context of higher education, Maria Charles (2011) and Karen Bradley (2009), as well as Paula England (2010) contend that gender stereotypes (such as women just are not interested in technical objects and abstract things like engines and physics) and understandings of the college experience as a self expressive journey (do what you love!) often work to channel women out of math and science majors and into others presumed to be a better fit.³³⁻³⁵ Universities now offer an array of activities, majors, and experiences that are gender-typed, and therefore the possibility, and perhaps, now the expectations are greater, that individuals will follow a gender normative path.³⁴ Belief systems about gender combined with certain social contexts are important in shaping the pathways individuals take. Indeed, it is surprising to note, in many authoritarian and less economically developed countries, women are actually more likely to enter a math and science career than in the United States. It seems that the choices young people make towards careers in the United States are in many ways the result of structural, cultural, and economic forces that celebrate gendered selves and allow individuals to develop and fulfill educational and career aspirations along gendered dividing lines.³³⁻³⁴ Young people considering a career now, are exposed to numerous messages to follow their bliss coupled with messages about their skills, while engaging in messaging about appropriate interests

for boys and girls.³³⁻³⁴

In sum, these bodies of research offer a valuable lens through which to view projects that aim to recruit women to engineering. In what follows, drawing on this literature, I ask how outreach campaigns understand engineering's connection to masculinity, and how women are categorized in order to recruit them to the discipline. Do such campaigns rely on messages of stark difference between men based on biology, or is their recognition of the socially constructed nature of gender and the diverse and varied nature of women's lives? Also, are campaigns placing emphasis on self-expressive gendered messages related to career choice? In the following sections, I seek to answer these questions in the examination of three outreach strategies.

Goldieblox: Toys That Give Girls Confidence in Problem-Solving

Debbie Sterling is the founder of Goldieblox, a new kind of toy she designed to “disrupt the pink aisle and inspire the future generation of female engineers.”³⁶ According to Sterling, Goldieblox, is an alternative that provides intellectual stimulation for young girls. In November of 2013, her video advertisement of three young girls building a Rube Goldberg machine started to gain a great deal of attention for this new company she hoped to launch to increase women's participation in engineering.³⁷ The toy is designed to get little girls to love engineering and comes with a book, a construction set, and figurines of Goldie, the girl inventor and her friends, who go on adventures and build machines as part of the process. Girls must read the book and can engage in hands on building projects through stories.³⁶

Sterling, who studied mechanical engineering at Stanford, founded Goldieblox, because she was bothered by the fact that so few women were enrolled in her program and convinced that part of the reason had to do with the toys often provided to girls.³⁸ According to Sterling, girls' toys are stereotypically pink, and focus narrowly on things such as dolls and princesses, without putting them on the path of becoming engineers. She contends that such toys disadvantage women, because they do not help them develop their spatial skills, which are seen as fundamental to engineering practice. Based on her own experience in an engineering drawing class, Sterling concluded that if she had had different kinds of toys, she would have been better prepared.³⁸ In 1992, sociologists Judith Mcilwee and Gregg J. Robinson conducted research on female engineers both in college and industry and demonstrated that tinkering in one's childhood serves as beneficial in an engineering career in the future. In this respect women often had little experience in comparison to their male counterparts and suffered for this lack of exposure.¹⁷ Thus, Sterling identifies a key mechanism undergirding women's inequality in engineering and her toy aims to level the playing field in this respect. Yet, Sterling chooses not to emphasize how unequal social conditioning of women creates this outcome and instead conceptualizes this problem as one of innate preferences and abilities. She does this in her Kickstarter fundraising campaign, with a sales pitch for Goldieblox where she states, “boys like building and girls like reading,” thus justifying the need for this toy.³⁹ In this sense, engineering retains its image as being a solely technical field without any social element, and this technical side is firmly linked to

something boys enjoy, but not girls. Women and men's skills remain gendered among these dividing lines and Goldieblox stresses that women must play catch up and learn to love building, as if it were a deficiency they hold as a result of being women.

It is striking that she explains it this way in her campaign pitch, because in a TedTalk, she gives, she claims that the men she studied with were not “born geniuses” who were simply better at engineering than she was.³⁸ She explains that she was not provided with the appropriate toys that would have encouraged her in her spatial skills. Yet the messaging of her toys are not based on this narrative. Goldieblox rests on the idea that women have superior verbal abilities, but need special help to be good at building, when she writes on her website: “By tapping into girls’ strong verbal skills, our story + construction set bolsters confidence in spatial skills while giving young inventors the tools they need to build and create amazing things.”³⁶ Researchers have demonstrated that the notion of women as exceptional in verbal abilities is questionable. For example, looking at women and men, Hyde and Linn (1988) determined in their metanalysis that, “the magnitude of the sex difference in verbal ability is currently so small that it can effectively be considered to be zero pg (64).”⁴⁰ Nevertheless, cognitive differences are what Goldieblox bring to the fore to in the advertising surrounding the product.

In such a campaign, there is little attention paid to the social construction of gender, or the different experiences that women encounter in regards to toys, that shape how they view their identity. The idea of women constituting a unified group based on inherent cognitive traits is a defining element. Furthermore, even though Sterling explains in her Kickstarter campaign that we should not simply produce pink construction toy for women, her toy is, in fact, a separate toy for women, that is specifically marketed to girls. Goldieblox also incorporates pastel colors into what are considered “girly” themes and aligns this with building. In doing all of this, we see the lines being drawn around difference between women in men, creating beliefs about difference that often lead to different outcomes.³¹ These toys presume that building is something that women will necessarily engage in, in a different way than boys. Women must find their way into the male world of engineering on their own terms, in line with Sterling’s assumption that women, as a category, need special science toys and enticement to like engineering. It creates a niche and a separate path for women to engineering, rather than an integrative one, based on commonly held beliefs about what they like. The promotion that women possess a deficit in relationship to technology, may only foster self fulfilling beliefs on the part of women about whether they possess the aptitude to engage with technology or engineering, as well as influence other’s beliefs about their strengths and abilities. What might be needed then is more than a disruption of the pink aisle, as Sterling suggests, but also a disruption of the enduring perception that engineering is something that men do better, or take to more naturally.

A final point that warrants discussion and is illustrative of many such efforts that aim to involve women in engineering also pertains to the doll crafted to accompany the book and construction site for Goldieblox. The character, known as Goldie, who should inspire young women to become engineers is a thin, white, blond girl. Unfortunately this type of doll, even if unknowingly, groups women along a single axis of identity, while giving

little consideration to race. What the doll might compel us to consider, is if these campaigns are targeted to a certain demographic of women (white and normatively feminine). Where do women of color (among others) fit into such messaging? Indeed, the whole idea of Goldieblox, which is predicated on the idea that women need special toys to excite them to engineering neglects research on women of color that has shown different attitudes that different racial groups hold towards science and technology. Sterling explains how her parents wanted her to be an actress and did not provide her with building toys, but norms vary in black communities. Many young black women express a keen interest in science and technology early in school and are encouraged to pursue this interest by their families.⁴¹ Yet these women often face discouragement from teachers and educators on account of their race and may not have access to schools and educational systems that would train them adequately for pursuing engineering.⁴¹ Thus we might expect that many black girls might be also need a more supporting and high quality learning environment rather than simply Goldiblox toys to become engineers. As Collins (2004) has pointed out, white feminist paradigms do not always apply to black women and in the same way.

“Changing the Conversation”

In 2008, The National Academy of Engineering published its report titled “Changing the Conversation: Messages for Improving Public Understanding of Engineering.”⁴² The purpose of the report was to discuss research that had been undertaken to explore perceptions and understandings of engineering among the public. It also reported on public opinion campaigns conducted to understand how engineering might be presented to attract more young people, so that interventions could be undertaken. A primary claim in the document is that engineering is misunderstood by the public, and this often leads young people to reject or fail to consider it as a career. As the name suggests, “Changing the Conversation” is an attempt to reposition engineering in the United States and make it a profession that the public can be enthusiastic about in terms of the possibilities it holds. The report warns about the dire underrepresentation of women and minorities and claims that the profession must tap into all possible candidates if the United States is to maintain and increase its technological capacity. Of note, is that the report places particular emphasis on recent arguments that several psychologists have been discussing in the academy regarding women in STEM. That is, that women reject engineering careers because they seek out those professions that are caring and nurturing and do not believe engineering to meet these criteria.⁴³⁻⁴⁷ Many claim, that on average women value communal goals that emphasize altruism and helping society when they select work, as opposed to men, who tend to base career decisions on obtaining agency often realized in the form of status and money.⁴⁵⁻⁴⁷ “Changing the Conversation” draws somewhat on this idea and encourages educators to highlight the socially useful parts of engineering, while perhaps focusing less on the technical nature of the job, particularly in efforts to recruit minority groups to engineering. A passage in the report reads, “ The research strongly suggests that boys and girls have different reactions to messages and different perceptions of engineering. The focus groups and triads confirmed other research showing that girls are much more comfortable with engineering when it involves people, especially women,

whereas boys tend to gravitate towards things” (pg. 89). The report also highlights the social relevance of engineering as a key message that should be promoted to the public.

While engineering certainly is a profession where individuals can make a difference in the world, identifying this interest as one that a majority of women share, whether due to their social position or their biology, allows it to become accepted as a sort of truth or myth that pertains to women. Again, while many social scientists often recognize that these preferences and choices for work can be socially shaped, this easily gets glossed over in such messages.

Beyond these concerns, it is unclear, whether women and men have dramatically different values in terms of the type of career they desire. Recently, DiPrete and Buchmann (2013) found in their quantitative analysis, that there was only a small connection to the choice of an engineering or natural science degree based on differing work related values between women and men.¹ Thus, such a report can also easily lead to what might be called gender priming.

Bystydzienski and Brown’s (2012) empirical findings speak to such priming and the ways in which outreach can have unintended consequences when framed in terms of gender difference and the technical/social dualism outlined in “Changing the Conversation.” These authors detail their research in which they helped facilitate a National Science Foundation intervention program to recruit women to engineering. They observe that young women engage with engineering in gendered ways, partially due to the manner in which the profession is depicted to them by others. The outreach program they researched often operated under the assumption that women would be more interested in engineering if it was described as having socially and human relevant applications. Thus, in line with this assumption the programs’ facilitators sought to involve women in engineering projects given this designation. The authors note, that they themselves were guided by gender appropriate assumptions, and that it was often inadvertent, as they drew on a feminized paradigm of helping in offering the girls information about certain projects.²² While there certainly may be many women who are looking for a career that allows them to realize altruistic goals, starting from this assumption may falsely represent women (and men) and it may influence them as they construct ideas about what types of engineering might be a best fit. It may also lead women (and men) even if only subtly, into one field of engineering over the other, without even being exposed to all the possibilities. Most engineers would also agree that the technical work will always be one key element of the profession and therefore campaigns that attempt to depict engineering in ways that downplay this, while highlighting the communal aspects, may exclude them from meaningful participation and disadvantage their success.

The National Academy of Engineering’s report has much to be positive about. This is an attempt to inform the public about the creative nature of engineering, and the valuable role engineers can play in society, while distancing the profession from uninformed stereotypes of engineers. In terms of engineering, however, it suggests the work is characterized by either social or technical elements, and fails to recognize the varied

work engineers do, and in terms of gender, it does little to disentangle representations of the technical side engineering as being something more for men. Furthermore, it classifies women narrowly assuming their interests to be more attuned to the socially relevant pursuits. Even if we can assume that women on average place a higher relevance on such attributes, these ideas often do not consider if such preferences are the result of the differing social worlds men and women often occupy and may assume too hastily that women will be best distanced from the technical elements of the work.

The Nerd Girls

The last outreach effort this essay focuses on is known as the Nerd Girls. According to their website, “The Nerd Girls are a growing, global movement, which celebrates smart-girl individuality that’s revolutionizing our future.”⁴⁸ The group is made up of Tufts engineering students who aim to communicate to young women a simple message: You can be beautiful and girly- and be an engineer! Their key aim is to counter the often masculine image of the nerd in STEM, that can create feelings for women that they do not belong.⁴⁹ In an interview on the Today Show with Hoda Kotb and Kathy Lee in 2008, the Nerd Girls explained that they were shattering stereotypes of the antisocial, and sexually challenged nerd and branding a new image of engineering. In this interview, the women discussed their work as engineers in a self confident manner making references to their intelligence, while also flaunting their attractiveness, and laughing about their wide interests in hobbies such as belly dancing, running, kickboxing, and snowboarding. The group’s advisor and spokesperson, Dr. Karen Pancetta, further elaborated, that young people often envision nerds to be dirty, homely and antisocial. For this reason she started the Nerd Girls to show young women how diversified engineers truly are as group.⁴⁹

The Nerd Girls also maintain a website with several pictures and information about the group’s aims. A careful reading of the website indicates that a large emphasis of the group revolves around beauty and appearance, standards of dress, and the hobbies they engage in.⁴⁸ The pictures on their website show light skinned women, with long hair, wearing makeup and earrings. A tab on the website showcases the Nerd Girls alumnae with pictures, presumably in order to inform any visitors to the site, about the ways in which these women present themselves, as engineers. All of the photos show the women wearing the same pair of glasses, which we can assume is a playful joke, while emanating a highly sexy persona. For example, in the first headshot of Christina, she appears wearing a strapless top or perhaps no shirt at all, and in the last picture of Joanna, she dons ponytails and pulls gum out of her mouth, reminiscent of a sexy-Lolita like school girl.⁴⁸ In their Youtube video posted online, interviews revolve around brief descriptions about the type of work the women do in their jobs juxtaposed with how men respond to their good looks, and how empowered they are through wearing stilettos and lots of makeup.⁵⁰

The discursive implication of these images is clear: It is a difficult challenge for women to fit into what has been the old boy’s club of engineering, but this group of women are exceptional and they have managed it. Not only do they excel in math in science but also have achieved the necessary, and most esteemed way of being a woman in terms of their

beauty, to have it all. Of course this message can be very empowering for a number of young women, but perhaps equally disenfranchising for many others who may be more interested in learning more about the specific work that engineers do, or could be encouraged by seeing a range of women, dressed in all kinds of clothing doing it. Indeed in presenting their image this way, they do little to meet definitions of women as a loosely unified group, characterized by certain social understandings.

The Nerd girls are certainly meant to ultimately shift images of women and STEM as unfeminine and show how they are comfortable with their identities as both engineers and women, but they depict only one image of an engineer. The Nerd Girls attempt to displace the image of the nerdy, white male engineer with a pocket protectors with another extreme and provide a new image of a beautiful woman who is highly sexualized and fantastically smart. By embracing a hyper feminine identity in order to disrupt the dominant image of a masculine engineer, this imposes, new demands and requirements on women attempting to make their way in engineering. They most certainly do what Butler (1990) warns against. That is, organize on a vision of women, in which several women will systematically fail to conform. Further, they are portrayed as exceptional woman, in opposition to the male engineer, who must act in ways that potentially impose extra requirements on women to be successful. Ironically, the Nerd Girls are challenging engineering's masculine image, but they are also gendering engineering in the opposite direction. Such efforts are also clearly embedded in a wider discourse that celebrates gendered identities and attempts to find a way to incorporate it into engineering to entice and appeal to young women.

Conclusion

As engineering outreach continues to grow in scope, more careful consideration must be given to the messages that are promoted with respect to engineering and gender in these campaigns. Categorizing women is a necessity if the field of engineering wishes to recruit them, yet as feminists have pointed out, there are multiple understandings of what it means to be a woman, and a multitude of experiences that shape women's lives. In this paper, I have shown how stereotypical assumptions in these efforts often define women as a group that shares some unifying essential qualities, which are rarely portrayed as a result of societal expectations or conditioning but rather as more innate or intrinsic. Furthermore, in enticing women to engineering, these campaigns often cater to women using gendered expectations about their skills, interests, and desires. Specifically, the outreach detailed in this paper conveys three messages. The first is that women are naturally deficient at technical skills and need correction. The second is that women are inclined to seek out work they deem as socially relevant, and thus engineering should seek to recruit them along these lines. The third is that women can counter the culture of engineering successfully, by enacting a type of femininity that places high expectations on them in terms of their self- presentation and appearance. These campaigns do not break down engineering's association with masculinity to expand the possibility of women's identification with these traits, nor do they emphasize how engineering requires a diversity of skills that are not mutually exclusive and are not dependent on one's gender. Instead they instead carve out a feminine niche where women can, and should,

find a distinct way of existing within engineering. In terms of toys, one wonders why the possibility does not exist to introduce gender-neutral toys that would be available to both girls and boys to introduce them to building. Perhaps in rebranding engineering, it would be wise to present diversified images of engineering, without imposing gender on certain tasks. Current descriptions of engineering that rely on dualistic thoughts could potentially be creating pockets of engineering where power hierarchies are set up based on perceptions of the work performed and the people who perform it. Caution also needs to be exercised that women and men are not falsely limiting their possibilities in engineering based on cultural beliefs about what women and men excel at. Lastly, attempting to highlight how female engineers can utilize their sexuality and take pleasure in their beauty in engineering risks isolating many women who do not want to meet these requirements. Perhaps a different strategy would be to highlight a variety of women who do STEM and in the words of gender scholars “do their gender” (or express their identity through various forms of dress, behaviors, and social interactions) in diverse ways. In these campaigns all nuance about gender seems to get lost. Women are categorized in ways that inflate their differences from men and take the gaze off of how the social world constructs and allows for those differences.

A useful way to characterize engineering might be to define it as a profession that provides individuals with the ability to turn ideas into reality⁵¹ and expose more young women to it. Embracing the idea that engineering is an exciting line of work for those who are fundamentally curious and creative might be a way to present it without attaching any gendered distinctions to it. Indeed, research has shown in other countries, that many women involved in math and science oriented fields speak with great enthusiasm about technical work, calling into question the notion that fields like engineering are inherently masculine or naturally more suited to men.⁵² Attracting women to engineering need not be undertaken by accentuating stereotypical feminine traits and showing them how they can fit to engineering but may require also for engineering itself to be transformed. Avoiding stereotypes of what women and men like, as well as stereotypes of engineering as a set of dualistic practices, may be the best way forward.

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