



Gendered products act as the extended phenotype of human sexual dimorphism: They increase physical attractiveness and desirability

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ABSTRACT

Gendered marketing is a pervasive trend, despite the public controversies it generates. Most of research so far has focused on the socialization-based perspectives of gendered marketing to explain this phenomenon. In this research, we ask the following instrumental question: which benefits can men and women derive from owning gender-typical variants of consumer goods? We propose that gender-typical products can act as the extended phenotype of human sexual dimorphism, broadcasting a cultural equivalent to the signals issued by biological, secondary sexual characteristics. Based on evidence showing that secondary sexual characteristics increase attractiveness and desirability, we predict that gender-typical products increase the attractiveness and desirability of their owners by acting as supernormal stimuli of sexual dimorphism. An internal meta-analysis across three studies confirms that consumers who own gender-typical products are mentally pictured as more physically attractive. We also find that owners of gender-typical products can be perceived as sexier, and more desirable partners.

1. Introduction

Men and women alike drive cars, write with pens, use toothpaste, and buy coffee mugs. Gendered marketing, though, presumes that they do not want the same cars, pens, toothpastes, or mugs. For example, the Signal White Now toothpaste comes in a dark blue and black package labeled as ‘Unbeatable’ (introduced as “*the world's first toothpaste designed specifically for men*”, Unilever, 2018), but also in a turquoise and pink package labeled as ‘Super Glossy’, aimed at female consumers. This is a typical case of gendered marketing, in which male consumers are targeted with one variant of the product, whereas female consumers are targeted with another.

Gendered marketing is a pervasive trend (ubiquitous in the hygiene, fashion, diet, and automotive industries, NYC Consumer affairs, 2015), in spite of the public controversies and the negative buzz that it constantly generates. Some gendered marketing campaigns triggered an onslaught of negative social media comments, for example when the Bic company launched a range of pens ‘for her’, with pastel-tinted, thinner barrels ‘to fit a woman's hand’ (Furness, 2012); or when PepsiCo launched ‘Lady Doritos’ for women ‘who don't like to crunch too loudly in public’ (The Guardian, 2018; Time, 2018).

In the context of these controversies, most of research so far has

focused on the socialization-based perspectives of gendered marketing to explain this phenomenon (e.g. Avery, 2012; Fine & Rush, 2016; Holt & Thompson, 2004). Based on these perspectives, consumers who buy gendered products do so either because of social pressures or because of marketing influence. We fully acknowledge that such mechanisms occur and influence consumers. However, examining these mechanisms only allow one to understand *how* social pressure and marketing lead to the consumers' purchase of gendered products. They do not help understand *why* some gendered products that increase perceived sexual differences between adult consumers exist in the first place. The fact that men and women are pressured to buy products that fit their sexually dimorphic features highlights the mechanism by which gendered marketing spreads. It is not an explanation for why it occurs. As Kenrick, Maner, and Li (2005) noted: “*appealing to social norms may simply redescribe a phenomenon, rather than explain its roots*”. In this paper, we suggest that research on mate selection can provide a richer and more nuanced understanding of the roots of the gendered marketing phenomenon among adults.

More specifically, in this article, we explore the potential benefits that men and women might derive from buying the masculine or feminine versions of consumer products. We start with the simple idea that consumers use the products they own to signal individual

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characteristics to other people. We then suggest that consumers use gendered products as a feature of the extended phenotype (Dawkins, 1982), to signal exaggerated sexual-typicality based on secondary sexual characteristics. Unlike primary sexual characteristics that are directly necessary for sexual reproduction to occur (e.g. genitals), secondary sexual characteristics are physical markers of femininity and masculinity such as a rounder face and a smaller stature for women, and a squarer face and a larger body for men. In this research, we compare gendered products to cultural extensions of these secondary sexual characteristics as gendered products act as flashy signals of exaggerated sexual-typicality, a form of supernormal stimuli. We also argue that gendered products exaggerate sexual-typicality to modulate impressions of physical appearance towards the other-sex and to increase their body appeal. Indeed, based on evidence showing that secondary sexual characteristics that exaggerate femininity or masculinity tend to increase attractiveness and desirability to the opposite sex (Buss, 2005; DeBruine, Jones, Crawford, Welling, & Little, 2010; Gangestad, 1993; Grammer, Fink, Moller, & Thornhill, 2003; Holzleitner & Perrett, 2017; Marcinkowska et al., 2014; Singh, 1993; Thornhill & Gangestad, 1999), we hypothesize that gender-typical products increase the attractiveness and desirability of their owners.

Based on the results of three studies, this research deepens our understanding of the benefits of using gender-typical products by indicating that consumers can adopt these products in an attempt to increase their physical attractiveness and overall desirability. The present work also contributes to research on the efficacy of gendered marketing (Aspara & Van Den Bergh, 2014; Lieven, Grohmann, Herrmann, Landwehr, & van Tilburg, 2014; Lieven, Grohmann, Herrmann, Landwehr, & van Tilburg, 2015; Lieven & Hildebrand, 2016; Moss, Gunn, & Heller, 2006; Neale, Robbie, & Martin, 2016; Tilburg, Lieven, Herrmann, & Townsend, 2015) by explaining the conditions of consumers adoption of gender-typical products.

2. Conceptual background

Consumer products have been compared to extensions of individuals (Belk, 1988), that signal information about their owners. Consumers can choose their products strategically, to manipulate the impression they make on others (Berger & Ward, 2010; Dubois, Rucker, & Galinsky, 2012; Dunham, 2011). What do gendered products signal, and for what purpose? In this research, we argue that gendered products act as the extended phenotype of human sexual dimorphism, a form of super normal stimulus: they signal exaggerated masculinity or femininity to increase the physical attractiveness of their owners, and to increase desirability towards the opposite-sex.

2.1. Secondary sexual characteristics and human sexual dimorphism

Secondary sexual characteristics result from sexual selection, that is, the natural selection of genetic traits that increase reproductive success by attracting sexual partners or discouraging sexual competitors. Their expression is regulated by the hormones estrogen and testosterone. From a biological perspective, a feminine physique is simply a collection of traits (the secondary sexual characteristics) that express as an effect of estrogen, and enhanced the reproductive success of ancestral females. Similarly, and still from a biological perspective, a masculine physique is simply a collection of traits that express as an effect of testosterone, and improved the reproductive success of ancestral males. In other words, the fact that men and women develop different secondary sexual characteristics has both a proximal cause (they have different levels of estrogen and testosterone) and an ultimate cause: The traits that increased the reproductive success of ancestral females were not the same as the traits that increased the reproductive success of ancestral males (Puts, 2010, 2016).

The estrogen-driven physique is characterized by gracile facial features, high voice pitch, and specific deposition of fat on the hips and

breasts. What these traits have in common is their sexual attractiveness to many heterosexual men¹ (Collins & Missing, 2003; Dixon et al., 2011; Singh, Dixon, Jessop, Morgan, & Dixon, 2010). The testosterone-driven physique is characterized by robust faces, deep voices, facial hair, and upper-body muscularity. While some of these traits are not always preferred by women (e.g., beards or other highly masculinized features; Dixon & Vasey, 2012; Perrett et al., 1998; Rhodes, Hickford, & Jeffery, 2000), others are perceived as attractive by many heterosexual women. For example, heterosexual women tend to prefer men who are taller, with a V-shaped torso, large jaws, and prominent brows (Hönekopp, Rudolph, Beier, Liebert, & Müller, 2007; Little, Burt, Penton-Voak, & Perrett, 2001; Stulp, Buunk, & Pollet, 2013). Of course, there is variation in the physical characteristics that men and women find physically attractive, but a large body of previous research has convincingly established that humans show a high consistency, regardless of age, sex, and culture, with respect to classifying other humans as attractive or not (Buss, 2016; Gangestad, 1993; Gangestad & Scheyd, 2005; Grammer et al., 2003). More specifically, research has shown that, on average, there is a clear statistical preference for symmetrical faces and for conventionally masculine or feminine physiques (e.g. Little et al., 2001; Little, Jones, DeBruine, & Feinberg, 2008; Perrett et al., 1998; Singh et al., 2010), and this effect appears to be robust across diverse samples (Marcinkowska et al., 2014). Accordingly, sexual selection of the feminine and the masculine morphological features appear to have been driven at least partially by mate selection, by virtue of the reproductive advantage they confer (Buss, 1995; Puts, 2010, 2016; Rhodes, 2006).

2.2. Gendered products as the extended phenotype of human sexual dimorphism

We suggest that gendered products can perform as the extended phenotype of human sexual dimorphism, broadcasting a cultural equivalent to the biological signals of masculinity and femininity sent by secondary sexual characteristics (Dunham, 2011; Miller, 2011). The concept of extended phenotype was introduced by Dawkins (1982) to explain how living organisms succeed in manipulating their environment, to increase their chances either of survival or reproduction. This manipulation can occur on the organism in which the gene resides, other organisms, or the environment (spider's webs, bowerbird nests or beaver dams). In other words, biological traits (the phenotypes) are not restricted to the organism: they include features of the external world (the extended phenotypes). Even though there is no direct causal relationship between genes and human creations, the idea of applying the concept of extended phenotype to human cultural creations and body adornments has been evoked by many researchers (e.g. Dunham, 2011; Etcoff, Stock, Haley, Vickery, & House, 2011; Kruger & Kruger, 2018; Mileva, Jones, Russell, & Little, 2016; Miller, 2011; Morris, White, Morrison, & Fisher, 2013). For example, Miller (2011, p258) stated that cultural art creations are aesthetic ornamentations beyond the body, “a natural extension of the penises, beards, breasts and buttocks that adorn the body itself”. Other researchers have used the extended phenotype as a metaphor for different human cultural adornments such as Etcoff et al. (2011) who compared cosmetics to the extended phenotype because they significantly influence the perception of biologically important signals; or Morris et al. (2013) who compared high heels to the extended phenotype because they emphasize some attractive sex specific aspects of the female body and gait. In sum, human creations (such as makeup, corset, clothing, shoes, cosmetic implants) can be considered as phenotypic extensions because they are found in many different

¹ Note that in this research, we focus on heterosexual relationships only because the literature on homosexual preferences for the level of sexual dimorphism of a mating partner is scarce. Furthermore, our recruitment procedure would not allow one to get large enough samples of gay women and men.

societies and their role is to improve the perceived biological fitness (Etcoff et al., 2011).

In this paper, we argue that gendered products are a form of external cultural ornamentation that advertises fundamental biological traits of sexual dimorphism, extending body features. Gendered products can be completely arbitrary, but they can also be inspired by human sexual dimorphism through design elements of shape, color, and material (Tilburg et al., 2015). Specific variations of each of these elements can create a more masculine or feminine perception of the product. For example, products with bulky proportions, angular shapes, dark colors, rough texture or heavy weight are perceived as more masculine (Semin & Palma, 2014; Tilburg et al., 2015), which would seem to reflect male sexual dimorphism (i.e., the secondary sexual characteristics that make men have a more solid, defined body, edged, sharp facial shapes, and darker and thicker skin). While products that are smaller, with round shapes, curvy lines, lighter colors, a smooth texture and a soft surface are perceived as more feminine (Tilburg et al., 2015), which would seem to reflect female sexual dimorphism (i.e., the secondary sexual characteristics that make the average woman lighter, curvier, paler, and smoother than the average man).

2.3. Gendered products act as supernormal stimuli of sexual dimorphism to increase physical attractiveness

Although sexual dimorphism of the secondary sexual characteristics in humans is visible to the naked eye, humans have, on average, a low level of sexual dimorphism compared to other primates (Leutenegger & Kelly, 1977), which results in a considerable overlap in terms of their physical differences (e.g. weight and height). Because of this moderate level of sexual dimorphism, and because human sexual dimorphism plays a key role in physical attractiveness (Perrett et al., 1998; Rhodes, 2006), humans might use gendered products as cues to sexually dimorphic differences. The objective would be to help the opposite-sex quickly assess their physical attractiveness and their overall desirability.

To exaggerate these sexually dimorphic differences, consumers can use gendered products as extended supernormal stimuli or super releaser. Supernormal stimuli (Barrett, 2010; Tinbergen, 1953) are any stimulus that elicits a response stronger than the stimulus for which it evolved — even if it is artificial. Tinbergen (1953) was the first to discover that the sign of a natural stimulus can be artificially exaggerated and produce a supernormal stimulus to trigger a supernormal response. For example, oystercatchers prefer large artificial eggs to their own normal size eggs (Tinbergen, 1953). Adornments that exaggerate signs of attractiveness — such as cultural adornments — can then be considered as artificially supernormal stimuli that trigger a supernormal response. This concept of supernormal stimulus has been used to explain the success of many cultural artificial extended phenotypes such as makeup, corset, clothing, shoes, and cosmetic implants (Etcoff, 1999). The objective of these supernormal stimuli is to exaggerate our normal aesthetic response by taking advantage of human sensory biases (Etcoff et al., 2011; Morris, Reddy, & Bunting, 1995).

We suggest that gendered products, like cosmetics or high-heels, could transform the perception of the human body as a supernormal stimulus (i.e. super feminine or super masculine) to trigger a supernormal response (increased perceived attractiveness and desirability). That is, the normal stimulus of femininity or masculinity sent by human bodies and faces can be exaggerated with gendered products that produce a supernormal stimulus. Because gendered products are cultural extensions of the secondary sexual characteristics, they exaggerate human sexual dimorphism to deliver the same benefits as secondary sexual characteristics: they can increase physical attractiveness. In sum, by conspicuously advertising their sexually dimorphic physical traits through gender-typical variants of consumer products, we predict that consumers could make themselves more sexually dimorphic, attractive, and more desirable to the opposite sex.

To sum up, the objective of this research is to better understand why gendered products are successful among adults. Our prediction is that these products fulfill a function of mating effort by increasing consumers sexual dimorphism, body appeal and desirability among the other sex. And we predict that individuals intuitively recognize the role of gendered products in these attractiveness efforts.

3. Overview of experiments and data statement

We test this prediction in three studies:

Study 1 tests whether consumers attribute a higher level of desirability (femininity/masculinity, body appeal, sex appeal, and partner appeal) to imaginary opposite-sex targets who own a gender-typical (as opposed to a *gender-atypical*) version of a car in a realistic context.

Studies 2 and 3 investigate further if consumers also attribute a higher level of body-appeal to opposite-sex targets who own gender-typical versions of *everyday* products (vs. *gender-atypical* in study 2, and vs. *gender-neutral* in study 3). These studies also verify if the positive effect of owning gender-typical products on body appeal holds when a picture of the owner is shown.

Finally, a meta-analysis across studies 1–3 assesses the overall impact of owning gender-typical products on body appeal.

All studies recruited participants in the USA through online panels (Crowdfunder or Prolific). Participants in all studies gave the following demographic information: Gender, age, number of children and dating status (currently single or not). To determine sample sizes, we aimed at collecting a minimum of 60 responses for each cell in the experimental designs. All analyses were conducted in R (R Core Team, 2015). All data can be downloaded from the Open Science Framework at https://osf.io/fb4zr/?view_only=5f35abefaf054863b88863bee510aee8.

4. Study 1

The purpose of Study 1 was to test whether participants would attribute a higher level of desirability to opposite-sex targets who owned a gender-typical (as opposed to a gender-atypical) version of a product in a realistic context (the imaginary owner of a car behind tinted glasses). More specifically, this study tested whether owning a typical (vs an atypical) car would increase the owner's femininity or masculinity, body appeal, sex appeal, and partner appeal. This study further assessed whether this increased femininity or masculinity of a gender-typical car translates in higher desirability. Finally, it evaluates consumers preferences for a gender-typical vs. a gender-atypical car.

4.1. Method

398 participants were recruited on Prolific (Mage = 35, SD = 12; 199 men). Participants were randomly exposed to either a masculine or a feminine car (See Appendix A). They were asked to look attentively at this car. The brand names were hidden and an identical price range was indicated on both cars. Then, respondents were asked to imagine that they stopped at a traffic light and that they could not clearly see the owner of this car behind the tinted glasses. They were told that they could only guess that the owner was of the opposite sex. They were then asked to imagine the male consumer (for female respondents) or the female consumer (for male respondents) who owned and drove this car.

Participants then made inferences about various characteristics of the owner, using 7-point scales. The questions were randomized to avoid any consistency bias. They rated the perceived femininity/masculinity of the imaginary owner (1 differential semantic item: “*would you say that this man/woman looks...*”), his/her body appeal (7 items, e.g., *He/She has a nice body*), sex appeal (5 items, e.g., *Men/Women find her/him sexy*), and partner appeal (4 items, e.g., *He/She will find a partner easily*). We computed an aggregate index of desirability by averaging all ratings of Body Appeal, Sex Appeal, and Partner Appeal — based on the strong positive correlations between these three variables

(cf. Appendix B).² Finally, respondents were asked whether they would consider purchasing this car if they needed to buy one for them and if it was available on the market at a price they could afford (1 item). Appendix C lists all items, descriptive statistics, and Cronbach alpha scores.

At the end of the questionnaire, respondents were asked to rate the perceived gender of the car they were exposed to with two items (“*this car is feminine*”, “*this car is masculine*”), using 7-point Likert scales.

4.2. Results

The two cars clearly differed in the gender they conveyed. The masculine car was perceived as significantly more masculine than the feminine car ($M_{\text{MascCar}} = 5.9$, $SD = 1.2$ vs. $M_{\text{FemCar}} = 2.3$, $SD = 1.3$; $t(396) = 29.2$, $p \leq .001$) and significantly less feminine than the feminine car ($M_{\text{MascCar}} = 2.3$, $SD = 1.3$ vs. $M_{\text{FemCar}} = 5.8$, $SD = 1.1$; $t(396) = -31.5$, $p \leq .001$).

First, we tested whether the imaginary male and female owners of a gender-typical (vs. a gender atypical) car would be perceived as more feminine or masculine. We ran a regression model (see Table 1) with perceived femininity as the dependent variable; the car (masculine vs. feminine), the imaginary owner (man vs. woman), and their interaction as predictors; and the three covariates that were included in all analyses in this article: age, relationship status (single or not), and parental status (having children or not). These three covariates were included because they are directly linked to reproductive strategies, and reproductive strategies are known to influence individuals mating strategies (Buss, 1995; Buss & Shackelford, 1997; Buss & Schmitt, 1993). The analyses detected a significant main effect of the gender-typicality of the car on the perceived femininity of the imaginary owner ($t(391) = 20.2$, $p \leq .001$), with an effect in the predicted direction ($M_{\text{MascCar}} = 2.5$, $SD = 1.2$ vs. $M_{\text{FemCar}} = 5.5$, $SD = 1.1$) and a significant effect of the imaginary owner's gender (man vs. woman) on perceived femininity ($t(391) = 3.6$, $p \leq .001$), with women being logically perceived as more feminine than men ($M_{\text{Women}} = 4.2$, $SD = 1.9$ vs. $M_{\text{Men}} = 3.7$, $SD = 1.8$). The interaction effect did not reach significance ($t(391) = 0.1$, $p = .93$), meaning that the gender-typicality of the car had a positive effect on the perceived femininity/masculinity of both women and men.

Second, we tested whether the imaginary owner of a gender-typical (vs. a gender atypical) car would be perceived as a more desirable mate. The index of desirability was regressed on imaginary owner (man vs. woman), the car (atypical vs. typical), and their interaction; with age, dating status, and parent status as covariates (see Table 2). The desirability index was significantly higher for owners of a gender-typical car, $M_{\text{TypicalCar}} = 4.3$, $SD = 1.1$ than for owners of a gender-atypical car, $M_{\text{AtypicalCar}} = 3.7$, $SD = 1.0$ ($t(391) = 3.6$, $p \leq .001$). The interaction between the owner's gender and the gender-typicality of the car was not significant meaning that both men and women benefited from owning a gender-typical car ($t(391) = 0.9$, $p = .37$).

We then further analyzed ratings of Body Appeal, Sex Appeal, and Partner Appeal as a function of the imaginary owner and the gender-typicality of the car. Descriptive results are displayed in Appendix D and in Fig. 1, and regression results are displayed in Table 3. As confirmed in Table 3, both the female and the male imaginary owners of the gender-typical car (vs. atypical car) scored significantly higher on body appeal and partner appeal ($t(194) = 5.6$, $p \leq .001$; $t(194) = 2.7$, $p = .01$, respectively for female owners; and $t(194) = 5.3$, $p \leq .001$; t

² The desirability of a potential partner does not rest solely on these three characteristics. Other physical and psychological traits play an important role in a person's desirability. In this research though, we focus on the impact of sexual dimorphism on physical attractiveness and sex appeal, because physical attractiveness and sex appeal do increase the desirability of an individual on the mating market (e.g. Barber, 1995).

Table 1

Regression results, Study 1.

	Dependent variable	
	Perceived femininity	
	(1)	(2)
Feminine car	1.64*** (0.06)	1.63*** (0.08)
Female owner		0.29*** (0.08)
Age	0.07* (0.03)	0.04 (0.03)
Children	-0.09 (0.06)	-0.01** (0.06)
Single	0.02 (0.07)	-0.01 (0.07)
Feminine car × female owner		0.01 (0.11)
Constant	-0.78*** (0.06)	-0.95*** (0.07)
Observations	398	398
R ²	0.67	0.69
Adjusted R ²	0.66	0.68
Residual std. error	0.58 (df = 393)	0.56 (df = 391)
F statistic	196.34*** (df = 4; 393)	142.67*** (df = 6; 391)

(Unstandardized regression coefficients with standard errors in brackets).

Model 1: Regression model with perceived femininity as the dependent variable; the car (masculine vs. feminine) as predictor; and age, relationship status (single or not), and parental status (having children or not) as covariates.

Model 2: Regression model with perceived femininity as the dependent variable; the car (masculine vs. feminine), the imaginary owner (man vs. woman), and their interaction as predictors; and age, relationship status (single or not), and parental status (having children or not) as covariates.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

(194) = 2.5, $p = .01$ for male owners). Only the female owners though scored significantly higher on sex appeal when paired with a gender typical (vs. atypical) car ($t(194) = 4.5$, $p \leq .001$) although the effect went in the expected direction also for male owners with a gender-typical car ($t(194) = 1.8$, $p = .07$). See also Fig. 2 for a meta-analysis on Body appeal across the 3 studies.

We then tested the indirect effect of owning a gender-typical or a gender atypical car on desirability via perceived femininity (for imaginary female owners) and via perceived masculinity (for imaginary male owners). We used the macro Process (Hayes, 2013) to test the indirect effect of an independent variable on a dependent variable that passes through a mediating variable (see Appendices E and F). Hayes' bootstrapping procedure (Hayes, 2013) provides a reliable estimation of direct effects as well as indirect effects. The proposed hypothesis in our research was that the indirect effect of a gender-typical product (vs. a gender-atypical product) on desirability via perceived femininity/masculinity is positive. We performed separate mediations for two subsamples: one mediation among men exposed to the female owner of a feminine or a masculine car, and one mediation among women exposed to the male owner of a feminine or a masculine car. The indirect effect was strong and significant both for female owners (Hayes, Model 4, $r = 0.88$, [0.49; 1.27]) and for male owners (Hayes, Model 4, $r = 0.73$, [0.31; 1.17]). In other words, both men and women who imagined the driver of a typical car as a more sexually dimorphic individual (and not the driver of a gender-atypical car) were more likely to rate this individual as a desirable mate. This shows that the effect of owning a gender-typical car on desirability operates, at least partially, through sexual dimorphism.

Finally, we tested whether respondents were more likely to

Table 2
Regression results, Study 1.

Desirability of the owner of a gender typical vs. a gender atypical car (desirability index).

	Dependent variable	
	Desirability index	
	(1)	(2)
Typical car	0.56*** (0.10)	0.48*** (0.13)
Female owner		0.34* (0.14)
Age	0.16** (0.05)	0.13* (0.05)
Children	-0.25 (0.10)	-0.13 (0.11)
Single	-0.07 (0.11)	-0.10 (0.11)
Typical car × female owner		0.17 (0.19)
Constant	-0.14 (0.09)	-0.36** (0.12)
Observations	398	398
R2	0.11	0.15
Adjusted R2	0.10	0.14
Residual std. error	0.95 (df = 393)	0.93 (df = 391)
F statistic	11.92*** (df = 4; 393)	11.56*** (df = 6; 391)

(Unstandardized regression coefficients with standard errors in brackets).

Model 1: Regression model with desirability as the dependent variable; the car (typical vs. atypical) as predictor; and age, relationship status (single or not), and parental status (having children or not) as covariates.

Model 2: Regression model with desirability as the dependent variable; the car (typical vs. atypical), the imaginary owner (man vs. woman), and their interaction as predictors; and age, relationship status (single or not), and parental status (having children or not) as covariates.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

purchase a gender-typical or a gender-atypical car (See Table 4). Results reveal that both male and female participants prefer gender typical products ($t(194) = 3.4, p \leq .001, M_{\text{PurchMascCar}} = 3.1, SD = 1.9$ vs. $M_{\text{PurchFemCar}} = 2.2, SD = 1.5$ for male participants; $t(194) = 2.7, p = .01, M_{\text{PurchFemCar}} = 3.9, SD = 2.1$ vs. $M_{\text{PurchMasCar}} = 3.0, SD = 2.1$, for female participants).

4.3. Discussion

Study 1 shows that both men and women can obtain greater desirability by owning gender-typical products. Participants expected that opposite-sex targets who owned a gender typical car – rather than a gender-atypical car – had a nicer body, more sex appeal, and a higher mating success. This study also shows the role of increased femininity or masculinity in the desirability of owners of gender typical products. Finally, both men and women were more likely to consider purchasing a gender-typical car.

Note that despite being significant, our regression models produced low R-squared values. This suggests a high-variability in respondents' responses and indicates that additional predictors and moderators could increase the true explanatory power of our models. Perceived attractiveness is indeed likely to be multi-determined by a number of antecedents. Despite this high variability, our predictor variable (gender-typical vs. gender atypical product) provides significant information about consumers' perception of owners of gendered products.

5. Study 2

Study 2 investigated further the effect of owning gendered products

on consumer's body appeal. This study is different from Study 1 on two aspects: it sought to extend the results to everyday products and to determine whether this effect holds when a picture of the owner is shown.

5.1. Method

406 participants were recruited through Prolific. They were asked their dating preference (women, men or both) at the end of the questionnaire. Participants who indicated that they had an exclusive preference for dating same-sex individuals were discarded before analysis, because the experimental protocol assumed a preference for dating opposite-sex individuals. The final sample included 364 participants ($M_{\text{age}} = 34, SD = 8; 164$ men).

Respondents were exposed to what we described as pictures of identical twins: sisters Ella and Rosalie for male participants, and brothers Ethan and Alex for female participants (Appendix G). The two pictures were strictly identical, in order to make sure that any dating preference for one twin or the other could not be due to physical features. The twins were described as each having a favorite set of products, which was shown together with their picture. One set was gender-typical, the other set was gender-atypical. Which twin (Ella or Rosalie; Alex or Ethan) preferred the gender-typical set of products was counterbalanced across participants, to ensure that aggregated dating preferences would not be influenced by the first names of the characters.

Participants were asked to imagine that they met the twins at a party, and clicked on the twin that they would rather date.³ Participants were also asked to rate how physically attractive they imagined each twin's body to be. Appendix H lists all items, descriptive statistics, and Cronbach alpha scores.

5.2. Results

Participants' expectations about the twins' bodies were analyzed with a mixed model in which participants were entered as a random factor, the sex of the twins pair, and the product owned by each twin (and their interaction) were entered as fixed effects (plus the usual covariates). This analysis detected a significant effect of products ($t(362) = 2.1, p = .03$), a significant effect of sex ($t(504) = -5.4, p < .001$), and a significant interaction of sex and products ($t(362) = 3.7, p < .001$). More specifically, the male twin owning gender-typical products was pictured (by female participants) as having a nicer body ($M_{\text{BodyTypicalMaleOwner}} = 4.9, SD = 1.3, M_{\text{BodyAtypicalMaleOwner}} = 4.3, SD = 1.3, t(199) = 6.8, p \leq .001$); and the female twin owning gender-typical products was also pictured (by male participants) as having a nicer body – although the difference is somewhat lesser than for men ($M_{\text{BodyTypicalFemaleOwner}} = 5.2, SD = 1.3, M_{\text{BodyAtypicalFemaleOwner}} = 5.0, SD = 1.4, t(163) = 2.6, p = .01$). See also Fig. 2 for a meta-analysis on Body appeal across the 3 studies.

5.3. Discussion

In this Study, we found that both men and women benefitted from owning gender-typical (vs. atypical) products: both men and women who owned gender-typical products were pictured as more physically attractive.

³ 84% of women chose to date the male twin owning gender-typical products (vs. 26% who preferred the twin owning gender atypical products). 51% of men chose to date the female twin who owned gender typical-products (vs. 49% who preferred the female twin with gender atypical products).

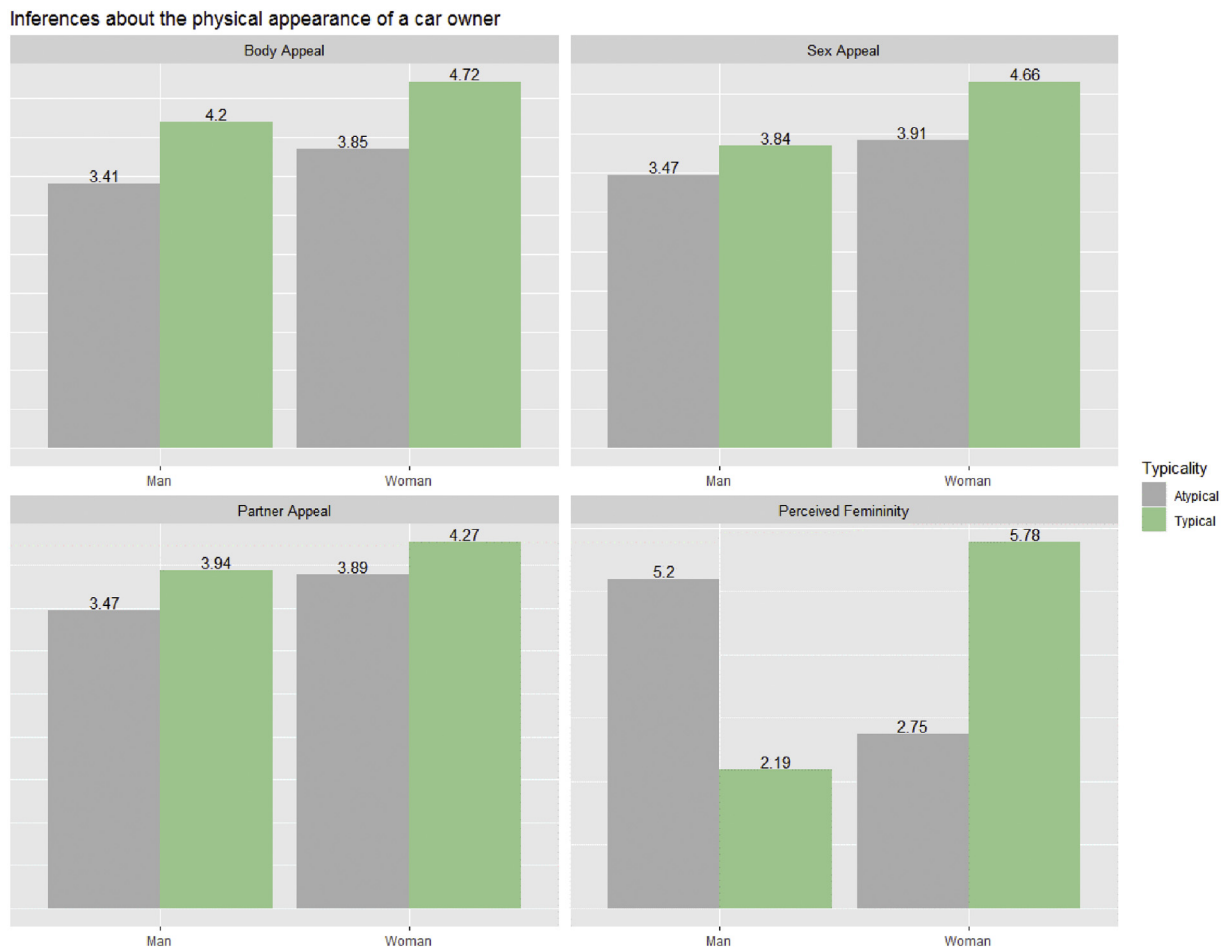


Fig. 1. Study 1 – inferences about the physical appearance of a car owner, as a function of whether the car was gender-typical or not (feminized or masculinized).

6. Study 3

Study 3 investigated further the effect of owning gendered products on body appeal. In this study though, we contrasted gendered-typical products against gender-neutral products (and not against gender-atypical products, as performed in Study 2). In this research, we felt it was important to contrast gender-typical products to gender-neutral products for two main reasons: First, including gender-neutral options allow us to reduce the distance on the masculine-feminine gradient between the two product choices. This will help us explore the boundary conditions for gendered products to increase body appeal. Second, including gender-neutral options allow us to include more realistic consumer choices as, in everyday life, consumers generally make their choices between typical and gender-neutral products. Because the distance of perceived gender between gender typical and gender-neutral products is smaller (than between gender typical and atypical products), we expected to obtain weaker effects on body appeal.

6.1. Method

618 participants were recruited through Crowdfunder. In line with Study 2, respondents were asked their dating preference (women, men, or both) at the end of the questionnaire, and those who indicated that they had an exclusive preference for dating same-sex individuals were discarded before analysis. Thus, the final sample included 573 participants ($M_{age} = 34$, $SD = 12$; 301 men).

We used the same protocol and the same questionnaire as those utilized in Study 2, with the same pairs of twins and the same names.

The only difference was that the twins in these stimuli were paired with gender-typical products or gender-neutral products (see Appendix I). Two different types of gender neutral products were used. We have run multiple pretests to find gender neutral sets of everyday products as, ideally, masculine and feminine packagings should be equidistant from their neutral version on a masculine-feminine gradient. In practice, though, it is extremely hard to find such a perfect set of experimental stimuli. Indeed, consumers tend to assign gender to almost any entities (Martin & Slepian, 2018; Wilkie & Bodenhausen, 2012) so finding perfectly neutral sets of products proved to be very complicated. As a result, we adopted a different strategy, that of using two sets of products: one in which the neutral packagings were closer to the masculine pole of the masculine-feminine gradient (Subset A), and one in which the neutral packagings were closer to the feminine pole (Subset B) – See Appendix J for the detailed results of the pretests. As in Study 2, participants were asked to imagine that they met the twins at a party, and to click on the twin that they would rather date.⁴ Participants were then asked to rate how physically attractive they imagined each twin's body to be. Appendix K lists all items, descriptive statistics, and Cronbach alpha scores.

⁴ In Set A (where the neutral products are closer to the masculine pole), 52% of men chose the typical female twin while 38% of women chose the typical male twin; In Set B (where the neutral products are closer to the feminine pole), 50% of women chose the typical male twin while 43% of men chose the typical female twin.

Table 3

Regression results, Study 1.

Desirability of the owner of a gender typical vs. a gender atypical car (body appeal, sex appeal, partner appeal).

	Dependent variable					
	Body appeal		Sex appeal		Partner appeal	
	Female owner	Male owner	Female owner	Male owner	Female owner	Male owner
	(1)	(2)	(3)	(4)	(5)	(6)
Typical car	0.74*** (0.13)	0.70*** (0.13)	0.61*** (0.14)	0.27 (0.14)	0.38** (0.14)	0.36* (0.14)
Age	0.08 (0.07)	0.16* (0.07)	0.15* (0.07)	0.06 (0.08)	0.17* (0.07)	0.08 (0.08)
Children	-0.04 (0.15)	-0.36* (0.14)	-0.06 (0.16)	-0.11 (0.16)	-0.05 (0.16)	-0.16 (0.15)
Single	-0.28 (0.15)	0.07 (0.16)	-0.13 (0.15)	0.10 (0.18)	-0.25 (0.16)	0.19 (0.17)
Constant	-0.26 (0.13)	-0.15 (0.13)	-0.24 (0.13)	-0.09 (0.15)	-0.08 (0.14)	-0.13 (0.15)
Observations	199	199	199	199	199	199
R2	0.16	0.19	0.11	0.03	0.07	0.06
Adjusted R2	0.15	0.17	0.09	0.01	0.05	0.04
Residual std. error (df = 194)	0.92	0.91	0.95	1.00	0.97	0.98
F statistic (df = 4; 194)	9.40***	11.02***	6.02***	1.43	3.88**	3.02*

(Unstandardized regression coefficients with standard errors in brackets).

* $p < .05$.** $p < .01$.*** $p < .001$.

6.2. Results

Participants' expectations about the twins' bodies were analyzed with a mixed model in which participants were entered as a random factor, and the product set, the sex of the twins pair, and the product owned by each twin (and their interaction) were entered as fixed effects (plus the usual covariates). This analysis detected a significant interaction of sex and products ($t(568) = 2.2, p = .03$), such that the female twin owning gender-typical products was pictured (by male participants) as having a nicer body. Incidentally, older participants imagined nicer bodies ($t(565) = 2.1, p = .03$). More specifically, the female twin owning gender-typical products was pictured (by male participants) as having a nicer body both when owning the typical subset from Set A ($M_{\text{BodyTypicalFemaleOwner}} = 5.4, SD = 1.1, M_{\text{BodyANeutralFemaleOwner}} = 5.1, SD = 1.2, t(137) = 3.9, p \leq .001$); and from Set B ($M_{\text{BodyTypicalFemaleOwner}} = 5.6, SD = 0.9, M_{\text{BodyNeutralFemaleOwner}} = 5.2, SD = 1.1, t(162) = -5.6, p \leq .001$). The male twin owning gender-typical products was not pictured (by female participants) as having a nicer body with Set A ($M_{\text{BodyTypicalMaleOwner}} = 5.1, SD = 1.0, M_{\text{BodyNeutralMaleOwner}} = 4.9, SD = 1.0, t(114) = -1.4, p = .16$), but was pictured as having a nicer body with Set B ($M_{\text{BodyTypicalMaleOwner}} = 5.2, SD = 0.9, M_{\text{BodyNeutralMaleOwner}} = 4.9, SD = 0.9, t(156) = -4.6, p \leq .001$), although to a lesser extent than for the female twins. See also Fig. 2 for a meta-analysis on Body appeal across the 3 studies.

6.3. Discussion

In this Study, we found that both men and women benefitted from owning gender-typical (vs. neutral) products: both men and women who owned gender-typical products were pictured as more physically attractive, although men, more than women, imagined the typical twin has having a nicer body. Overall, and contrary to our expectations, the

effect of owning gender-typical products (vs. gender-neutral products) on perceived body appeal was as strong as the one obtained in Study 2 when contrasting gender-typical vs. gender atypical products (see below and Fig. 2 for a meta-analysis on Body appeal across the 3 studies).

7. Meta-analyses of studies 1–3 on body appeal

In order to get an overall assessment of the impact of owning gender-typical products on body appeal, we performed an internal meta-analysis across studies 1, 2, and 3 (see Fig. 2). This analysis detected a significant meta-analytic effect of owning gender-typical products (vs. neutral or atypical products) on body appeal, both for male and female owners.

More specifically, and as predicted, owners of gender-typical products were mentally pictured as more physically attractive [$d = 0.45$, with a 95% confidence interval of (0.14, 0.76)]. This effect was positive both for male owners of gender-typical products [$d = 0.48$, with a 95% confidence interval of (0.14, 0.82)] and for female owners of gender-typical products [$d = 0.42$, with a 95% confidence interval of (0.05, 0.78)]. In sum, studies 1–3 offered robust overall evidence that gender-typical products confer a benefit in terms of physical appearance compared to neutral or atypical products.

8. General discussion

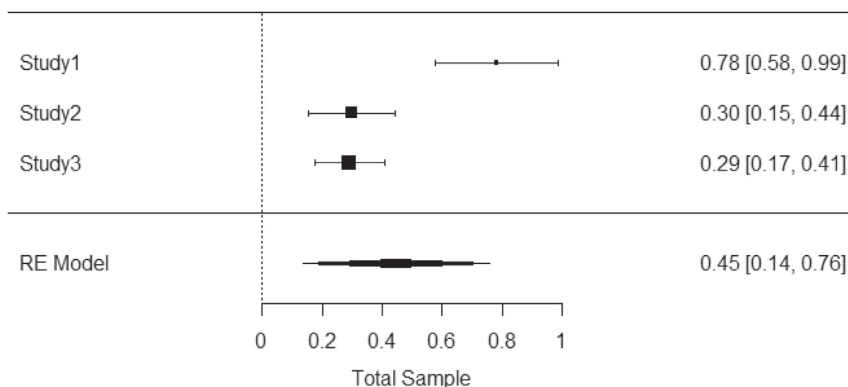
In the context of the controversies that surround gendered marketing and the lack of research on the roots of this marketing phenomenon, we asked the following question: which benefits, if any, can men and women derive from owning gender-typical variants of common consumer goods? We proposed that gender-typical products could act as the extended phenotype of sexual dimorphism, a supernormal stimulus of femininity or masculinity, broadcasting a cultural equivalent to the signals issued by biological, secondary sexual characteristics. We reviewed evidence showing that secondary sexual characteristics tend to increase physical attractiveness and desirability by increasing femininity or masculinity, and that gendered products, like cosmetics or high-heels, could transform the perception of the human body as a supernormal stimulus (i.e. super feminine or super masculine) to trigger a supernormal response (increased attractiveness). Accordingly, we predicted that consumers may obtain greater physical attractiveness and desirability through the purchase of gender-typical products.

We found converging evidence for this prediction. In Study 1, both male and female imaginary owners of a gender-typical car behind tinted glasses obtained greater desirability (a nicer body, more sex appeal, and a higher mating success). This study also showed the role of increased femininity or masculinity in the desirability of owners of a gender typical car. Studies 2 and 3 investigated further if consumers also attribute a higher level of body-appeal to opposite-sex targets who own gender-typical versions of *everyday* products (vs. *gender-atypical* in study 2, and vs. *gender-neutral* in study 3), and whether the positive effect of owning gender-typical products on body appeal holds when a picture of the owner is shown. In these two studies, both men and women who owned gender-typical everyday products were pictured as having a nicer body. A meta-analysis of the 3 studies conducted in this research confirmed the overall impact of owning gender-typical products on body attractiveness: both men and women who own gender-typical products were pictured with a nicer body.

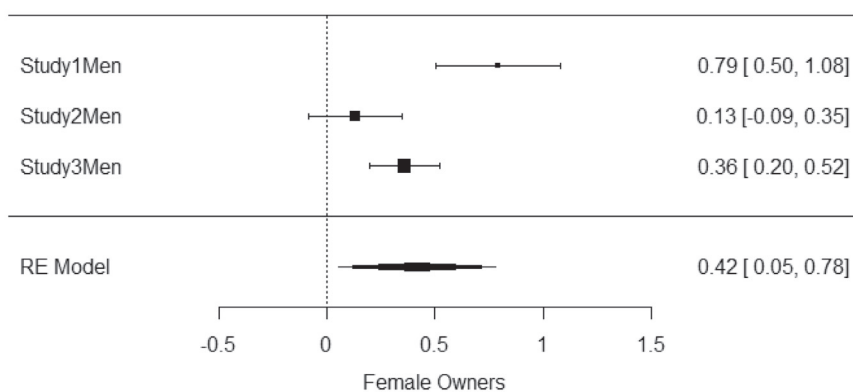
8.1. Novelty

Our findings extend the gendered marketing literature by suggesting that consumer preferences for some gendered products could be motivated by instrumental reasons, beyond compliance with stereotypes, identity protection, or a desire for a fit between products and self-

Total sample (owner of gender-typical products)



Among male respondents (perception of female owner of gender typical products)



Among female respondents (perception of male owner of gender-typical products)

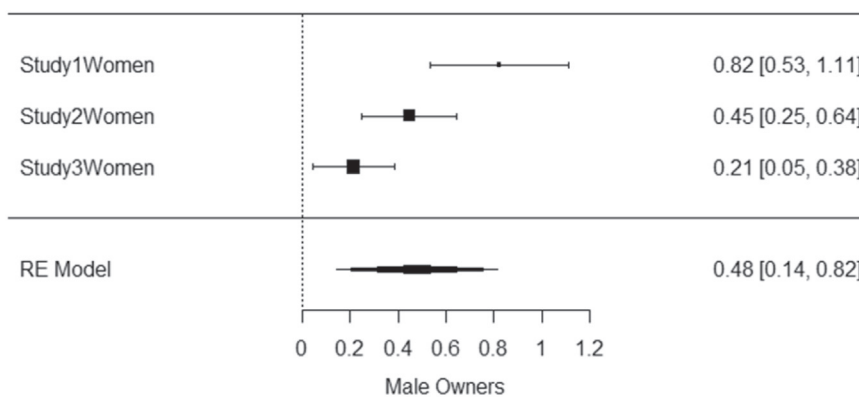


Fig. 2. Meta-analysis on body appeal.

Table 4
Regression results, Study 1.

	Dependent variable	
	Purchase intent	
	Male respondents	Female respondents
	(1)	(2)
Feminine car	−0.48*** (0.14)	0.39** (0.14)
Age	−0.03 (0.07)	−0.10 (0.08)
Children	0.06 (0.16)	0.11 (0.16)
Single	−0.0000 (0.16)	0.08 (0.18)
Constant	0.21 (0.14)	−0.27 (0.14)
Observations	199	199
R2	0.06	0.05
Adjusted R2	0.04	0.03
Residual std. error (df = 194)	0.98	0.98
F statistic (df = 4; 194)	2.94*	2.65*

(Unstandardized regression coefficients with standard errors in brackets).

* $p < .05$.

** $p < .01$.

*** $p < .001$.

concepts (Avery, 2012; Brough, Wilkie, Ma, Isaac, & Gal, 2016; Fugate & Philipps, 2010; Neale et al., 2016; Tilburg et al., 2015; Weiss & Johar, 2013; White & Dahl, 2006; Wilkie & Gal, 2010). That is, consumers can strategically purchase gender-typical products to increase their physical attractiveness and overall desirability. In other words, gendered products, like sexy selfies (cf. Blake, Bastian, Denson, Grosjean, & Brooks, 2018), could be instrumental in the process of mate attraction. Gendered products are highly visible sexually dimorphic adornments that feature exaggerated gendered characteristics (such as size, color, but probably also smell and sound) that are effective at extending and showing off the secondary sexual characteristics of individuals. These extended secondary sexual characteristics, or super stimuli of femininity or masculinity, can increase attractiveness.

The findings are also novel within the broader field of evolutionary consumption (Griskevicius & Kenrick, 2013; Kenrick, Griskevicius, Neuberg, & Schaller, 2010; Saad, 2007, 2013), which seeks to apply Darwinian insights to the study of consumer behavior, by identifying the predispositions and preferences which were ancestrally selected because they enhanced survival and reproduction, and translated into present-time consumer choice. The field of evolutionary consumption has given special attention to the products that people may buy with the goal (or the effect) of increasing their mating success. For example, men can increase (or attempt to increase) their mating success by purchasing positional goods, that function as markers of status and financial success (Dunn & Searle, 2010; Hennighausen & Schwab, 2014; Saad & Vongas, 2009; Sundie et al., 2011). Women, too, can increase their mating success by owning luxury goods, but the mechanism in that case is protective rather than prospective, as luxury goods appear to signal the strength of their partner's commitment, thus deterring potential mate poachers (Wang & Griskevicius, 2014). Our results do not fall within this category of conspicuous consumption, though, since we did not study positional goods or status markers, but common everyday products such as earplugs, toothpastes, or coffee mugs. Our findings bear a closer connection to research on the consumption of products that allow for a direct manipulation of secondary sexual characteristics; such as makeup and cosmetics that exaggerate feminine facial features, clothes that exaggerate the feminine hourglass figure, or heels that exaggerate the feminine gait (Etoff, 1999; Etoff et al., 2011; Mileva et al., 2016; Morris et al., 2013). The novelty of our findings, though, is

that the gendered products we studied can increase attractiveness and desirability without any actual impact on physical characteristics.

8.2. Limitations

In Study 1, participants expected opposite-sex individuals to have a nicer body when they owned a gender-typical product, when they could *not* actually see these individuals. This is a remarkable effect, but it leaves open the possibility that personal interaction with (and further visual information on) the owner may dilute the impact of the products. However, in Studies 2 and 3, participants could see the face of the owners, but not their bodies; and in this context again, both men and women imagine the owners of gender-typical products to have a more attractive body. We note though that our studies only used products for which gender cues are visual, rather than working via other senses (e.g., scent, touch), and in somewhat unrealistic contexts with few other information about the imaginary owners. These contexts are not completely unlikely though: it is common to imagine the driver of a car, without being able to clearly see him. And it is common today to imagine the owner of products displayed on his social network profile (such as Pinterest or Instagram) without seeing a picture of this individual. Still, we cannot affirm that our findings will generalize to other cues than visual ones or to other contexts, and leave this topic to future research. Future research using scenarios implicating non heterosexual individuals may also lead to a greater understanding of the role of gendered products in mate attraction.

8.3. Perspectives

Future research could extend our findings in at least four other directions. First, future research may explore asymmetric benefits that men and women may derive from owning gendered products. Indeed, male and female secondary sexual characteristics may not perform entirely symmetrical function. To begin with, female desirability is mainly visually assessed, while male desirability is more likely to also rely on non-visual components such as status and dominance. Furthermore; while female secondary sexual characteristics mainly give women an advantage in courtship, male secondary sexual characteristics also give men an advantage in aggressive interactions with rivals (Hill et al., 2013; Puts, Bailey, & Reno, 2015; Puts, Hodges, Cárdenas, & Gaulin, 2007; Sherlock, Tegg, Sulikowski, & Dixon, 2017). If gender-typical products mimic the biological signals issued by secondary sexual characteristics, then they may asymmetrically enhance the intimidation level of male owners. In other words, men who own gender-typical products may be perceived as more threatening by other men.

Second, future research could examine the advantage that owning gender-typical products confers to his/her owner on the mating market. In spite of the benefits we identified in this research, gendered products are unlikely to confer very strong mating benefits to their owners though. Signals of gender-typicality may be effective for catching the attention of potential mates by increasing physical attractiveness, but may also be counterproductive if they are not subtle enough as gendered products can also signal gendered personality traits and interests, fitting masculine and feminine stereotypes (Cunningham & Macrae, 2011). Besides, androgyny in a potential partner can also be attractive to some men and women (e.g. Green & Kenrick, 1994).

Third, future research may apply our approach to brands themselves, which can be perceived as masculine or feminine (Grohmann, 2009). That is, future research may investigate whether owning products of a brand perceived as gender-typical may increase desirability as owning a product that is marketed to one's own gender. In the same spirit, future research might investigate the role of gendered labels on products, and test whether merely labeling a product with feminine or masculine descriptors might be enough to increase desirability.

Fourth, our findings may inspire research that seeks to better understand the onslaught of gendered marketing in industrialized nations.

Industrialized nations are multi-level societies where individuals face major threats in terms of mate poaching and mate-switching. These societies can be an especially fertile ground for the evolution of conspicuous cultural ornamentations that increase mating value (Grueter, Isler, & Dixson, 2015; Wilson, Miller, & Crouse, 2017). Besides, cross-cultural research suggests that the preference for dimorphic physical traits may be evolutionarily novel (Scott et al., 2014). If the evolution of consumers' preference for gendered products follows the evolution of humans' preference for sexually dimorphic traits, this pattern could explain why gendered marketing is a growing trend in industrialized nations.

In summary, this research shows that gendered products act as the extended phenotype of human sexual dimorphism. They are artificial supernormal stimuli that can increase consumers' perceived femininity or masculinity and physical attractiveness.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jbusres.2019.03.007>.

References

- Aspara, J., & Van Den Bergh, B. (2014). Naturally designed for masculinity vs. femininity? Prenatal testosterone predicts male consumers' choices of gender-imagined products. *International Journal of Research in Marketing*, 31, 117–121.
- Avery, J. (2012). Defending the markers of masculinity: Consumer resistance to brand gender-bending. *International Journal of Research in Marketing*, 29(4), 322–336.
- Barber, N. (1995). The evolutionary psychology of physical attractiveness: Sexual selection and human morphology. *Evolution and Human Behavior*, 16(5), 395–424.
- Barrett, D. (2010). *Supernormal stimuli: How primal urges overran their evolutionary purpose*. WW Norton & Company.
- Belk, R. W. (1988). Possessions and the extended self. *Journal of Consumer Research*, 15, 139–168.
- Berger, J., & Ward, M. (2010). Subtle signals of inconspicuous consumption. *Journal of Consumer Research*, 37, 555–569.
- Blake, K. R., Bastian, B., Denson, T. F., Grosjean, P., & Brooks, R. C. (2018). Income inequality not gender inequality positively covaries with female sexualization on social media. *Proceedings of the National Academy of Sciences*, 115(35), 8722–8727.
- Brough, A. R., Wilkie, J. E., Ma, J., Isaac, M. S., & Gal, D. (2016). Is eco-friendly unmanly? The green-feminine stereotype and its effect on sustainable consumption. *Journal of Consumer Research*, 43(4), 567–582.
- Buss, D. M. (1995). *Psychological sex differences: Origins through sexual selection*.
- Buss, D. M. (Ed.). (2005). *The handbook of evolutionary psychology*. John Wiley & Sons.
- Buss, D. M. (2016). *The evolution of desire: Strategies of human mating*. Basic books.
- Buss, D. M., & Schmitt, D. P. (1993). Sexual strategies theory: An evolutionary perspective on human mating. *Psychological Review*, 100(2), 204.
- Buss, D. M., & Shackelford, T. K. (1997). From vigilance to violence: Mate retention tactics in married couples. *Journal of Personality and Social Psychology*, 72(2), 346.
- Collins, S. A., & Missing, C. (2003). Vocal and visual attractiveness are related in women. *Animal Behavior*, 65, 997–1004.
- Cunningham, S. J., & Macrae, C. N. (2011). The colour of gender stereotyping. *British Journal of Psychology*, 102(3), 598–614.
- Dawkins, R. (1982). *The extended phenotype*. Oxford: W. H. Freeman & Co.
- DeBruine, L. M., Jones, B. C., Crawford, J. R., Welling, L. L., & Little, A. C. (2010). The health of a nation predicts their mate preferences: Cross-cultural variation in women's preferences for masculinized male faces. *Proceedings of the Royal Society of London B: Biological Sciences*, 277(1692), 2405–2410.
- Dixson, B. J., & Vasey, P. L. (2012). Beards augment perceptions of men's age, social status, and aggressiveness, but not attractiveness. *Behavioral Ecology*, 23, 481–490.
- Dixson, B. J., Vasey, P. L., Sagata, K., Sibanda, N., Linklater, W. L., & Dixson, A. F. (2011). Men's preferences for women's breast morphology in New Zealand, Samoa, and Papua New Guinea. *Archive of Sexual Behavior*, 40, 1271–1279.
- Dubois, D., Rucker, D. D., & Galinsky, A. D. (2012). Super size me: Product size as a signal of status. *Journal of Consumer Research*, 38, 1047–1062.
- Dunham, B. (2011). The role for signaling theory and receiver psychology in marketing. *Evolutionary psychology in the business sciences* (pp. 225–256). Springer Berlin Heidelberg.
- Dunn, M. J., & Searle, R. (2010). Effect of manipulated prestige-car ownership on both sex attractiveness ratings. *British Journal of Psychology*, 101(1), 69–80.
- Etcoff, N. L. (1999). *Survival of the prettiest: The science of human beauty*. NY: Random House.
- Etcoff, N. L., Stock, S., Haley, L. E., Vickery, S. A., & House, D. M. (2011). Cosmetics as a feature of the extended human phenotype: Modulation of the perception of biologically important facial signals. *PLoS One*, 6, e25656.
- Fine, C., & Rush, E. (2016). “Why does all the girls have to buy pink stuff?” the ethics and science of the gendered toy marketing debate. *Journal of Business Ethics*, 1–16.
- Fugate, D. L., & Philipps, J. (2010). Product gender perceptions and antecedents of product gender congruence. *Journal of Consumer Marketing*, 27, 251–261.
- Furness, H. (2012). BIC ridiculed over ‘comfortable’ pink pens for women. *The Telegraph*. Retrieved from <http://www.telegraph.co.uk/news/newstopping/howaboutthat/9503359/BIC-ridiculed-over-comfortable-pink-pens-for-women.html> (October 1st, 2017).
- Gangestad, S. W. (1993). Sexual selection and physical attractiveness - implications for mating dynamics. *Human Nature*, 4, 205–235.
- Gangestad, S. W., & Scheyd, G. J. (2005). The evolution of human physical attractiveness. *Annual Review of Anthropology*, 34, 523–548.
- Grammer, K., Fink, B., Moller, A. P., & Thornhill, R. (2003). Darwinian aesthetics: Sexual selection and the biology of beauty. *Biological Reviews*, 78, 385–407.
- Green, B. L., & Kenrick, D. T. (1994). The attractiveness of gender-typed traits at different relationship levels: Androgynous characteristics may be desirable after all. *Personality and Social Psychology Bulletin*, 20(3), 244–253.
- Griskevicius, V., & Kenrick, D. T. (2013). Fundamental motives: How evolutionary needs influence consumer behavior. *Journal of Consumer Psychology*, 23, 372–386.
- Grohmann, B. (2009). Gender dimensions of brand personality. *Journal of Marketing Research*, 46, 105–119.
- Grueter, C. C., Isler, K., & Dixson, B. J. (2015). Are badges of status adaptive in large complex primate groups? *Evolution and Human Behavior*, 36(5), 398–406.
- Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: Guilford Press.
- Hennighausen, C., & Schwab, F. (2014). Relationship status moderates men's conspicuous consumption of smartphones. *Letters on Evolutionary Behavioral Science*, 5, 13–16.
- Hill, A. K., Hunt, J., Welling, L. L. M., Cardenas, R. A., Rotella, M. A., Wheatley, J. R., ... Puts, D. A. (2013). Quantifying the strength and form of sexual selection on men's traits. *Evolution and Human Behavior*, 34, 334–341.
- Holt, D. B., & Thompson, C. J. (2004). Man-of-action heroes: The pursuit of heroic masculinity in everyday consumption. *Journal of Consumer Research*, 31, 425–440.
- Holzleitner, I. J., & Perrett, D. I. (2017). Women's preferences for men's facial masculinity: Trade-off accounts revisited. *Adaptive Human Behavior and Physiology*, 1–17.
- Hönekopp, J., Rudolph, U., Beier, L., Liebert, A., & Müller, C. (2007). Physical attractiveness of face and body as indicators of physical fitness in men. *Evolution and Human Behavior*, 28(2), 106–111.
- Kenrick, D. T., Griskevicius, V., Neuberg, S. L., & Schaller, M. (2010). Renovating the pyramid of needs: Contemporary extensions built upon ancient foundations. *Perspectives on Psychological Science*, 5, 292–314.
- Kenrick, D. T., Maner, J. K., & Li, N. P. (2005). Evolutionary social psychology. In D. M. Buss (Ed.), *The handbook of evolutionary psychology* (pp. 803–827). Hoboken, NJ: John Wiley & Sons.
- Kruger, D. J., & Kruger, J. S. (2018). What do economically costly signals signal?: A life history framework for interpreting conspicuous consumption. *Evolutionary Psychological Science*, 1–8.
- Leutenegger, W., & Kelly, J. T. (1977). Relationship of sexual dimorphism in canine size and body size to social, behavioral, and ecological correlates in anthropoid primates. *Primates*, 18(1), 117–136.
- Lieven, T., Grohmann, B., Herrmann, A., Landwehr, J. R., & van Tilburg, M. (2014). The effect of brand gender on brand equity. *Psychology & Marketing*, 31, 371–385.
- Lieven, T., Grohmann, B., Herrmann, A., Landwehr, J. R., & van Tilburg, M. (2015). The effect of brand design on brand gender perceptions and brand preference. *European Journal of Marketing*, 49(1/2), 146–169.
- Lieven, T., & Hildebrand, C. (2016). The impact of brand gender on brand equity: Findings from a large-scale cross-cultural study in ten countries. *International Marketing Review*, 33, 178–195.
- Little, A. C., Burt, D. M., Penton-Voak, I. S., & Perrett, D. I. (2001). Self-perceived attractiveness influences human female preferences for sexual dimorphism and symmetry in male faces. *Proceedings of the Royal Society of London B: Biological Sciences*, 268(1462), 39–44.
- Little, A. C., Jones, B. C., DeBruine, L. M., & Feinberg, D. R. (2008). Symmetry and sexual dimorphism in human faces: Interrelated preferences suggest both signal quality. *Behavioral Ecology*, 19(4), 902–908.
- Marcinkowska, U. M., Kozlov, M. V., Cai, H., Contreras-Garduño, J., Dixson, B. J., Oana, G. A., ... Prasai, K. (2014). Cross-cultural variation in men's preference for sexual dimorphism in women's faces. *Biology Letters*, 10(4).
- Martin, A. E., & Slepian, M. L. (2018). Dehumanizing gender: The debiasing effects of gendering human-abstracted entities. *Personality and Social Psychology Bulletin*, 44(12), 1681–1696.
- Mileva, V. R., Jones, A. L., Russell, R., & Little, A. C. (2016). Sex differences in the perceived dominance and prestige of women with and without cosmetics. *Perception*, 45, 1166–1183.
- Miller, G. (2011). *The mating mind: How sexual choice shaped the evolution of human nature*. Anchor.
- Morris, P. H., Reddy, V., & Bunting, R. C. (1995). The survival of the cutest: Who's responsible for the evolution of the teddy bear? *Animal Behaviour*, 50(6), 1697–1700.
- Morris, P. H., White, J., Morrison, E. R., & Fisher, K. (2013). High heels as supernormal stimuli: How wearing high heels affects judgements of female attractiveness. *Evolution and Human Behavior*, 34, 176–181.
- Moss, G., Gunn, R., & Heller, J. (2006). Some men like it black, some women like it pink: Consumer implications of differences in male and female website design. *Journal of Consumer Behaviour*, 5(4), 328–341.
- Neale, L., Robbie, R., & Martin, B. (2016). Gender identity and brand incongruence: When

- in doubt, pursue masculinity. *Journal of Strategic Marketing*, 1–13.
- NYC Consumer affairs. *From cradle to cane: The cost of being a female consumer. A study of gender pricing in New York City.* (2015). Retrieved from <http://www1.nyc.gov/assets/dca/downloads/pdf/partners/Study-of-Gender-Pricing-in-NYC.pdf> (on March 5th 2018).
- Perrett, D. I., Lee, K. J., Penton-Voak, I., Rowland, D., Yoshikawa, S., Burt, D. M., ... Akamatsu, S. (1998). Effects of sexual dimorphism on facial attractiveness. *Nature*, 394, 884–887.
- Puts, D. A. (2010). Beauty and the beast: Mechanisms of sexual selection in humans. *Evolution and Human Behavior*, 31, 157–175.
- Puts, D. A. (2016). Human sexual selection. *Current Opinion in Psychology*, 7, 28–32.
- Puts, D. A., Bailey, D. H., & Reno, P. L. (2015). Contest competition in men. In D. M. Buss (Ed.), *The handbook of evolutionary psychology*. Wiley.
- Puts, D. A., Hodges, C. R., Cárdenas, R. A., & Gaulin, S. J. (2007). Men's voices as dominance signals: Vocal fundamental and formant frequencies influence dominance attributions among men. *Evolution and Human Behavior*, 28, 340–344.
- R Core Team (2015). *R: A language and environment for statistical computing*. Vienna, Austria: R Foundation for Statistical Computing.
- Rhodes, G. (2006). The evolutionary psychology of facial beauty. *Annual Review of Psychology*, 57, 199–226.
- Rhodes, G., Hickford, C., & Jeffery, L. (2000). Sex-typicality and attractiveness: Are supermale and superfemale faces super-attractive? *British Journal of Psychology*, 91, 125–140.
- Saad, G. (2007). *The evolutionary bases of consumption*. Psychology Press.
- Saad, G. (2013). Evolutionary consumption. *Journal of Consumer Psychology*, 23, 351–371.
- Saad, G., & Vongas, J. G. (2009). The effect of conspicuous consumption on men's testosterone levels. *Organizational Behavior and Human Decision Processes*, 110, 80–92.
- Scott, I. M., Clark, A. P., Josephson, S. C., Boyette, A. H., Cuthill, I. C., Fried, R. L., ... Honey, P. L. (2014). Human preferences for sexually dimorphic faces may be evolutionarily novel. *Proceedings of the National Academy of Sciences*, 111, 14388–14393.
- Semin, G. R., & Palma, T. A. (2014). Why the bride wears white—Grounding gender with brightness. *Journal of Consumer Psychology*, 24(2), 217–225.
- Sherlock, J. M., Tegg, B., Sulikowski, D., & Dixon, B. J. (2017). Facial masculinity and beardedness determine men's explicit, but not their implicit, responses to male dominance. *Adaptive Human Behavior and Physiology*, 3(1), 14–29.
- Singh, D. (1993). Adaptive significance of female physical attractiveness: Role of waist-to-hip ratio. *Journal of Personality and Social Psychology*, 65(2), 293.
- Singh, D., Dixon, B. J., Jessop, T. S., Morgan, B., & Dixon, A. F. (2010). Crosscultural consensus for waist-hip ratio and women's attractiveness. *Evolution and Human Behavior*, 31, 176–181.
- Stulp, G., Buunk, A. P., & Pollet, T. V. (2013). Women want taller men more than men want shorter women. *Personality and Individual Differences*, 54(8), 877–883.
- Sundie, J. M., Kenrick, D. T., Griskevicius, V., Tybur, J. M., Vohs, K. D., & Beal, D. J. (2011). Peacocks, Porsches, and Thorstein Veblen: Conspicuous consumption as a sexual signaling system. *Journal of Personality and Social Psychology*, 100, 664–680. *The Guardian*. Retrieved from <https://www.theguardian.com/lifeandstyle/shortcuts/>
- 2018/feb/05/lady-doritos-a-solution-to-a-problem-that-doesnt-exist (on March 7th 2018).
- Thornhill, R., & Gangestad, S. W. (1999). Facial attractiveness. *Trends in Cognitive Sciences*, 3(12), 452–460.
- Tilburg, M., Lieven, T., Herrmann, A., & Townsend, C. (2015). Beyond “pink it and shrink it”: Perceived product gender, aesthetics, and product evaluation. *Psychology & Marketing*, 32, 422–437.
- Time*. Retrieved from <http://time.com/5133674/lady-doritos/> (on March 7th 2018).
- Tinbergen, N. (1953). *The herring gull's world: A study of the social behaviour of birds*.
- Unilever (2018). Retrieved from <https://www.unilever.com/news/news-and-features/Feature-article/2014/the-worlds-first-toothpaste-just-for-men.htmlhttps://www.whitenow.com/en/products/white-now-glossy-chic> (March 5th 2018).
- Wang, Y., & Griskevicius, V. (2014). Conspicuous consumption, relationships, and rivals: Women's luxury products as signals to other women. *Journal of Consumer Research*, 40, 834–854.
- Weiss, L., & Johar, G. (2013). Egocentric categorization and product judgment: Seeing your traits in what you own (and their opposite in what you don't). *Journal of Consumer Research*, 40, 185–201.
- White, K., & Dahl, D. W. (2006). To be or not be? The influence of dissociative reference groups on consumer preferences. *Journal of Consumer Psychology*, 16(4), 404–414.
- Wilkie, J., & Gal, D. (2010). Real men don't eat quiche: Discrepancy between automatic and deliberate gender expressive choices in men. In M. C. Campbell, J. Inman, & R. Pieters (Vol. Eds.), *NA - Advances in Consumer Research*. 37. NA - *Advances in Consumer Research* (pp. 926–927). Duluth, MN: Association for Consumer Research.
- Wilkie, J. E., & Bodenhausen, G. V. (2012). Are numbers gendered? *Journal of Experimental Psychology: General*, 141(2), 206–210.
- Wilson, M. L., Miller, C. M., & Crouse, K. N. (2017). Humans as a model species for sexual selection research. *Proceedings of the Royal Society B*. <https://doi.org/10.1098/rspb.2017.1320>.

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