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Abstract

In the present dissertation I focus on the representation of two areas in the field of social cognition that are highly influential for advertising: representation of minority groups and attractiveness. In my first essay, I review the literature on minorities in advertising. According to my analysis, the number of top journal articles in advertising about minorities is deficient (85 articles among the top seven journals that publish in advertising, Less then 0.01%). Most of the literature looked at the consumption practices of minorities and their role in reinforcing the minority group identities or helping them to cope with identity threat. While the most represented minority group is the ethnic minority, most of the articles focused on investigating their consumption practices. Future research should broaden its focus by considering other minority groups (e.g., people with disabilities, homosexuals). In addition, previous literature in marketing, under the influence of social identity theory, focused mostly on the persuasive power of minority groups when the target population matches the source ethnicity. Future research should investigate the persuasive power of minorities on the consumption practices of a broader audience. The second essay of the dissertation aims to fill this gap in the literature. According to theories of persuasion, advertising should work best when endorsers and target audience match on salient characteristics such as gender or race. The persuasion potential of minority endorsers should hence be very limited as they would appeal only to that minority audience. Potentially negative aspects such as stereotypes and stigmata associated with minorities would be projected onto the brand and harm consumer attitudes and decrease choice. I argue that this view of consumers and their reactions to minority endorsers is outdated. I investigate the impact of a minority that — according to the above theories — should be among the least effective in promoting products and brands: models with a physical disability. Adopting the perspective of social identity theory, I hypothesize and show that when brands express a positive social value, consumers develop more positive attitudes toward the ad and the brand. In the case of a brand endorser with a disability, consumers reward the brand for expressing social inclusivity. My studies suggest that ads with models with a disability reverse the traditional model–brand relationship in advertising. Rather than a model endorsing a brand, in ads with models with a disability the brand endorses the model, and hence the value of social inclusivity. Consumers reward brands that do so. In the third essay of my dissertation I focus on how pupil size affects consumers' perceptions of a model's attractiveness and its downstream consequences for product choice. Previous research has found pupil dilation to signal interest to the observer, which is used to explain why models with larger pupils are found to

be more attractive. While prior research has explained the impact of pupil size on observers' perceptions through a physiological route (i.e., pupil mimicry), I propose that, in marketing contexts, pupil size affects consumers' evaluations though an aesthetic route. I argue that, because eyes with smaller pupils reveal a more colorful and brighter eye, constricted pupils improve the model's perceived attractiveness and the ad's evaluation. Six experiments show that models with constricted (versus dilated) pupils are perceived as more physically attractive and, consequently, they improve consumers' attitudes toward the advertisement. Despite finding that consumers automatically assimilate to the model's pupil size, our results show that pupil mimicry does not affect ad evaluations. Thus, in advertising, consumers seem to be more directly influenced by the ad's aesthetic properties than by their physiological reactions.

LISTS OF TABLES

LISTS OF FIGURES

1. INTRODUCTION

New trends are emerging in the marketing field (e.g., diversity and inclusion, new beauty concepts), while marketers reject old normative standards (e.g., stereotypes). Nike's "Just Do It" campaign featuring Colin Kaepernick and Diesel's 2014 Reboot campaign (involving a model with a disability) are a few examples of how less traditional and counter-stereotypical models are being used frequently in ad campaigns. Many companies' choices to make these shifts have created a need for research to understand their impact.

Social cognition, the study of cognitive processes that underline social psychological phenomena (Fiske and Taylor 1991), provides a theoretical perspective to understand these trends. In particular, in the present dissertation I focus on the representation of two areas in the field of social cognition that are highly influential for advertising: representation of minority groups and attractiveness.

In my first essay, I review the literature on minorities in advertising. According to my analysis, the number of top journal articles in advertising about minorities is deficient (85 articles among the top seven journals in advertising, less then 0.01%). This number is quite surprising if we consider how much the study of minority groups is beneficial to the investigation of inclusivity, a relevant topic to consumers. Most of the literature looked at the consumption practices of minorities and their role in reinforcing the minority group identities or helping them to cope with identity threat. While the most represented minority group is the ethnic minority, most of the articles focused on investigating their consumption practices. Future research should broaden its focus by considering other minority groups (e.g., people with disabilities, homosexuals). In addition, previous literature in marketing, under the influence of social identity theory, focused mostly on the persuasive power of minority groups when the target population matches the source ethnicity. Future research should

investigate the persuasive power of minorities on the consumption practices of a broader audience.

The second essay of the dissertation aims to fill this gap in the literature. According to theories of persuasion, for example the elaboration likelihood model (Petty and Cacioppo 1986), source attractiveness model (McGuire 1985), and social adaptation model (Kahle and Homer 1985), advertising should work best when endorsers and target audience match on salient characteristics such as gender or race (Aaker, Brumbaugh, and Grier 2000; Deshpandé and Stayman 1994; Forehand, Deshpandé, and Reed 2002; Grier and Brumbaugh 1999; Grier and Deshpandé 2001; Wooten 1995). The persuasion potential of minority endorsers should hence be very limited as they would appeal only to that minority audience. Potentially negative aspects such as stereotypes and stigmata associated with minorities would be projected onto the brand and harm consumer attitudes and decrease choice. I argue that this view of consumers and their reactions to minority endorsers is outdated. I investigate the impact of a minority that — according to the above theories — should be among the least effective in promoting products and brands: models with a physical disability. Adopting the perspective of social identity theory (McCracken, 1986, 1989; see also Reed et al. 2012), I hypothesize and show that when brands express a positive social value, consumers develop more positive attitudes toward the ad and the brand. In the case of a brand endorser with a disability, consumers reward the brand for expressing social inclusivity. My studies suggest that ads with models with a disability reverse the traditional model–brand relationship in advertising. Rather than a model endorsing a brand, in ads with models with a disability the brand endorses the model, and hence the value of social inclusivity. Consumers reward brands that do so.

The third essay focuses on one of the most studied constructs in the literature of advertising: attractiveness. Previous literature in marketing and advertising documented positive influences of attractiveness on consumers' evaluations (Caballero and Pride 1984) and sales (Häfner and Trampe 2009). Beautiful models increase persuasion, for example in a study by Kahle and Homer (1985) where beautiful celebrities enhanced attitudes toward a razor. For this reason, several scholars devoted their attention to study factors that enhance perceptions of attractiveness of the model. In the third essay of my dissertation I focus on how pupil size affects consumers' perceptions of a model's attractiveness and its downstream consequences for product choice. Previous research has found pupil dilation to signal interest to the observer, which is used to explain why models with larger pupils are found to be more attractive. While prior research has explained the impact of pupil size on observers' perceptions through a physiological route (i.e., pupil mimicry), I propose that, in marketing contexts, pupil size affects consumers' evaluations though an aesthetic route. I argue that, because eyes with smaller pupils reveal a more colorful and brighter eye, constricted pupils improve the model's perceived attractiveness and the ad's evaluation. Six experiments show that models with constricted (versus dilated) pupils are perceived as more physically attractive and, consequently, they improve consumers' attitudes toward the advertisement. Despite finding that consumers automatically assimilate to the model's pupil size, our results show that pupil mimicry does not affect ad evaluations. Thus, in advertising, consumers seem to be more directly influenced by the ad's aesthetic properties than by their physiological reactions. In conclusion, these three essays provide empirical and theoretical evidence that studies trends in the advertising industry. Specifically, the findings suggested there is room for the literature to investigate factors that explain old and established constructs such as attractiveness. At the same time, scholars need to explore new and prominent trends, such as the representation of minorities in marketing.

REFERENCES

Aaker, Jennifer L., Anne M. Brumbaugh, and Sonya A. Grier (2000), "Nontarget markets and viewer distinctiveness: The impact of target marketing on advertising attitudes," *Journal of Consumer Psychology*, 9, (3), 127-40.

Caballero, Marjorie J., and William M. Pride (1984),"Selected effects of salesperson sex and attractiveness in direct mail advertisements," *Journal of Marketing*, 48 (1), 94-100.

Deshpandé, Rohit, and Douglas M. Stayman (1994),"A tale of two cities: Distinctiveness theory and advertising effectiveness," *Journal of Marketing Research*, 31(1), 57-64.

Fiske, S. T., & Taylor, S. E. (1991). *Social cognition*. Mcgraw-Hill Book Company.

Grier, Sonya A., and Anne M. Brumbaugh (1999), "Noticing cultural differences: Ad meanings created by target and non-target markets," *Journal of Advertising*, 28 (1), 79-93.

Grier, Sonya A., and Rohit Deshpandé (2001),"Social dimensions of consumer distinctiveness: The influence of social status on group identity and advertising persuasion," *Journal of Marketing Research*, 38 (2), 216-224.

Häfner, Michael, and Debra Trampe (2009), "When thinking is beneficial and when it is not: The effects of thin and round advertising models," *Journal of Consumer Psychology*, 19 (4), 619-28.

Kahle, Lynn R., and Pamela M. Homer (1985), "Physical attractiveness of the celebrity endorser: A social adaptation perspective," *Journal of Consumer Research*, 11 (4), 954-61.

McCracken, Grant (1986), "Culture and consumption: A theoretical account of the structure and movement of the cultural meaning of consumer goods," *Journal of Consumer Research*, 13 (1), 71-84.

McCracken, Grant (1989), "Who is the celebrity endorser? Cultural foundations of the endorsement process," *Journal of Consumer Research*, 16 (3), 310-21.

McGuire, W. J. (1985), “Attitudes and attitude change,” In *Handbook of Social Psychology*, New York: Random House.

Petty, Richard E., and John T. Cacioppo (1986), "The elaboration likelihood model of persuasion," In *Communication and persuasion*, Springer, New York, NY.

Reed II, Americus, Mark R. Forehand, Stefano Puntoni, and Luk Warlop (2012), “Identity-based consumer behavior,” International Journal of Research in Marketing, 29 (4), 310-21.

Wooten, David (1995), “One of a Kind in a Full House: Some Consequences of Ethnic and Gender Distinctiveness,” Journal of Consumer Psychology, 4 (3), 205-24.

2. MINORITIES IN ADVERTISING

The public debate about discrimination and inclusiveness is intensifying in our societies. One particular aspect of this debate focuses on the representation of minority groups is increasing in public domains including advertising. Companies are following this new sociocultural trend by developing more inclusive advertising strategies. Desigual “What do you see?” campaign featuring Winnie Harlow (a black model with vitiligo) and Diesel's 2014 Reboot campaign (involving a model with a disability) are examples of how companies promote inclusivity. A recent survey performed in a collaboration of Google and Ipsos (N =3,000 U.S. citizens) shows that consumers are more likely to consider and purchase a product after seeing an ad they think is diverse or inclusive compare to more traditional non-inclusive ads.

The advertising industry is one of the most receptive sectors to social trends (McCracken 1986). Chapter two presents a literature review of how minorities are represented in advertising. Specifically, I look at how minority groups are represented in the academic literature and by the media industry, and suggest new marketing strategies including minorities. I will cover these aspects by summarizing current findings in the literature and provide suggestions for future research directions.

MINORITY GROUPS: A SOCIO-PSYCHOLOGICAL PERSPECTIVE

Before I start with the literature review, I will first define minorities. I look at three different approaches to define minorities, numerical prevalence, social status, and stereotypical categorization.

Numerical prevalence, social status and stereotypical categorization

The most widespread definition of minorities is related to numerical prevalence (Brewer 1991; Mullen 1991; Simon 1992). Minorities are usually defined as being small in size (Brewer 1991; Moscovici and Paicheler 1978; Simon 1992) compared to a majority.

The criterion of numerical prevalence is mostly applied when describing the relationship between collective identity (e.g. being African American) and self-identity (e.g. being an individual) for members of minority groups. Specifically, collective identity is a set of attributes, values, and beliefs associated with a social group, whereas self-identity refers to the collection of qualities and characteristics that each member associates with his individual identity.

Numerosity of the group influences how salient a collective identity is to each member. Specifically, when members of a specific minority group are numerically less prevalent compare to the majority (the ratio between number of members of minorities vs. number of members of the majority is lower), their collective identity is very salient, and therefore they identify more with their minority group. For example, McGuire and McGuire (1988) suggested that children think about their gender or ethnicity only when they hold a minority position (e.g., they are the only females in class). The impact of numerical prevalence on self's definition is powerful and persistent even when the attributes associated with the identities are negative.

A limitation of the numerical prevalence approach is that it does not reflect how the sociocultural context influences the collective identity's salience (Oakes 1987; Oakes and Turner 1986). Specifically, Oakes (1987) suggested that the activation of a collective identity (e.g., being black) depends on the social context in which it occurs (e.g., teachers' discriminatory behaviors). Numerosity alone without reference to social status is insufficient to describe how minority members define their identity.

Defining minorities in terms of social status and power help to differentiate oppressed groups (minorities) from dominant groups (majority). An oppressed minority is often discriminated against and considered to be a vulnerable group in society. Note that according to this definition an oppressed minority may be as numerous as or even more numerous than a majority. For example, women are considered a social minority compared to men. In the same vein, during apartheid, Whites were considered a majority even though they were less numerous than Blacks.

In practice, however, the two criteria numerical prevalence and social status/power are not independent, since numerical prevalence often co-varies with social status such that a numeric majority also holds the dominant position in society. This aspect is particularly prevalent in Western democratic societies where many groups have gained power and status due to their numerosity (Sachdev and Bourhis 1984).

Note the role that context plays in the activation of collective identity. The salience of group membership and its importance for to self-identity is influenced by the attractiveness of the ingroup, that is how desirable membership is to the ingroup. In this sense, if membership to a specific group is associated with stigmatization, individuals will not consider themselves members of the minority. The reduced saliency of the collective identity will protect their self-identity from the stigmatized identity's negative impact. In the same way when the collective identity is associated with positive characteristics (e.g. high status), members of the minority

will be more willing to identify with their group. In this sense, desirability is a function of status where high-status membership is highly desirable (Ditto and Jemmott 1989).

Finally, a third definition of minorities was developed within the context of intergroup perceptions and information processing and defines them by their stereotypical categorization. Stereotypes are social categories (Allport 1954; Tajfel 1969), similar to object categories, defined by a set of attributes that are presumed to be more or less descriptive of group members. In the stereotype model, the categories are fixed and embedded in the social structure of the society, and the individual characteristics are inferred from group's membership.

The four most prevalent minorities studied within the stereotype account are women, homosexuals, ethnic groups and people with a disability (Brown 1995; Fiske 1998; Leyens, Yzerbyt, and Schadron 1994; Macrae and Bodenhausen, 2000).

The first scholar using stereotypical representation to define minorities was Fiske (1993). Fiske's model distinguishes between a dominant majority and subordinate minorities. The majority is typically assigned positive characteristics and traits, whereas minorities are assigned less positive or negative traits. Stereotypical categorization varies along two dimensions, warmth and competence. The dominant groups in society are characterized by high warmth and high competence. Minorities, in contrast, are associated with at least one negative trait, either they are high in competence but low in warmth (e.g., Asian; Jews) or high in warmth and low in competence (e.g., people with a disability).

The advantage of Fiske's stereotype model is that it allows classifying groups as minorities that could previously not be defined as such (e.g., housecleaners, housewives, the elderly, religious groups).

LITERATURE REVIEW: METHODOLOGY

For the literature review I selected articles from the Scopus database published until September 30th 2020. Since the literature review's primary objective is to cover research on minorities in the advertising context, I selected articles from the top 7 journals — ranked by impact factor — that publish research in advertising: *Journal of Marketing*, *Journal of Consumer Research*, *Journal of Marketing Research*, *Journal of Consumer Psychology*, *Journal of Advertising*, *Journal of Advertising Research*, and the *International Journal of Advertising Research*.

From these journals, I selected articles related to minorities by searching the database for the following 21 keywords: three keywords were based on the numeric prevalence criterion: minorit*, subgroup*, outgroup* (Brewer 1991; Moscovici and Paicheler 1978; Simon 1992), six keywords were based on the sociocultural status criterion: vulnerable* group*; non-dominant* group*; discriminate*group*, and twelve keywords were based on the stereotypical criterion: gender* ; women*; gay; lesbian*; homosexual*; trans*; queer*; bisexual*; disab*; handicap*; rac*; ethnic. This keyword search resulted in 123 articles, the list of keywords and the number of articles associated with each can be found in Table 1.

Table 1. Keywords for article selection.

Criterion	Group	Keyword	Keyword	Keyword	Keyword	Keyword	Keyword	Total
Numerical prevalence	Generic	Minorit*						21
Numerical prevalence	Generic	Subgroup*						6
Numerical prevalence	Generic	Outgroup*						1
Status	Generic	Vulnerabl*	AND group*					1
Status	Generic	Non-dominant*	AND group*					0
Status	Generic	Discriminat*	AND group*					6
Stereotypical categorization	Women	Gender	Women					57
Stereotypical categorization	LGBTQ	Gay	Lesbian	Homosexual*	Trans*	Queer*	Bisexual*	3
Stereotypical categorization	Disabled	Disab*	Handicap*					5
Stereotypical categorization	Ethnic minority	Rac*	Ethnic*					23
Total								**123**

The 123 articles were further manually examined to ensure that they corresponded to the research topic of minorities in advertising. The criteria used for this step are defined in Table 2. This send selection resulted in a final list of 85 articles (less then 0.01% of the total articles).

Table 2. List of criteria used to refine the list of articles manually.

No	Manual refining criteria
1	The term "minority" does not refer to intergroup dynamics
2	The term vulnerable does not refer to a specific group of consumers
3	The term "subgroup" does not refer to intergroup dynamics
4	Discrimination is used as a synonym of differentiation
5	The terms women and gender do not refer to intergroup dynamics (women are not a minority)
6	The term "disabled" does not refer to a specific group of people
7	The term "handicap" does not refer to a specific group of people
8	DVs not relevant to the advertising

HOW INCLUSIVE HAS ADVERTISING RESEARCH BEEN SO FAR?

The academic literature on advertising reviewed here has primarily studied minority groups that are defined by stereotypical categorization: women, homosexuals, people with a disability, and ethnic minorities. To a lesser extent, minority groups defined by numeric prevalence have been studied, such as linguistic and cultural minorities. Surprisingly, I did not find any articles focusing on religious minorities.

The most studied minority in the academic literature on advertising are ethnic minorities. Out of the eighty-five papers in the dataset, fifty-two (61.17%) focused on ethnic minorities. Information concerning the representation of different ethnic groups are summarized in Table 3.

Table 3. Representation of different ethnic groups in the top seven marketing journals in advertising.

	Number of papers	Percentage of the total dataset
Black	52	61.17%
Hispanics	11	12.94%
Asian	3	3.52%
Other	5	5.88%

Among these, the most prevalent group are black people, with twenty-six papers studying phenomena related to black minorities (e.g., representation, consumption, effectiveness as sources in advertising).The second most studied ethnic minority are Hispanics, followed by Asian and other ethnic minorities.

The large overrepresentation of blacks and Hispanics among the ethnic minorities that have been studied is probably due to most of the research being conducted in the United States, where African Americans represent the most prevalent group, making their study relevant to the United States' socio-cultural context.

Only ten (11.76%) articles studied women as a minority, and only eight articles looked at LGBTQ+ minorities, and all of those articles focused on homosexuals while disregarding the other groups (e.g., transgender, bisexuals). Only one article looked at people with a disability.

Also, eight studies considered less traditional minority groups. These are segments of the populations that acquired their minority status because they have a distinct characteristic from the general population and are numerically less prevalent (e.g., linguistic minority, cultural minorities, or subculture). Compared to the more traditional minority groups, the activation of their specific group's identity is contingent on their numerical prevalence compare to the majority. For example, an Italian citizen is not part of a minority group unless he is a resident in a country that is not Italy, where Italians are a minority. The presence of these groups suggested that advertising literature is adopting a more flexible approach to identifying minorities. In the future, the literature could explore other minority segments, such as religious groups or body types, to improve its research's inclusivity.

Two articles analyzed the challenges that researchers face when studying minority groups. The first challenge is related to the fact that the researchers' background can influence the hypothesis's development and interpretation of the results. These biases are significant for qualitative research. For example, in a study that included participants and coders who belonged to different minority groups, Wilkes and Valencia (1989) found that the coder's ethnicity or race affected the judgments made in content analyses involving minority groups. Specifically, when coders were identifying variables related to their in-groups (black coders coding representation of black minorities) they showed ethnic-centered bias. The black coder saw blacks in more prominent roles than did either the Anglo or Hispanic coder. Similarly, the Hispanic coder identified more Hispanics and saw them in more significant roles than either the Anglo or black coder.

According to Webster (1996), the opposite problem applies to data collection. The author studied the impact of interviewer’s ethnic background and gender on data collection quality (for qualitative research). The study included Hispanic and English interviewers and participants from both genders. Results suggest that the highest response quality is generated when the gender of the interviewer differs from the respondent. Also, when the interviewer and respondent were from the same ethnic group, effectiveness of the interview increases. Expressly, in the study, when the

interviewer of a different ethnic background asked the respondents questions about his culture, he deferred the answer. When questioned about noncultural, albeit sensitive, questions, the ethnic background did not influence the participant’s willingness to answer the question. The opposite was true for gender. These findings bring to the scholars' attention the presence of bias in data collection and measurement influenced by the researcher's cultural background. Scholars must acknowledge these limitations when discussing their results' implications and generalizability. They should also adopt strategies to decrease the presence of these potential biases by selecting researchers from different minorities.

In conclusion, the academic literature looking at minorities in advertising has mainly focused on African Americans, reflecting the ethnic composition of American society. Studies focusing on women as a minority are much less prevalent, and studies focusing on other minorities such as people with a disability, LGBTQ+, or religious minorities are non-existent. Given the growing importance of these groups and their inclusion in society, there are ample opportunities for researchers interested to study the effects of their inclusion in advertising.

MINORITIES IN ADVERTISING: A WELFARE PERSPECTIVE

The academic marketing literature has typically considered minorities as vulnerable consumer subgroups with a subordinated position in society. Even nowadays, minorities are still discriminated against in many domains, and there is a need to create regulations to protect them. For this reason, studies of minorities in advertising can have important implications, not only from a marketing perspective but also from a policy-making perspective.

To fight discrimination, representation in the media is vital. Since advertising reflects cultural changes in our society (Baker 2004), looking at inclusion and representation of minorities in advertising is key to understanding potential power relationships, shifts in the status quo, and socially accepted roles and trends (Gulas, McKeage, and Weinberger 2010).

Minorities also represent consumer segments that differ from majority consumer segments in their self-esteem and saliency of identity threat. Hence — apart from representation — understanding minorities' consumption habits and their impact on self-identity and wellbeing constitutes another essential aspect to protect vulnerable minorities.

In the following, I review the representation of minorities in the media and the impact of minority consumption patterns on minority self-identity and wellbeing.

Representation of minorities in the media

Minorities perceive their representation in the media as a form of legitimation of their groups (Tsai 2011). Advertising is hence a necessary form of the contemporary cultural context in which minorities demonstrate their group membership and negotiate their symbolic boundaries (Moisander and Valtonen 2006). In this sense, inclusion and representation in the media reflect

society's perceptions of minorities. The contents communicated in ads, newspapers and movies are essential sources of information for defining minorities' group identities.

As mentioned beforehand, blacks are the minority that is most represented in the American media, and their representation has been studied across different media contexts such broadcast advertising, direct marketing, radio, movies, etc. Zinkhan, Qualls, and Biswas (1990) reported that only 4.37 percent of consumer ads included black models and that African-Americans were mostly represented in industrial advertising. Humphrey and Schuman (1984) suggested the reason for blacks being more represented in industrial advertising is that Caucasians were more willing to accept integration in work settings than in social or residential settings. Supporting this hypothesis, Taylor, Lee and Stem (1995) found that nearly 35 percent of the African-Americans were portrayed in business ads, but only about five percent were included in ads with social interactions.

In recent decades, the situation has improved, blacks are now not only more often represented in the broadcasting media, newspapers, and direct marketing (Ellithorpe, Hennessy, and Bleakley 2019; James and Lindsey-Warren 2019), but are also represented in more important and central roles (Stevenson and Swayne 2011).

Other ethnic minorities continue to suffer from massive underrepresentation. Hispanics, for example, appeared in only six percent of commercials, and typically occupy only background roles (Coffey 2014). Only two studies have looked at mixed-race representation, and concluded that most portrayals are stereotypical, simplistic, and disregard the complex sociocultural context (Harrison et al. 2017; Taylor and Stem 1997).

The situation for other minorities such as LGBTQ+, people with a disability, or religious minorities is even worse. Specifically, in our dataset, eight papers (9.41%) focused on the LGBTQ+ minority. All these papers study gay or lesbian while the other subgroups such as transgender and bisexual are disregarded. Only one paper represents people with a disability (Burnett and Paul

1996). In this paper, the authors exclusively focuses on mobility-disabled individuals and looked at their media preferences.

The reasons for their underrepresentation, however, may be different for different groups. For what concerns homosexuals, most advertisers may be resistant to include them because they are afraid of possible backlash and tend to opt for ambiguous appeals to avoid alienating mainstream consumers (Oakenfull and Greenlee 2004). The same reasoning may apply to people with a disability as they still constitute a very stigmatized minority.

Regarding gender minorities, specifically the representation of women, for a long time they were portrayed in traditional roles (Courtney and Lockeretz 1971) as having less capacity than men (Grau and Zotos 2016). However, findings published in the last two decades suggest that this perception has shifted in line with a shift in cultural norms. Grau and Zotos (2016) report that the advertising narrative shifted from considering women as caregivers and housewives to representing them in more central roles. A longitudinal study of Superbowl commercials from 1990 to 2009 (Hatzithomas, Boutsouki, and Ziamou 2016) found 447 commercials that included women, and in 215 of these ads women featured in stereotypical female roles. The percentage of advertisements in which women were depicted in non-traditional roles, however, increased from 16.1% in 1990 to 28.9% in 2009.

How consumption habits impact minorities' identity and wellbeing

Most of the literature on minorities in advertising has investigated minorities' consumption of media, only a few studies looked at minorities' consumption of products and services. Television consumption is the highest among American audiences of black people and Hispanics (James and Lindsey-Warren 2017).

Findings concerning the impact of identification on wellbeing are mixed. If minorities are depicted stereotypically, higher exposure leads to greater tolerance of stereotypical representation (Mikkonen 2010), causing some of these stereotypes to be incorporated in the construction of group identities. Since most of the stereotypical representations of minorities are linked to victimization, exposure to advertising with stereotypes reduces these group's self-esteem. This has been documented for women, ethnic minorities, and homosexuals. Compare to the general population of African-America adults, these effects were more pronounced among adolescents (Ellithorpe, Hennessy, and Bleakley 2019) and children (Maher et al. 2008). In contrast, the positive representation of minorities can decrease marginalization of minorities, enhance their status, and foster their inclusion (Tsai 2011).

Not much attention has been devoted to how the consumption of products and services influences minorities' wellbeing. Out of the eighty-five papers reviewed, only two investigated the impact of consumption on minorities' wellbeing. Bone, Christensen, and Williams (2014) found that experiencing limited systemic financial services significantly decreased self-esteem for ethnic minorities. Minorities tended to react to the restriction by framing their identities as striving in a world of limited resources. The presence of restrictions and their inability to fulfill their needs increases their sense of helplessness, thus decreasing their self-esteem. Crockett (2017) studied stigma management in contemporary black middle-class consumers. The author suggests that minorities react to stigma by consuming and displaying status-oriented products, strongly linked to the group's ethnic identity. Among those products there are for examples blackness-themed art pieces (e.g. statues or paintings).In this case, consumption creates a different narrative. Goods that are representative of a specific group identity represent a source of legitimation for the group. Minorities consume and display these goods as a coping strategy to reduce stigmatization and increase their wellbeing. The difference in these findings might be explained by the economic backgrounds of the two groups, suggesting that one important aspect that might be interesting for future research is the investigation of consumption patterns within the same ethnic groups.

Future research directions

In conclusion, literature that documented the representation of minorities in the media reflects the attention and exposure that each minority has on the public-opinion agenda. Most of the studies focused on representing black people and documented an increase in their presence in different media. The same positive trend was also observed concerning women, who were represented in a more empowering perspective. Less research has been devoted to studying the representation of other minorities such as Asians, Hispanics, LGBTQ+, and people with a disability.

Future research may investigate which factors influence the representation of minorities in advertising by looking at the most influential decision-makers in the arena (e.g., government, public opinion, activists, firms). Furthermore, an investigation of the factors that limit the representation of specific minority groups is essential.

A smaller proportion of the advertising literature has studied how consumption habits influenced minorities' identification and wellbeing by devoting most of their attention to media usage. Scholars assumed the strong influence of advertising on groups' identification and wellbeing while disregarding factors that might influence the message's persuasiveness. Also, significant attention was devoted to looking at ethnic minorities and women, while less attention was paid to the LGBTQ+ minority and individuals with a disability (Burnett and Paul 1996). Therefore, scholars need to devote their attention to studying consumption practices and media usage of these specific groups.

MINORITIES IN ADVERTISEMENT: AN OVERLOOKED MARKETING OPPORTUNITY

Regarding minorities in advertising, the advertising literature has provided insights into how to create effective marketing strategies that target minorities, and that use minorities as effective sources of persuasion. In this section, I summarize these findings and provide suggestions for future research.

Marketing strategies to target minorities

Consumers attribute meaning to consumption practices (McCracken 1986). Minority groups, for example, use consumption practices to define their group's identity. Investigating ethnic groups' usage of products in the context of stigmatization, Crockett (2017) found that minorities chose products that represent their subculture.

Apart from consumption, also advertisements can be identity relevant, which is leveraged by marketers to target minorities. Marketing scholars have focused on three drivers of identification with advertisements: individual-specific, ad-specific factors and the composition of the external environment.

Individual specific factors were explored when looking at the effectiveness of marketing strategies that target ethnic minorities. Early work in this area identified ethnic surnames (e.g, Spanish surnames; Mirowsky and Ross 1980), country of origin (Gurak and Fitzpatrick 1982; Massey 1981), paternal ancestry (Alba and Moore 1982), and Spanish spoken at home (Massey and Mullan 1984) as drivers of identification with advertisements. Deshpande, Hoyer, and Donthu (1986) suggested that the degree of ethnic identification also depends on each members' ability to identify with their subculture. This kind of association produces a stable and lasting sensitivity to identity-related information (Reed 2004).

Advertisement specific factors that activate group identity and are under the control of companies are: ethnic primes, linguistic cues, and the inclusion of beliefs and values representative

of the targeted minority culture. The presence of ethnic primes, linguistic cues and representative values and beliefs trigger identification as they facilitate social categorization making category membership more relevant to the self. Most studies investigating these ad specific factors looked at ethnic minorities, linguistic minorities, and homosexuals.

Ethnic primes have been shown to increase consumers' identification with the ads, induce trust, and to enhance their attitudes toward the ad and the brand, and (Aaker et al. 1998; Appiah 2001; Deshpande and Stayman 1994; Forehand, and Deshpandé 2001; Grier and Brumbaugh 2006). Ethnic priming can consist of a spokes person from that ethnicity (Forehand and Deshpandé 2001) or race-specific cues in the ads (Appiah 2001). The effectiveness of ethnic priming depends on ethnic "ethnic embeddedness" (Williams 1995) or the prime's coherence with the cultural heritage and values of the targeted ethnicity.

Like ethnic primes, linguistic cues can increase consumers' identification with the ads. For example, the accent of radio communicators or advertising spokes persons has been shown to positively affect attitudes towards the ads for ethnic and linguistic minorities (Ivanic, Bates, and Somasundaram 2014; Puzakova and Bell 2015). However, if the accent is perceived as a stereotypical representation of the ethnic minority, attitudes decreases (Ivanic, Bates, and Somasundaram 2014). The literature also looked at how multiple linguistic cues can affect the activation of different identities. Specifically, Luna and Peracchio (2005) looked at code-switching slogans or the practice of mixing two different languages in a sentence. For example, a slogan containing an English sentence with some Spanish word in it, would be considered a code-switching slogan. Findings suggest that code-switching results in higher persuasiveness, with greater persuasion when switching from minority-language to majority language.

A third strategy that companies can use to increase identification with the ad is the inclusion of values and beliefs that are representative of the targeted minority. This practice is especially common in advertising targeting homosexuals and cultural minorities. In contrast to linguistic cues

and ethnic priming which are salient and are recognized by targeted as well as non-targeted consumer segments, values and beliefs are accessible by the targeted minorities but may not be so for non-targets groups (Kates 1999; Yoo and Lee 2016). It is common practice in advertising to use messages that can generate multiple meanings across a heterogeneous audience. This strategy is defined as purposeful polysemy (Puntoni, Vanhamme, and Visscher 2011). Specifically, in their studies that looked at advertisements with gay couples Puntoni, Vanhamme, and Visscher (2011) found that two men standing next to each other were considered as a couple by the gay respondents, while heterosexual consumers considered them to be friends. This is an example of how two distinct targets could perceive the message of the ad differently. Adopting this strategy has two main goals: protect the brand/products from possible backlash due to negative evaluations of non-targeted groups and avoid the minority's refusal to adopt the product because they are afraid of discrimination. However, in their study, the authors found that both target and non-target segments react negatively to these types of ads. Therefore, ambiguous messages are not effective.

Lastly, even when advertisements are targeted to minorities, the effectiveness of the strategies can be influenced by the composition of an external environment, in particular, by the numerical prevalence of minority members in the environment.

Specifically, the numerical prevalence of minority members determines the distinctiveness of the traits associated with the specific minority. More rare traits are associated with higher distinctiveness. For example, skin color will be perceived as a more distinctive trait for a black person when the majority of the population is white. The higher is the degree of distinctiveness, the stronger is the identification with the ad (McGuire 1984; McGuire et al. 1978). In this sense, advertisement targeted to ethnic groups is more effective when the target group is a numeric minority (McGuire 1984).

In contrast to this perspective, Grier and Deshpandé (2001), suggested that when the sociocultural status is salient, targeted advertisement is effective even in contexts in which the

target groups are a numeric majority. In their study, the authors investigated the impact of using an ethnic spokesperson in the ad on the attitudes of black people. Ethnic groups were identified based on their sociocultural status and on the basis of their numerical prevalence. Specifically, the study compared the responses between different populations of black people in South Africa. While numerical prevalence influenced the responses to the ad, results suggested that the positive effect of ethnic spokesperson persisted even among black South Africans even if they were a numeric majority on a national level.

So far, we discussed how marketing strategies can activate group identities and positively affect consumers' responses. Minorities, however, also have an enhanced sensitivity to social categorization and are vulnerable to identity threats (Steele and Aronson 1995). Social identity concerns can lower self-esteem (Klandermans 1997; Moscovici and Paicheler 1978), making minority groups a particularly vulnerable segment. For example, some minority groups are often evaluated negatively (Cuddy, Fiske, and Glick 2007; Wheeler, Jarvis, and Petty 2001). Black people are perceived to be dangerous (Lemons 1997), women are weak (Cuddy, Fiske, and Glick 2007), and people with a disability are perceived incompetent (Cuddy, Fiske, and Glick 2007). We also know that those groups are often stigmatized (Heslin, Bell, and Fletcher 2012). In this sense, when marketing strategies target these groups, the stigma associated with their minority status is more salient, thus threatening their self-identity.

For example, Lee, Kim, and Vohs (2011) tested the impact of stereotypical ads on women's purchase intentions when the provider belonged to an outgroup (men) vs. an ingroup (women). Specifically, the exposure to math cues in an ad promoting financial services activated the women's perception to be the subject of a negative stereotype (women are less good at math). As a result, women were more willing to purchase from a woman financial advisor than men.

This is because the minority experienced higher transaction anxiety associated with the interaction with an outgroup than an ingroup provider. Other scholars identified ways to reduce

stereotype threat by changing, for example, the labeling (Aronson, Quinn, and Spencer 1998; Spencer et al. 1999). Lee, Kim, and Vohs (2011) suggested that a sensory cue (e.g., vanilla scent) attenuates consumers' anxiety in a marketing context.

Minorities as sources of persuasion:

Identity theory was particularly influential on research on the effectiveness of minorities as persuasive sources. The general hypothesis is that the extent to which source and target match, the more persuasive is the source. This has been shown for ethnic minorities (e.g., Aaker, Brumbaugh, and Grier 2000; Deshpandé and Stayman 1994; Grier and Brumbaugh 1999; Grier and Deshpandé 2001; Whittler 1991, 1989; Whittler and Di Meo 1991; Williams and Qualls 1989; Williams, Qualls, and Grier 1995) and homosexuals (Chng and Moore 1991; Goldberg 1982; Morin 1974).

In support of the matching hypothesis, minority sources have also been shown to have little or even negative effects on a majority audience. For example, findings concerning the use of homosexual imagery found negative effect on heterosexual consumers (Eisend and Hermann 2019). A similar pattern of results was found for ethnic minority spokespeople, they had little persuasive appeal for white consumers (Grier and Brumbaugh 1999; Ouellet 2007).

Future research directions:

Finding concerning the limited persuasiveness on the ethnic minority on a more general target seems to be outdated. Specifically, there are many examples in the advertising industry that contradicts the match-up hypothesis. Nike’s inclusion of Colin Kaepernick is a very prominent example of how including members of minority can have a persuasive effect also on a broad general audience. Specifically, the literature overlooked one crucial aspect: the inclusion of a minority signals promotion of inclusivity. While members from the majority group might find it difficult to identify themselves with the minority, they might identify with the positive value of inclusiveness. So far, the field of advertising did not consider this perspective.

CONCLUSION

The present literature review has three main goals: looking at the minority groups represented in the literature, summarizing empirical evidence concerning the representation of minority groups in the media, and explaining how the literature in advertising contributed to enhancing marketing strategies that included minorities. To achieve these goals, I first investigated the current definitions of minorities in the social psychology literature; This section aimed to understand what the definitions of minority groups are. According to our analysis, the number of top journal articles in advertising who studies minorities is deficient (85 articles among the top seven journals in advertising). This number is quite surprising if we consider how much the study of minority groups is beneficial to the investigation of inclusivity, a relevant topic to advertising. Most of the literature looked at the consumption practices of minorities and their role in reinforcing the minority group identities or helping them cope with identity threat. The most represented group is the ethnic minority. The most prevalent ethnic group is black, and the second group is Hispanic, followed by Asian and other ethnic groups. The number of articles concerning women is low. This might also be due to our selection criteria, as we considered only those articles that referred to women as a minority group. The number of journal articles related to people with a disability and homosexuals is meager, especially if we consider that these groups are relevant and profitable segments for companies.

Therefore, scholars in marketing need to expand their research concerning both people with a disability and homosexuals. A similar pattern of results is also replicated in the media industry. While, not surprisingly, minorities are underrepresented, black people are the most prevalent minority in the media, followed by Hispanics. Also, while studies about representation in the media of ethnic minorities are prevalent, those who looked at the representation of homosexuals and people with a disability are scarce. The reason for this lack of representation might be different. For what concerns homosexuals, most advertisers might be resistant to include them because they are afraid of possible backlash and tend to opt for ambiguous appeals to avoid alienating mainstream

consumers (Oakenfull and Greenlee 2004). The same might apply to people with a disability as we know they are a stigmatized minority. In conclusion, from the review of the advertising literature that looked at marketing strategies that included minorities, emerged a strong influence of identity theory. In particular, the literature focused on those factors that influenced group identification. However, it is essential to note that most of the minority' when processing the advertising, often compare themself with majority groups. Future research directions should consider how, for example, targeting strategies directed towards minority and majority groups will influence the behavior of the minorities. Also, previous literature in marketing focused mostly on the persuasive power of minority groups when the target population matches the source ethnicity. Future research should investigate the persuasive power of minorities to a broader audience.

REFERENCE

Aaker, Jennifer L., Anne M. Brumbaugh, and Sonya A. Grier (2000), "Nontarget markets and viewer distinctiveness: The impact of target marketing on advertising attitudes," *Journal of Consumer Psychology,* 9 (3), 127-40.

Abrams, Dominic, Joanne Thomas, and Michael A. Hogg (1990), "Numerical distinctiveness, social identity and gender salience," *British Journal of Social Psychology,* 29 (1), 87-92.

Alba, Richard D., and Gwen Moore (1982), "Ethnicity in the American elite," *American Sociological Review,* 47 (3), 373-83.

Allport, Gordon Willard, Kenneth Clark, and Thomas Pettigrew (1954), "*The nature of prejudice*," MA: Addison-Wesley.

Appiah, Osei (2001), "Ethnic identification on adolescents' evaluations of advertisements," *Journal of Advertising Research,* 41 (5), 7-22.

Aronson, Joshua, Diane M. Quinn, and Steven J. Spencer (1998),"Stereotype threat and the academic underperformance of minorities and women," In *Prejudice,* Academic Press, 83-103.

Baker, C. Edwin (2004), "Media structure, ownership policy, and the First Amendment," *Sothern California Law Review,* (78), 733.

Bone, Sterling A., Glenn L. Christensen, and Jerome D. Williams (2014),"Rejected, shackled, and alone: The impact of systemic restricted choice on minority consumers' construction of self," *Journal of Consumer Research,* 41 (2), 451-74.

Brewer, Marilynn B. (1991),"The social self: On being the same and different at the same time," *Personality and Social Psychology Bulletin,* 17 (5), 475-82.

Brown, Steven (2002), "What is disability culture?," *Disability Studies Quarterly,* 22 (2), 34-50.

Burnett, John J., and Pallab Paul (1996), "Assessing the media habits and needs of the mobility-disabled consumer," *Journal of Advertising*, 25 (3), 47-59.

Chng, Chwee Lye, and Alan Moore (1991), "Can attitudes of college students towards AIDS and homosexuality be changed in six weeks? The effects of a gay panel," *Health Values: Health Behavior, Education & Promotion*, *15* (2), 41–9.

Coffey, Amy Jo (2014), "The Power of Cultural Factors In Spanish-Language Advertising: Ethnic-Group Traits and Metrics May Predict Advertiser Investment across Media Platforms," *Journal of Advertising Research*, 54 (3), 346-55.

Courtney, Alice E., and Sarah Wernick Lockeretz (1971), "A woman's place: An analysis of the roles portrayed by women in magazine advertisements," *Journal of Marketing Research*, 8 (1), 92-5.

Crockett, David (2017), "Paths to respectability: Consumption and stigma management in the contemporary black middle class." *Journal of Consumer Research*, 44 (3), 554-81.

Cuddy, Amy JC, Susan T. Fiske, and Peter Glick (2007), "The BIAS map: behaviors from intergroup affect and stereotypes," *Journal of Personality and Social Psychology*, 92 (4) 631-48.

Deshpande, Rohit, Wayne D. Hoyer, and Naveen Donthu (1986), "The intensity of ethnic affiliation: A study of the sociology of Hispanic consumption," *Journal of Consumer Research* 13 (2), 214-20.

Deshpandé, Rohit, and Douglas M. Stayman (1994), "A tale of two cities: Distinctiveness theory and advertising effectiveness," *Journal of Marketing Research*, 31 (1), 57-64.

Ditto, Peter H., and John B. Jemmott (1989), "From rarity to evaluative extremity: Effects of prevalence information on evaluations of positive and negative characteristics," *Journal of Personality and Social Psychology*, 57 (1), 16-26.

Eisend, Martin, and Erik Hermann (2019), "Consumer Responses to Homosexual Imagery in Advertising: A Meta-Analysis," *Journal of Advertising*, 48 (4), 380-400.

Feeley, Malcolm M., and Jonathan Simon (1992), "The new penology: Notes on the emerging strategy of corrections and its implications," *Criminology,* 30 (4), 449-74.

Fiske, Susan T. (1993), "Controlling other people: The impact of power on stereotyping," *American Psychologist,* 48 (6), 621-28.

Fiske, Susan T. (1998), "Stereotyping, prejudice, and discrimination," *The Handbook of Social Psychology*, 2 (4), 357-411.

Fiske, Susan T., and Steven L. Neuberg (1990),"A continuum of impression formation, from category-based to individuating processes: Influences of information and motivation on attention and interpretation," In *Advances in Experimental Social Psychology*, Academic Press, 23, pp. 1-74.

Forehand, Mark R., and Rohit Deshpandé (2001),"What we see makes us who we are: Priming ethnic self-awareness and advertising response," *Journal of Marketing Research,* 38 (3), 336-48.

Gerard, Harold B., and Michael F. Hoyt (1974), "Distinctiveness of social categorization and attitude toward ingroup members," *Journal of Personality and Social Psychology*, 29 (6), 836-42.

Gulas, Charles S., Kim K. McKeage, and Marc G. Weinberger (2010), "It's just a joke," *Journal of Advertising,* 39 (4), 109-20.

Gurak, Douglas T., and Joseph P. Fitzpatrick (1982), "Intermarriage among Hispanic ethnic groups in New York City," *American Journal of Sociology*, 87 (4), 921-34.

Grau, Stacy Landreth, and Yorgos C. Zotos (2016), "Gender stereotypes in advertising: a review of current research," *International Journal of Advertising*, 35 (5), 761-70.

Grier, Sonya A., Anne M. Brumbaugh, and Corliss G. Thornton (2006), "Crossover dreams: Consumer responses to ethnic-oriented products," *Journal of Marketing,* 70 (2), 35-51.

Grier, Sonya A., and Rohit Deshpandé (2001), "Social dimensions of consumer distinctiveness: The influence of social status on group identity and advertising persuasion," *Journal of Marketing Research*, 38 (2), 216-24.

Harrison, Robert L., Kevin D. Thomas, and Samantha NN Cross (2017), "Restricted visions of multiracial identity in advertising," *Journal of Advertising*, 46 (4), 503-20.

Hatzithomas, Leonidas, Christina Boutsouki, and Paschalina Ziamou (2016),"A longitudinal analysis of the changing roles of gender in advertising: A content analysis of Super Bowl commercials," *International Journal of Advertising*, 35 (5), 888-906.

Heslin, Peter A., Myrtle P. Bell, and Pinar O. Fletcher (2012), "The devil without and within: A conceptual model of social cognitive processes whereby discrimination leads stigmatized minorities to become discouraged workers," *Journal of Organizational Behavior*, 33 (6), 840-62.

Humphrey, Ronald, and Howard Schuman (1984), "The portrayal of Blacks in magazine advertisements: 1950–1982," *Public Opinion Quarterly*, 48 (3), 551-63.

Ivanič, Aarti S., Kenneth Bates, and T. Somasundaram (2014), "The role of the accent in radio advertisements to ethnic audiences: does emphasizing ethnic stereotypes affect spokesperson credibility and purchase intention?," *Journal of Advertising Research*, 54 (4), 407-19.

James, J. P., and Tyrha M. Lindsey-Warren (2019), "An Examination of Television Consumption By Racial and Ethnic Audiences in the US: Implications for Multicultural Media Planning And Media Measurement," *Journal of Advertising Research*, 59 (1), 40-52.

Kates, Steven M. (1999), "Making the ad perfectly queer: Marketing “normality” to the gay men's community?," *Journal of Advertising*, 28(1), 25-37.

Klandermans, Pieter Gijsbertus (1997), "*The social psychology of protest*," Oxford: Blackwell.

Lee, Kyoungmi, Hakkyun Kim, and Kathleen D. Vohs (2011), "Stereotype threat in the marketplace: Consumer anxiety and purchase intentions," *Journal of Consumer Research,* 38 (2), 343-57.

Lemons, Gary L. (1997), "To be black, male, and “feminist” making womanist space for black men," *International Journal of Sociology and Social Policy,* 17 (1), 35-61.

Leyens, Jacques-Philippe, Vincent Yzerbyt, and Georges Schadron, (1994), *Stereotypes and Social Cognition*, London: Sage Publications Inc.

Lorenzi-Cioldi, Fabio (1998), "Group status and perceptions of homogeneity," *European Review of Social Psychology,* 9 (1), 31-75.

Luna, David, and Laura A. Peracchio (2005), "Advertising to bilingual consumers: The impact of code-switching on persuasion," *Journal of Consumer Research,* 31 (4), 760-765.

Macrae, C. Neil, and Galen V. Bodenhausen (2000), "Social cognition: Thinking categorically about others," *Annual Review of Psychology*, 51 (1), 93-120.

Maher, Jill K., Kenneth C. Herbst, Nancy M. Childs, and Seth Finn (2008), "Racial stereotypes in children's television commercials," *Journal of Advertising Research,* 48 (1), 80-93.

Massey, Douglas S. (1993), "Latinos, poverty, and the underclass: A new agenda for research," *Hispanic Journal of Behavioral Sciences,* 15 (4), 449-75.

Massey, Douglas S., and Brendan P. Mullan (1984), "Processes of Hispanic and black spatial assimilation," *American Journal of Sociology,* 89 (4), 836-73.

McCracken, Grant (1986), "Culture and consumption: A theoretical account of the structure and movement of the cultural meaning of consumer goods," *Journal of Consumer Research,* 13 (1), 71-84.

McCracken, Grant (1989),"Who is the celebrity endorser? Cultural foundations of the endorsement process," *Journal of Consumer Research,* 16 (3), 310-21.

McGuire, William J., and Claire V. McGuire (1988), "Content and process in the experience of self," In Advances in Experimental Social Psychology, Academic Press Inc, 97-144.

McGuire, William J., Claire V. McGuire, Pamela Child, and Terry Fujioka (1978), "Salience of ethnicity in the spontaneous self-concept as a function of one's ethnic distinctiveness in the social environment," *Journal of Personality and Social Psychology*, 36 (5), 511-20.

Mikkonen, Ilona (2010), "Negotiating subcultural authenticity through interpretation of mainstream advertising," *International Journal of Advertising*, 29 (2), 303-26.

Mirowsky, John, and Catherine E. Ross (1980), "Minority status, ethnic culture, and distress: A comparison of Blacks, Whites, Mexicans, and Mexican Americans," *American Journal of Sociology*, 86 (3), 479-95.

Moisander, Johanna, and Anu Valtonen (2006), *Qualitative marketing research: A cultural approach*, London: Sage.

Morin, Stephen F. (1977), "Heterosexual bias in psychological research on lesbianism and male homosexuality," *American Psychologist*, 32 (8) 629-37.

Moscovici, Serge, and Geneviève Paicheler (1978),"Social comparison and social recognition: Two complementary processes of identification," *Differentiation Between Social Groups*, 251-66.

Mulhern, Francis J., and Jerome D. Williams (1994), "A comparative analysis of shopping behavior in Hispanic and non-Hispanic market areas," *Journal of Retailing*, 70 (3), 231-51.

Mullen, Brian (1991),"Group composition, salience, and cognitive representations: The phenomenology of being in a group," *Journal of Experimental Social Psycholog*, 27 (49), 297-323.

Mummendey, Amélie, Bernd Simon, Carsten Dietze, Melanie Grünert, Gabi Haeger, Sabine Kessler, Stephan Lettgen, and Stefanie Schäferhoff (1992), "Categorization is not enough: Intergroup discrimination in negative outcome allocation," *Journal of Experimental Social Psychology*, 28 (2), 125-44.

Oakenfull, Gillian, and Timothy Greenlee (2004), "The three rules of crossing over from gay media to mainstream media advertising: Lesbians, lesbians, lesbians," *Journal of Business Research*, 57 (11), 1276-285.

Oakes, Jeannie (1987), "Tracking in secondary schools: A contextual perspective," *Educational Psychologist*, 22 (2), 129-53.

Oakes, Penelope, and John C. Turner (1986), "Distinctiveness and the salience of social category memberships: Is there an automatic perceptual bias towards novelty?," *European Journal of Social Psychology*,16 (4), 325-44.

Ouellet, Jean-François (2007), "Consumer racism and its effects on domestic cross-ethnic product purchase: An empirical test in the United States, Canada, and France," *Journal of Marketing*, 71 (1), 113-28.

Puntoni, Stefano, Steven Sweldens, and Nader T. Tavassoli (2011),"Gender identity salience and perceived vulnerability to breast cancer," *Journal of Marketing Research*, 48 (3), 413-24.

Puntoni, Stefano, Joelle Vanhamme, and Ruben Visscher (2011), "Two birds and one stone," *Journal of Advertising*, 40 (1), 25-42.

Puzakova, Marina, Hyokjin Kwak, and Monique Bell (2015), "Beyond seeing McDonald's fiesta menu: The role of accent in brand sincerity of ethnic products and brands," *Journal of Advertising*, 44 (3), 219-31.

Reed, Americus (2004), "Activating the self-importance of consumer selves: Exploring identity salience effects on judgments," *Journal of Consumer Research*, 31 (2), 286-295.

Sachdev, Itesh, and Richard Y. Bourhis (1984), "Minimal majorities and minorities," *European Journal of Social Psychology*, 14 (1), 35-52.

Simon, Bernd (1992), "The perception of ingroup and outgroup homogeneity: Reintroducing the intergroup context," *European Review of Social Psychology*, 3 (1),1-30.

Simon, Bernd, Brigitta Glässner-Bayerl, and Ina Stratenwerth (1991), "Stereotyping and self-stereotyping in a natural intergroup context: The case of heterosexual and homosexual men," *Social Psychology Quarterly*, 252-66.

Simon, Bernd, and David L. Hamilton (1994), "Self-stereotyping and social context: The effects of relative in-group size and in-group status," *Journal of Personality and Social Psychology*, 66 (4), 699-711.

Simon, Bernd, Claudia Hastedt, and Birgit Aufderheide (1997), "When self-categorization makes sense: The role of meaningful social categorization in minority and majority members' self-perception," *Journal of Personality and Social Psychology*, 73 (2), 310-20.

Solomon, Paul J., Ronald F. Bush, and Joseph F. Hair Jr. (1976),"White and black consumer sales response to black models," *Journal of Marketing Research*, 13 (4), 431-34.

Spencer, Steven J., Claude M. Steele, and Diane M. Quinn (1999), "Stereotype threat and women's math performance," *Journal of Experimental Social Psychology*, 35 (1), 4-28.

Stayman, Douglas M., and Rohit Deshpande (1989),"Situational ethnicity and consumer behavior," *Journal of Consumer Research*, 16 (3), 361-71.

Steele, Claude M., and Joshua Aronson (1995), "Stereotype threat and the intellectual test performance of African Americans," *Journal of Personality and Social Psychology*, 69 (5), 797-811.

Stevenson, Thomas H., and Linda E. Swayne (2011), "Is the changing status of African Americans in the B2B buying center reflected in trade journal advertising?," *Journal of Advertising*, 40 (4), 101-22.

Taylor, Charles R., and Barbara B. Stern (1997), "Asian-Americans: Television advertising and the "model minority" stereotype," *Journal of Advertising*, 26 (2), 47-61.

Tajfel, Henri (1969), "Cognitive aspects of prejudice," *Journal of Biosocial Science*, 1 (1), 173-91.

Tajfel, Henri (1978), *Differentiation between social groups: Studies in the social psychology of intergroup relations*, London: Academic Press.

Tajfel, Henri, Michael G. Billig, Robert P. Bundy, and Claude Flament (1971), "Social categorization and intergroup behaviour," *European Journal of Social Psychology*, 1 (2), 149-78.

Tajfel, Henri, John C. Turner, William G. Austin, and Stephen Worchel (1979), "An integrative theory of intergroup conflict," In *Organizational Identity: A reader*, Oxford University Press, 56-65.

Taylor, Charles R., Ju Yung Lee, and Barbara B. Stern (1995), "Portrayals of African, Hispanic, and Asian Americans in magazine advertising," *American Behavioral Scientist*, 38 (4), 608-21.

Torelli, Carlos J., Rohini Ahluwalia, Shirley YY Cheng, Nicholas J. Olson, and Jennifer L. Stoner. (2017),"Redefining home: How cultural distinctiveness affects the malleability of in-group boundaries and brand preferences," *Journal of Consumer Research*, 44 (1), 44-61.

Tsai, Wan-Hsiu Sunny (2011), "How minority consumers use targeted advertising as pathways to self-empowerment," *Journal of Advertising*, 40 (3), 85-98.

Turner, John C., Michael A. Hogg, Penelope J. Oakes, Stephen D. Reicher, and Margaret S. Wetherell (1987), "*Rediscovering the social group: A self-categorization theory*," Basil Blackwell.

Wheeler, S. Christian, W. Blair G. Jarvis, and Richard E. Petty (2001),"Think unto others: The self-destructive impact of negative racial stereotypes," *Journal of Experimental Social Psychology*, 37 (2), 173-80.

Webster, Cynthia (1996), "Hispanic and Anglo interviewer and respondent ethnicity and gender: The impact on survey response quality," *Journal of Marketing Research*, 33 (1), 62-72.

Wilkes, Robert E., and Humberto Valencia (1989), "Hispanics and Blacks in television commercials," *Journal of Advertising*, 18 (1), 19-25.

Williams, David R., and Chiquita Collins (1995), "US socioeconomic and racial differences in health: patterns and explanations," *Annual Review of Sociology*, 21, 349-86.

Williams, Jerome D., and William J. Qualls (1989), "Middle-class black consumers and intensity of ethnic identification," *Psychology & Marketing*, 6 (4), 263-86.

Williams, J. D., W. J. Qualls, and S. Grier (1995),"Racially exclusive real estate advertising: Public exclusive real estate advertising: Public policy implication for fair housing practices," *Journal of Public Policy & Marketing*, 14, 224-44.

Whittler, Tommy E. (1991), "The effects of actors' race in commercial advertising: Review and extension," *Journal of Advertising*, 20 (1), 54-60.

Whittler, Tommy E. (1989), "Viewers' processing of actor's race and message claims in advertising stimuli," *Psychology & Marketing*, 6 (4), 287-309.

Whittler, Tommy E., and Joan DiMeo (1991),"Viewers' reactions to racial cues in advertising stimuli," *Journal of Advertising Research, 31* (6), 37–46.

Yoo, Jinnie Jinyoung, and Wei-Na Lee (2016),"Calling it out: The impact of national identity on consumer response to ads with a patriotic theme," *Journal of Advertising*, 45 (2), 244-55.

Zinkhan, George M., William J. Quails, and Abhijit Biswas (1990), "The use of blacks in magazine and television advertising: 1946 to 1986," *Journalism Quarterly*, 67 (3), 547-553.

3. THE DISABILITY PREMIUM:

CONSUMERS REWARD BRANDS FOR ENDORSING INCLUSIVITY

Diesel's 2014 "Reboot" advertising campaign featured fashion model Jillian Mercado, and Nike's 2018 "Just do it" campaign included American football player *Shaquem Griffin. These ads were unremarkable in every way, except for one: Mercado and Griffin have physical disabilities. Mercado, who has muscular dystrophy, appears in a wheelchair in the Diesel ads. Griffin's hand, which was amputated in childhood due to a congenital disorder, is conspicuously absent in the Nike ad.*

According to theories of persuasion, neither Mercado nor Griffin should be an effective advertising endorser. The elaboration likelihood model (Petty and Cacioppo 1986), source attractiveness model (McGuire 1985), and social adaptation model (Kahle and Homer 1985) all recommend spokespeople and endorsers to be attractive, popular, and flawless (Kang and Herr 2006; Solomon et al. 1992). People with a disability, in contrast, are the subject of negative stereotypes and social stigmata. Hence, a brand endorser with a disability may transfer those negative associations onto the brand, thereby harming the brand's image, so the theories go. Diesel and Nike defied these assumptions and included members of one of the most stigmatized minorities — people with a disability — in their ads. Are these ads effective, and if so, what psychological process underlies their effectiveness?

Much prior research has examined the impact of minority endorsers on ad and brand attitudes (Aaker, Brumbaugh, and Grier 2000; Deshpandé and Stayman 1994; Forehand, Deshpandé, and Reed 2002; Grier and Brumbaugh 1999; Grier and Deshpandé 2001; Solomon, Bush, and Hair 1976; Wooten 1995), but that research has focused on targeting minority consumers. In this paper, we investigate the effectiveness of a specific minority (i.e., people with a disability) in targeting majority consumers. Adopting the perspective of identity theory (McCracken 1986, 1989; see also Reed et al. 2012), we hypothesize that when brands express a positive social

value, consumers who identify with that value will develop more positive attitudes toward the ad and the brand. In the case of a brand endorser with a disability, consumers who hold or aspire to the value of inclusivity will reward the brand for expressing that social value. We thus demonstrate what we call a *disability premium* in advertising: Models with a disability enhance attitudes toward the ad and the brand and positively affect consumer choice. We show that the disability premium is not driven by consumers' perception of the model, but rather by their perception of the brand. By including an advertising model with a disability, the brand conspicuously endorses social inclusivity, and consumers reward the brand for this.

THEORETICAL FRAMEWORK

Prior research on brand endorsement has focused on who endorses the brand. A vast literature of empirical studies, and several theoretical models, have examined how endorsers' traits and associations are transferred to the brand, thereby affecting the brand's image. The present research introduces the opposite approach: We focus on who the brand endorses. That is, we investigate advertising in which the brand does not seek to acquire the endorser's associations, but rather the brand signals some social value via its selection of endorser.

Who Endorses the Brand

Traditionally, advertising models and other brand endorsers have been attractive, popular, or expert, such as beautiful models, celebrities, and doctors. This enduring trend has been explained and advocated by several well-established models of persuasion, which collectively have identified three primary factors of the brand endorser that influence his or her power of persuasion: likeability, credibility, and similarity to the target. Source likeability typically depends on the endorser's attractiveness and/or familiarity, which is why beautiful models and celebrities are such ubiquitous brand endorsers. According to the elaboration likelihood model (Petty and Caccioppo 1986), for instance, physical attractiveness may act as a peripheral cue that can increase persuasiveness in low involvement contexts, such as a beautiful model advertising Budweiser (Caballero and Pride 1984).

According to social adaptation theory (Khale and Homer 1985), attractiveness can also provide diagnostic information to consumers, such as when a beautiful model advertises L'Oreal cosmetics, and hence can increase persuasion appeals also under high involvement. Similarly, an endorser's popularity can serve as either a peripheral cue or diagnostic information, such as Michael Jordan's endorsements of Coca Cola and Gatorade respectively. These examples of L'Oreal and Gatorade are particularly persuasive not only because the endorser is attractive or popular, but also because that endorser is a credible source for the given product.

The third important factor is the similarity of the source to the persuasion target. According to the "matching hypothesis," brand endorsers are persuasive to the extent that they match a consumer audience on central, identity-relevant characteristics (Aaker, Brumbaugh, and Grier 2000; Deshpandé and Stayman 1994; Grier and Brumbaugh 1999; Grier and Deshpandé 2001). The two characteristics that have been studied most are race/ethnicity (Block 1972; Cohen and Peterson 1981; Noel and Allen 1976; Qualls and Moore 1990; Solomon, Bush, and Hair 1976; Whittler 1989; Whittler and Di Meo 1991) and sexual orientation (Chng and Moore 1991; Goldberg 1982; Morin 1974). For example, the matching hypothesis states that an ethnic minority brand endorser will have persuasive appeal only if the target group belongs to the same minority. In case of a mismatch, such as an ethnic minority member advertising to the ethnic majority, negative associations are hypothesized to transfer from the endorser to the brand, hence negatively influencing consumers' reactions (Cagley and Cardozo 1970; Muse 1971).

To be clear, the matching hypothesis does not assume that similarity is all that matters for advertising effectiveness. Michael Jordan was an extremely powerful endorser for ethnic majority-targeted brands because he was very broadly liked and credible. Nonetheless, we suspect that the matching hypothesis may be outdated. In fact, we believe that in some cases minority endorsers can actually be more powerful than majority endorsers. As a case-in-point, the present studies investigate advertisements that include people with a disability.

A Stigmatized Minority: People with a Disability

A *minority* is a group with a subordinate position compared to the dominant group(s) in a society. This subordinate position typically arises from lower sociocultural status or numerical rareness of its members (Abrams, Thomas, and Hogg 1990; Moscovici 1975; Oakes 1987). Minorities are often stigmatized by significant segments of society, who hold negative attitudes and beliefs about them, such as minorities being dangerous or vulnerable (Crocker and Major 1989).

The 'Americans with Disabilities Act' (1990) defines *disability* as a physical or mental impairment that substantially limits a person's ability to perform self-care activities like bathing or eating, or life activities such as walking or reading. The impairments' nature can range from "invisible" disabilities such as heart disease or schizophrenia to visible disabilities such as paraplegia or Down's syndrome. People with a disability constitute one of the largest minorities in the world (WHO 2011). In 2016, about 12.8% of Americans had a disability (Kraus et al. 2018).

People with a disability are perceived as a vulnerable minority and are often associated with negative stereotypes (i.e., stigmata; Lee and Rodda 1994; Li and Moore 1998; Wells 2001). They are stereotyped as being interpersonally warm but incompetent (Fiske et al. 2002). Attitudes toward people with a disability tend to focus on the individual's impairment and are often based on the idea of personal tragedy (Darcy 2002). People with a disability evoke highly variable emotional reactions in others, and those reactions tend to be highly visceral (Dovidio, Major, and Crocker 2000; Goffman 1963). Indeed, Neuberg and Cottrell (2008) suggested that a disability may signal suboptimal genetic fitness, thereby reflexively triggering negative reactions. Such emotions of fear, disgust, or immediate aversion are usually experienced to a greater extent for physical disabilities than for "invisible" disabilities (Jones 1984).

People with a disability are grossly underrepresented in the media, and even worse, they tend to be portrayed negatively in Hollywood films (New York Times 2018). Although marketers have increasingly deployed advertising campaigns that are socially inclusive, those campaigns focus almost exclusively on ethnic or sexual minorities. Marketers rarely include people with a

disability as brand endorsers, and this omission may be understandable: As explained above, the vast majority of prior theorizing indicates that an endorser with a disability may harm the brand's image by transferring negative associations to the brand. As explained below, however, we hypothesized the opposite.

Who the Brand Endorses

Although the conceptual models of persuasion and advertising described above differ in details, they are all founded on the same basic assumptions: The endorser's attributes and associations (e.g., attractiveness, popularity, credibility) are transferred to the brand, and the degree of that transfer depends on the similarity of the endorser to the target. Thus, according to those conceptual models, a person with a disability would be a terrible choice to advertise a majority-targeted brand. There is little reason to believe that people with a disability are generally considered more attractive, more popular, or more credible than people without a disability. Moreover, people with a disability are saliently dissimilar from the majority of consumers without a disability. Thus, by those prior theories, an endorser with a disability should at best be ineffective at persuasion, and at worst could be detrimental to the brand's image among the majority of consumers. People with a disability could be effective endorsers of minority-targeted brands, but theoretically, under no circumstance should they endorse a majority-targeted brand.

We doubted that theoretical assumption. We instead adopted the perspective of social identity theory, which asserts that consumers appropriate the brands they consume and the models who endorse them to construct their own identities. McCracken (1986, 1989) explained how individuals (e.g., celebrities) acquire social and cultural meanings, how those meanings are transferred to associated brands, and how consumers choose those brands to reinforce or express those meanings. If the role of the endorser is to symbolize the brand's meaning, then the most effective endorser will be one who most clearly expresses that meaning, regardless of his or her attractiveness, popularity, credibility, or similarity to the target consumers. One prominent example

is Dove's "Campaign for Real Beauty," which featured a series of average-looking women as models, and which promoted a public discourse about the meaning of beauty and its role in self-identity. As the Dove example illustrates, McCracken's (1986, 1989) social identity theory of advertising provides a foundation for understanding how the endorser that a brand chooses is a signal of the brand's own identity and values.

The novel idea here is that consumers consider not who endorses the brand, but rather who the brand endorses. The brand's choice of endorser is a signal of the brand's identity, and if consumers share or admire that identity, then they will choose that brand in order to express that identity of themselves as well. Consequently, brands can benefit by advertising their own social values. Indeed, some brands have started choosing endorsers who are not admired unanimously and may even evoke strong opposition by some subgroups. For example, in addition to Shaquem Griffin, Nike's "Just Do It" campaign also featured Colin Kaepernick, the American football player who first knelt during the national anthem in support of the Black Lives Matter movement against racial inequality. Nike expressed its own social value — and a controversial one at that time — and consumers who identified with that value defended the brand on social media and supported the brand in the marketplace. Nike largely credits the Kaepernick ad for approximately $163 million in earned media exposure, a $6 billion increase in estimated brand value, and a 31% sales increase in the year following its release (CNBC 2018).

We hypothesize that consumers will similarly reward brands for including in their ads people with a disability, because such brands express a social value of inclusivity that many contemporary consumers identify with. Our hypothesis is consistent with some recent research on identity-based consumption (Forehand Deshpandé and Reed 2002; Reed et al. 2012; see also Escalas and Bettman 2017), which has followed in the tradition of McCracken (1986, 1989). Although we believe that identity-based models (e.g., Reed et al. 2012) can naturally account for positive effects of social value advertising on brand attitudes and choice, somewhat surprisingly, no prior research has directly examined the impact of such social value advertising on consumer

behaviors. People with a disability provide a strong test of this theorizing, in that the brand does not seek to transfer the endorser's traits onto its own image. By including Jillian Mercado in its ad campaign, Diesel presumably did not seek to acquire her associations. Rather, Diesel intended to express a particular social value of inclusivity, which like-minded consumers could then also endorse by choosing Diesel.

OVERVIEW OF THE STUDIES: THE DISABILITY PREMIUM

The present studies are the first to test whether and how a brand endorser with a disability affects consumers' attitudes and choices. We consistently find strong positive effects of a model with a disability on ad and brand attitudes and choices, which we refer to as a *disability premium* in advertising. In study 1, we demonstrate the disability premium in ad and brand attitudes, novelty, and purchase intentions. In addition, study 1 investigated consumers' negative and positive emotional responses to models with a disability. The results suggest that models with a disability are perceived to be part of an admirable subgroup.

Studies 2 and 3 investigated whether the disability premium is due to socially desirable responding. Socially desirable responses can arise from either of two differing processes: impression management or self-deception (Paulhus 1984). Speaking against an impression management account, participants in study 2 were more likely to choose an actual energy drink advertised by a model with a disability when choices were made in both private and public. And speaking against a self-deception explanation, no evidence for a corrective process in evaluating advertisements with models with a disability was found when respondents were under time pressure (study 3a) or cognitive load (3b). In addition, pupil dilation — an indicator of negative physiological reactions such as fear or aversion — did not differ between those evaluating advertisements with models with or without a disability (study 3c).

Having found no evidence that the disability premium is due to socially desirable responding, we tested whether consumers associate positive traits such as determination with

advertising models with a disability (i.e., "underdog effect," Paharia et al. 2011). Contrary to that theorizing, however, the disability premium persisted even when the models were perceived as being low in determination (study 4). Finally, in study 5, we presented ads that either implicitly endorsed the social value of inclusivity by employing a model with a disability, or explicitly rejected inclusivity with a slogan insinuating pity toward the model. In accordance with the disability premium being caused by the brand's endorsement of inclusivity, the disability premium disappeared when slogans evoking pity accompanied advertisements.

In all our studies testing the disability premium, we compare two versions of an ad (or of several ads), one in which the model was missing a limb (disability) and one in which the limb was Photoshopped onto the model (control), so that the two pictures were identical except for the presence or absence of the disability. Studies 2, 3a, 3b, 4, and 5 were preregistered. All experimental materials, surveys, datasets, analyses, preregistrations, and the web appendix are accessible at: https://osf.io/ry3ek/?view_only=2c2fd25df07b40849a54fca8c9dedc7e.

STUDY 1: BEHAVIORAL AND EMOTIONAL REPONSES TO DISABILITY

Study 1 explored whether the inclusion of models with a disability influences consumers' attitudes and emotions. Research on reference group influence has consistently shown that consumers have more positive attitudes toward brands associated with the groups that they admire or feel part of (i.e., in-groups) than toward other brands (Escalas and Bettman 2003, 2005). Models, celebrities, and athletes are typically part of consumers' in-groups (Escalas and Bettman 2005), while minorities and marginalized individuals are part of consumers' out-groups (Cuddy, Fiske, and Glick 2007). According to the stereotype content model (Fiske et al. 2002), dominant groups are associated with positive emotions such as admiration and envy, while subordinate groups elicit pity or fear. An advertisement with a model with a disability may hence elicit ambivalent feelings because the model can be considered either part of an in-group or of an out-group. As a person with a disability, the model may evoke pity. But as a brand endorser, the model may elicit admiration. In

order for a model with a disability to have a net positive effect on attitudes, then, the model has to evoke stronger admiration than pity. To test this hypothesized differential effect on emotions, we measured admiration and pity, and also positive and negative emotions more generally. We also explored whether models with a disability increase the ad's perceived novelty and participants' purchase intentions toward the advertised product.

Method

Participants. Two hundred one students (M = 20.7 years, SD = 1.8; 39% males) at a European university participated. The study was part of a broader set of studies conducted in the university's lab, and students were paid €5 for participating.

Stimuli. We created two versions of four ads. We sampled four pictures from online advertisements that included models with a disability. Each model was missing either an arm or a leg . We then created a control version of each image as described above. The branding in the original ads was replaced with fictitious brand names and logos. In addition, the ad included an image of a product (an energy drink, a pen, a bath gel, and a perfume; all stimulus ads can be accessed at https://osf.io/ry3ek/?view_only=2c2fd25df07b40849a54fca8c9dedc7e).

Procedure. Model-type (disability, control) was manipulated between-participants, so each participant evaluated all four disability ads or all four control ads, in random order. They viewed each ad and rated their emotional responses to the ad, their admiration and pity toward the model, attitudes toward and perception of the novelty of the ad, and intention to buy the advertised products. Participants' positive and negative emotional responses were measured using six items of the PANAS scale (positive: I feel interested; I feel attentive; I feel inspired (α = .90); negative: I feel scared; I feel upset; I feel guilty (α = .87); adapted from Watson, Clark, and Tellegen 1988), and item order was randomized within this block. Next, participants rated perceived pity (I feel sorry for the model) and admiration for the model (I admire the model), and items were counterbalanced. Finally, participants indicated their attitudes (I like the ad; I like the brand; I like

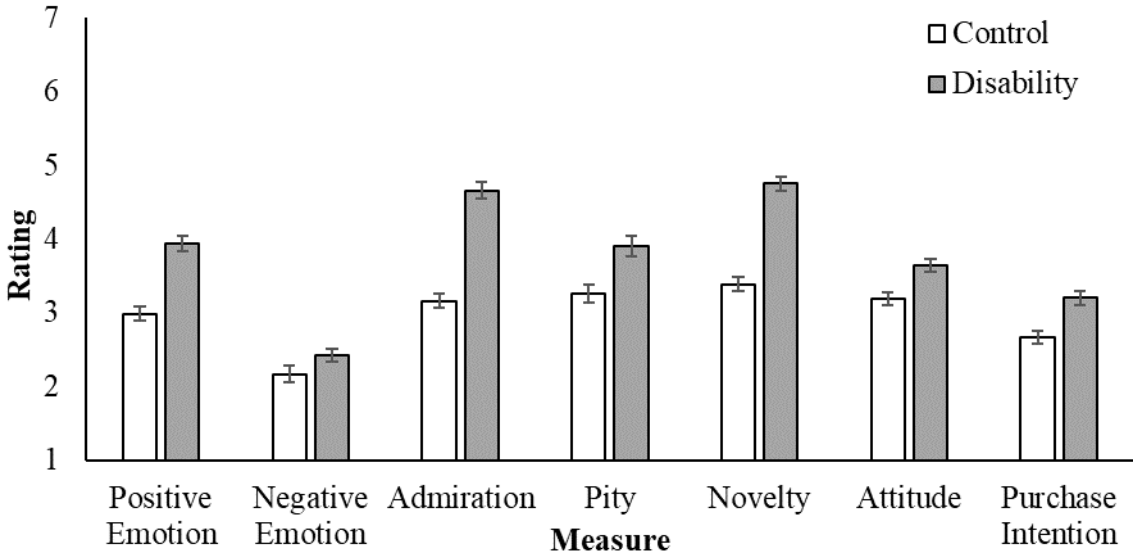
the product; I think the product is good (α = .90)), perceived novelty (the ad is novel; the ad is unusual (α = .77)), and intention to buy (I would buy this product); again items were randomized within this block. All items were measured on a scale from 1 (strongly disagree) to 7 (strongly agree). Participants indicated their age and sex at the end of the lab session.

Results and Discussion

Positive and negative emotions. We subjected the averaged positive and averaged negative emotions to a 2 (model: disability, control; between-participants) × 2 (emotion valence: positive, negative; within-participants) mixed ANOVA. A main effect of emotion valence indicated that positive emotions were experienced to a greater extent than negative emotions, $F(1, 199) = 139.52$, $p < .001$, $\eta^2 = .412$. The main effect of model showed that models with a disability evoked more emotions than control models did, $F(1, 199) = 32.76$, $p < .001$, $\eta^2 = .141$. The interaction ($F(1, 199) = 12.07$, $p < .001$, $\eta^2 = .057$) showed that models with a disability evoked more positive ($M_{positive} = 3.94$, $SD = 1.03$) than negative emotions ($M_{negative} = 2.43$, $SD = 1.02$, $t(92) = 10.31$, $p < .001$, $d = 1.07$), whereas control models did so to a lesser extent ($M_{positive} = 2.99$, $SD = 0.94$; $M_{negative} = 2.17$, $SD = 1.10$, $t(107) = 6.18$, $p < .001$, $d = 0.60$). Results are shown in figure 1.

FIGURE 1

Ratings of positive and negative emotions, pity and admiration for the model, perceived novelty of the ad, attitude toward the ad, and purchase intentions for the advertised products, study 1 (*M* ± *SE*).



Pity and admiration. A similar pattern also emerged for admiration and pity. A 2 (model: disability, control; between-participants) × 2 (specific emotion: admiration, pity; within-participants) mixed ANOVA yielded a main effect of specific emotion, $F(1, 199) = 6.44$, $p = .012$, $\eta^2 = .031$, a main effect of model, $F(1, 199) = 87.37$, $p < .001$, $\eta^2 = .305$, and their interaction, $F(1, 199) = 10.81$, $p < .001$, $\eta^2 = .052$. Models with a disability evoked more admiration ($M_{admiration} = 4.66$, $SD = 1.10$) than pity ($M_{pity} = 3.91$, $SD = 1.40$, $t(92) = 4.05$, $p < .001$, $d = 0.42$), whereas control models did not ($M_{admiration} = 3.16$, $SD = 1.07$; $M_{pity} = 3.26$, $SD = 1.31$, $t(107) = 0.54$, $p = .59$, $d = 0.05$).

Disability premium. The ads with models with a disability were judged as more novel, $F(1, 199) = 91.85$, $p < .001$, $d = 1.47$, received higher attitude ratings, $F(1, 199) = 10.22$, $p < .001$, $d = .53$, and also higher purchase intentions, $F(1, 199) = 15.00$, $p < .001$, $d = .55$.

Discussion. While models with a disability evoked more pity and negative emotions than control models, they also evoked more admiration and positive emotions, much more so than control models. The large positive effect on admiration suggests that models with a disability are

perceived more as part of an admirable subgroup in society than as a stigmatized minority. Together, the small increase in negative emotions and large increase in positive emotions yielded a net positive effect on attitudes. A disability premium thus was observed, as ads with models with a disability were judged as more novel, received more favorable attitudes, and increased purchase intentions.

STUDY 2: DISABILITY PREMIUM IN CONSEQUENTIAL CHOICE

Does the disability premium reflect genuine positive attitudes and behavioral intentions, or might it result from participants' impression management attempts to instill a positive image of themselves in the experimenters and their peers (Mick 1996)? One way to test whether participants' reported attitudes and behavioral intentions are genuine is to make their choices consequential. Choosing and actually consuming a product tends to reveal one's genuine preferences. Thus, in study 2, we tested the disability premium with consequential choices in a field setting. We intercepted patrons entering a gym, and we offered them a free energy drink. We escorted them to a separate room, showed them two brands of energy drinks (both orange flavor), and asked them which one they would like. Critically, one brand was advertised with a model with a disability, whereas the other brand's advertisement had a control model with no obvious disability (see figure 1 in the appendix). Participants then received their chosen brand.

However, there was more to the experiment. Another way to test whether an effect is due to impression management attempts is to manipulate the social context in which the behavior is exhibited. If an effect is solely due to impression management, then it should be observed when participants make choices in public, but not when they do so in private (Leary and Kowalski 1990). Thus, in study 2, we also manipulated whether participants made their choice in public or in private. If the disability premium reflects genuine attitudes, then participants should prefer the product advertised with a model with a disability, no matter whether choosing in private or in public. This study was preregistered.

Method

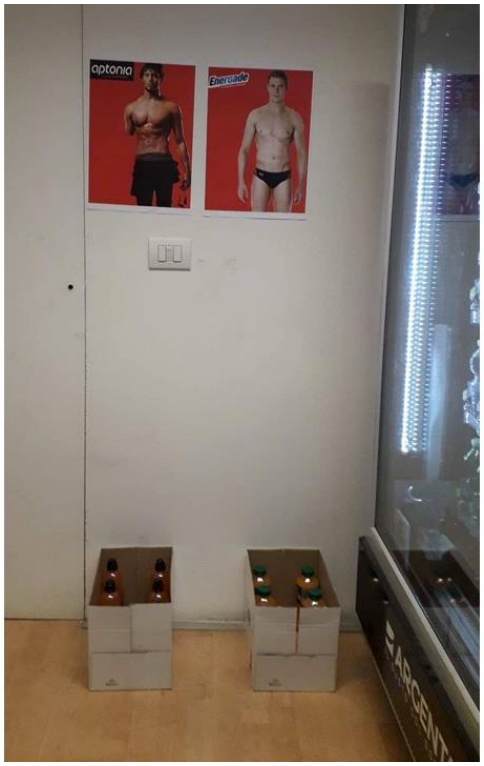
Participants. Three hundred fifty-four students (*M* = 23.6 years, *SD* = 8.1; 63% males) were recruited in a gym on the campus of a European university and were rewarded with an energy drink of their choice.

Stimuli. As in the prior study, we created disability and control ads for two brands. Given that the target products were energy drinks, we selected models with a disability who appeared sporty. As the two brands of energy drinks we selected Aptonia and Energade because neither brand was particularly well known among our participants, and hence participants were unlikely to strongly prefer one brand over the other. Both energy drinks featured an orange flavor. The two models, the two versions of each model (disability, control), and the two brands were fully crossed, resulting in eight stimulus ads. The ads were professionally printed as 16.5 x 11.5 inch color posters. For a sample of the stimuli see figure 2 below

Figure 2. Example stimulus ads used in study 2

Procedure. A research assistant (RA) approached students entering the gym, one at a time, and asked them if they wanted an energy drink for free. Participants who accepted the offer were escorted to a separate room that was unoccupied and not visible by other patrons or employees of the gym. Placed in the room were two boxes of energy drinks, one of each brand. Both boxes contained exactly five bottles of the given brand, and several spaces within the boxes were left empty. The presentation of the energy drinks was designed to prevent inferences about brand popularity (by including identical numbers of each brand) and to allow participants in the private condition to believe that their choice was not being monitored. Above each box was a poster advertising the brand below, and critically, one of the posters included a model with a disability and the other included a nondisabled control model. The position of the ad with the model with a disability (left, right) was counterbalanced across participants. For a photo of the room in which participants chose one of the energy drinks see figure 3.

Figure 3. Room in which participants chose an energy drink in study 2.



In the public condition, after escorting the participant to the room, the RA asked them which energy drink they wanted. The RA then grabbed one bottle of the selected brand, handed it to the participant, and released the participant back toward the gym area. In the private condition, the RA invited the participant to simply choose and take one bottle of whichever energy drink they wanted. The RA then conspicuously exited the room and returned to the entrance of the gym, leaving the participant alone to choose. The RA was blind to the hypothesis.

Importantly, participants were not informed that they were participating in an experiment. Unbeknownst to our participants, however, a different RA would intercept them after they exited the room. The second RA then informed them that they were in an experiment, and sought their informed consent to include their data in the study (no participant declined). Participants then indicated their age and sex, completed an attention check ("Did one of the two ads portray a disabled model?"), and answered two control questions: We asked participants "Have you tasted [Energade/Aptonia] before?". Participants indicated their prior consumption (or not) of both brands.

We initially sampled 300 participants, but 54 failed the attention check. As preregistered, we excluded their data from the analysis, and continued sampling new participants until we reached 300 valid participants.

Results and Discussion

Participants were more likely to choose the drink advertised by the model with a disability than the one advertised by the control model, regardless of whether they made their choice in private (60.1%) or in public (68.4%). Both of those percentages are significantly greater than 50% (both $z > 2.38$, $p < .02$), indicating that the disability premium was observed on consequential choices made both in public and in private. Moreover, the difference in choices of the brand advertised by a model with a disability between the public and private conditions (i.e., 68.4% versus 60.1%) was not significant, χ^2 (1) = 2.24, $p = .134$.

We further tested the robustness of this result in two ways. First, we repeated the analysis, but additionally including the 54 participants who previously were excluded for failing the attention check. Although the disability premium reduced slightly in magnitude, there still was no difference between the private (58.9%) and public conditions (66.7%), $N = 354$, χ^2 (1) = 2.20, $p = .130$, and both choice shares were still significantly greater than 50% (both $z > 2.30$, $p < .02$). Second, we analyzed the choice proportions via a logistic regression with condition (private vs. public) as the predictor of interest, and also with the three counterbalancing factors (brand, model, and position), time of day, day of week, and participants' prior consumption of the two brands all included as covariates. None of the covariates was significant (all $p > .15$), and once again the condition (private vs. public) failed to predict participants' choices of the brand advertised by a model with a disability, $p = .33$. Thus, we found no evidence that the disability premium is due to impression management.

STUDY 3A - RESPONSE DEADLINE PROCEDURE

The disability premium arises quickly

In study 3a, we used a response deadline procedure, a paradigm that is commonly used in social psychology to measure correction processes in stereotypical evaluations and socially desirable responding (e.g., Sherman et al. 2005; Mijović-Prelec and Prelec 2010). Participants viewed ads (disability vs. control), but critically, they were shown each ad for only 1 second (short exposure) or 2 seconds (long exposure). They then had only 1 additional second in which to provide their evaluation. Thus, both groups were under the same time pressure to respond, but one group had longer time to evaluate the ads and hence more time to adjust their evaluations. If the disability premium is due to a correction process, then we should observe a model (disability, control) × exposure (short, long) interaction, with a larger disability premium at the longer exposure duration. This hypothesis was preregistered. Results of study 3a are summarized in Table 4

TABLE 4

Attitudes toward ads/brands in studies 3a-c, and pupil dilation and eye fixations in study 3c. Means are indicated with "M", standard deviations are displayed in parentheses.

Study 3a

	Control Ads	Disability Ads	
short ad exposure (1 sec)	*M* = 1.63 (0.35)	*M* = 1.80 (0.49)	Disability Premium - main effect ads
long ad exposure (2 sec)	*M* = 1.60 (0.37)	*M* = 1.86 (0.51)	$F(1, 296) = 47.92$, $p < .001$, $\eta^2 = .14$
	main effect ad exposure $F(1, 296) = 0.18$, $p = .67$, $\eta^2 = .001$		interaction ads x exposure $F(1, 296) = 2.20$, $p = .14$, $\eta^2 = .007$

Study 3b

	Control Ads	Disability Ads	
low cognitive load (2 digits)	*M* = 3.63 (0.87)	*M* = 4.33 (1.14)	Disability Premium - main effect ads
high cognitive load (6 digits)	*M* = 3.59 (0.77)	*M* = 4.09 (1.04)	$F(1, 96) = 43.13$, $p < .001$, $\eta^2 = .31$
	main effect cognitive load $F(1, 96) = 0.66$, p = .42, $\eta^2 = .007$		interaction ads x cognitive load $F(1, 96) = 1.31$, $p = .26$, $\eta^2 = .013$

Study 3c

	Control Ads	Disability Ads	
attitudes toward ads	*M* = 3.27 (0.86)	*M* = 3.82 (1.06)	Disability Premium - main effect ads $t(118) = 7.32$, $p < .001$, $d = 0.67$
pupil dilation	*M* = -0.07 mm (2.46)	*M* = 0.07 mm (2.25)	pupil dilation - main effect ads $t(118) = 1.11$, $p = .270$, $d = 0.05$
attention paid to model (fixation)	*M* = 73.66 ms (83.36)	*M* = 112.94 ms (125.82)	interaction ads x area
attention paid to brand (fixation)	*M* = 166.09 ms (162.82)	*M* = 170.71 ms (162.22)	$F(1, 118) = 5.29$, $p = .02$, $\eta^2 = .04$

Method

Participants. Two hundred ninety eight students (M = 21.4 years, SD = 1.6; 44% males) at a European university participated in the lab for course credit, two short of the 300 that we preregistered. Participants were randomly assigned to the short or long ad exposure condition.

Stimuli. We created two different sets of stimuli: target ads and filler ads. The target ads tested the disability premium, as in the prior studies. We created two versions (disability and control) of twelve target ads, following the same procedure used in the prior studies. Filler ads, which were real ads shown in pretesting to be evaluated extremely positively (good) or extremely negatively (bad), served two purposes. First, they partially disguised the purpose of the study. Second, they provided a simple test of whether 1 second is sufficient time to reliably evaluate ads: If participants failed to evaluate the good ads more positively than the bad ads, this would suggest that participants were unable to properly evaluate the ads under the given time pressure, and hence our test of the disability premium would not be valid. Thus, from the pretest we selected the six worst ads and the six best ads for use in the main experiment as our "bad" and "good" filler ads.

Procedure. Given that participants were to evaluate the ads under time pressure, we were concerned that they may not notice the disability in some of the ads. Thus, to measure participants' detection of the disability, the experiment consisted of two tasks: an evaluation task where we asked participants to rate their attitudes toward the ads, and a detection task where we asked participants whether the model had a visible disability. Both tasks were completed under the same time pressure, as explained next.

During the evaluation task, participants rated a total of 24 ads: six disability ads, six control ads, six bad ads, and six good ads. We created two different experimental lists, so that each participant evaluated either the disability or the control version of each target ad, but not both. To be clear, no participant evaluated both the disability and the control versions of any given ad. Both experimental lists included the same six good ads and the same six bad ads. Participants were randomly assigned to one experimental list, and the 24 ads appeared in random order.

The experiment was programmed in E-Prime. The trial procedure of the evaluation task is illustrated in figure 4 in the main text. Participants initiated each trial by pressing the spacebar when prompted with a "Ready?" query. After a brief (half-second) blank delay, the ad appeared onscreen for either 1 second (short exposure) or 2 seconds (long exposure), during which time participants could not advance or respond. Then a visual mask appeared for 1 second (see Coltheart 1980), during which time participants were instructed to provide their evaluation of the ad.[1] Responses were not accepted after the 1-second exposure to the visual mask. By allowing responses only during the 1-second window signaled by the visual mask, we controlled the time pressure across conditions. That is, the short and long exposure conditions imposed the same time pressure (i.e., 1 second to respond), but they differed in time to evaluate the ad (i.e., 1 or 2 seconds). Moreover, to encourage timely responding, we penalized participants for failing to respond within the 1-second response deadline by presenting an error message for 2 seconds. Finally, because the task involved time pressure, we used a simple 3-point response scale ("How much do you like the ad?"; 1 = not at all; 2 = somewhat; 3 = a lot), and we instructed participants to place their fingers over the 1, 2, and 3 keys on the number pad to facilitate fast responding. The 24 experimental trials were preceded by 10 practice trials to familiarize participants with the procedure.

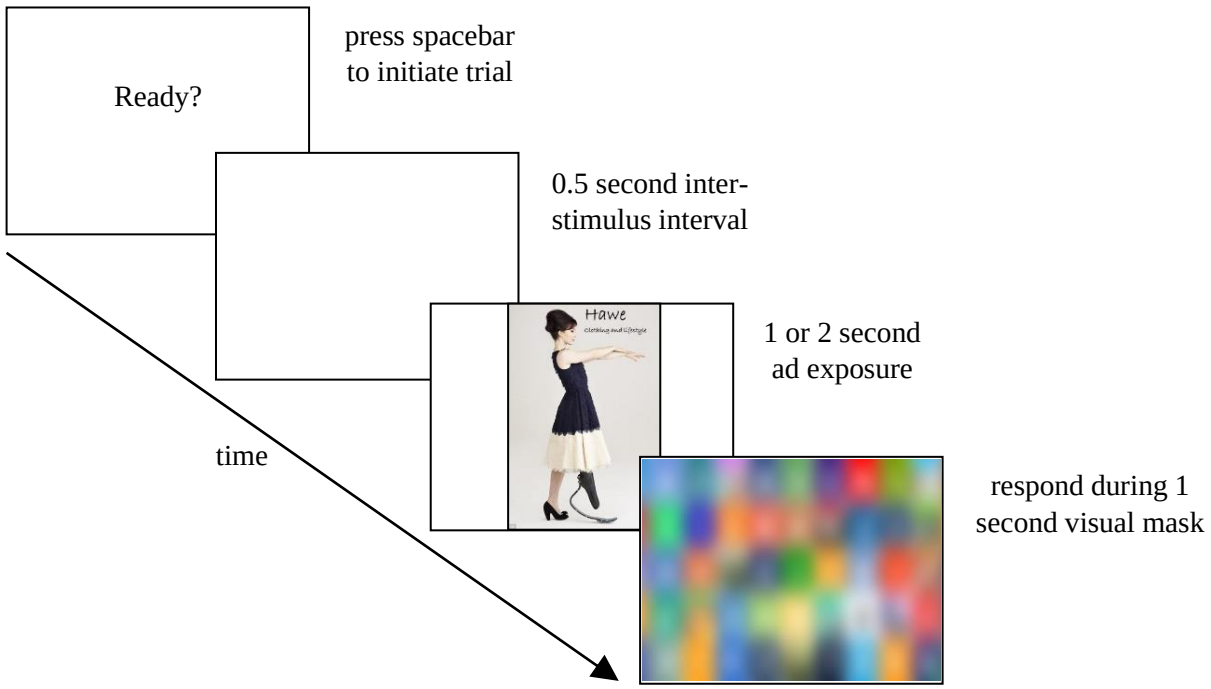
After completing the evaluation task, participants completed a disability detection task. In this task there were 12 trials: 6 disability ads and 6 control ads. Note that these ads were different from the ones that the participant saw in the evaluation task. For instance, if the participant saw the disability version of Ad 1 during the evaluation task, s/he was shown the control version of Ad 1 during this disability detection task. This was intended to prevent participants from responding simply on the basis of their memory from the evaluation task, so that we could instead get a

[1] The purpose of a visual mask, which is standard practice in research on attention and perception, is to prevent visual inspection of an iconic memory of the visual stimulus beyond the actual exposure to the stimulus (Coltheart 1980). That is, in the absence of a visual mask, a mental image of the stimulus remains in mind and can be mentally inspected for a few seconds after the stimulus has been removed. By instead replacing the stimulus with a visual mask, one effectively replaces or "masks" the mental image of the stimulus, thereby better controlling the time during which the participant can visually inspect the stimulus. Thus, the visual mask ensured that our participants could visually inspect the ad for exactly 1 or 2 seconds.

measure of their ability to detect the disabilities in images that they had not previously seen (but which participants in the other list had seen). The trial procedure of this task was identical to that of the evaluation task, including the response deadline being signaled by the visual mask, except that here participants indicated by keypress whether the model in the ad had a disability.

FIGURE 4

Trial procedure, study 3a.



Results and Discussion

Exclusions. In the response deadline procedure, participants sometimes fail to respond within the given time window, producing non-responses. We preregistered to exclude data for any participant who has non-responses on all six trials within a condition. As this did not occur, no data were excluded.

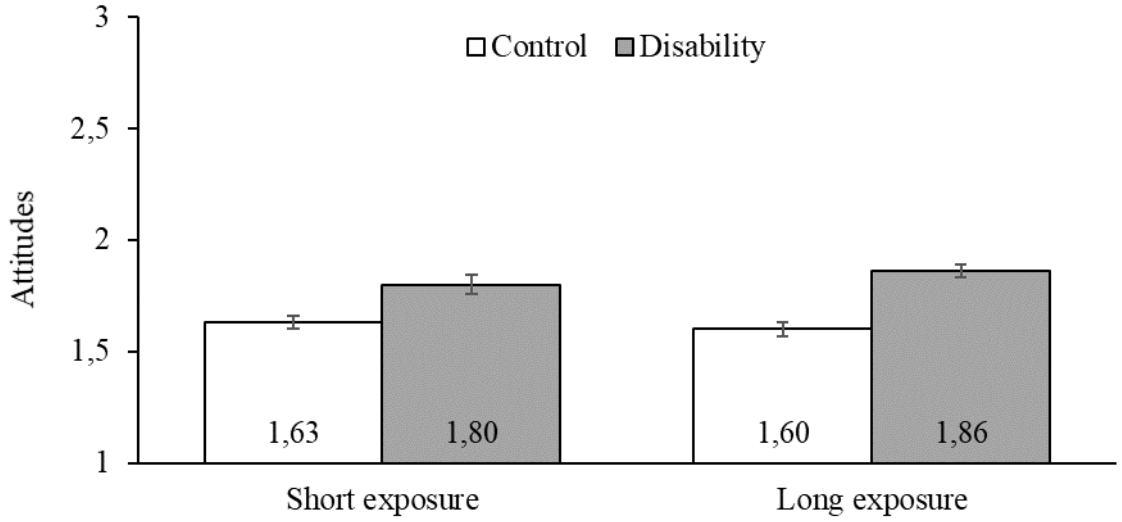
Filler ads. As expected (and preregistered), a 2 (ad: good, bad; within-participants) × 2 (exposure: 1, 2 seconds; between-participants) mixed ANOVA showed that participants evaluated the good ads more positively than the bad ads, indicated by a significant main effect of ad-type, $F(1, 296) = 1832.31$, $p < .001$, $\eta^2 = .86$. Ad exposure had no effect, $F(1, 296) = 0.90$, $p = .35$, $\eta^2 =$

.003, nor was the interaction significant, $F(1, 296) = 3.23$, $p = .073$, $\eta^2 = .011$. Attitudes were more positive toward good ads than bad ads under both short exposure ($M_{bad} = 1.43$, $SD = 0.32$, $M_{good} = 2.55$, $SD = 0.35$; $t(149) = 28.18$, $p < .001$, $d = 2.29$) and long exposure ($M_{bad} = 1.36$, $SD = 0.32$, $M_{good} = 2.57$, $SD = 0.43$; $t(147) = 32.55$, $p < .001$, $d = 2.29$).[2] Thus, participants were able to reliably evaluate ads under these timing conditions.

Disability premium. Results are illustrated in Figure 5. A 2 (ads: disability, control; within-participants) × 2 (exposure: 1, 2 seconds; between-participants) mixed ANOVA showed that participants evaluated the ads with models with a disability more positively than control ads, indicated by a significant main effect of ads, $F(1, 296) = 47.92$, $p < .001$, $\eta^2 = .14$. Ad exposure had no effect, $F(1, 296) = 0.18$, $p = .67$, $\eta^2 = .001$. Contrary to our preregistered prediction, the interaction of ad and ad exposure was not significant, $F(1, 296) = 2.20$, $p = .14$, $\eta^2 = .007$. Attitudes were more positive toward disability ads than control ads under both short exposure ($M_{disability} = 1.80$, $SD = 0.49$, $M_{control} = 1.63$, $SD = 0.35$; $t(149) = 3.75$, $p < .001$, $d = 0.31$) and longer exposure ($M_{disability} = 1.86$, $SD = 0.51$, $M_{control} = 1.60$, $SD = 0.37$; $t(147) = 6.10$, $p < .001$, $d = 0.50$).

[2] We calculated Cohen's *d* for the repeated measures effects with the following formula which is also used by GPower (Faul et al. 2009): https://memory.psych.mun.ca/models/stats/effect_size.shtml $d = \frac{|m_1 - m_2|}{\sqrt{s_1^2 + s_2^2 - (2rs_1s_2)}}$

Figure 5. Attitudes (*M* ± *SE*) toward ads under short (1 second) and long (2 seconds) exposures (panel **B**), Study 3a.



Disability detection. To measure performance on the disability detection task, we adopted the methods of signal detection theory (Stanislaw and Todorov 1999). We first calculated, for each participant, the proportion of models with a disability for whom that disability was correctly identified ("hits"), and the proportion of control models who were incorrectly judged to have a disability ("false alarms"). Then, to correct for response bias, we subtracted each participant's false alarm rate from his or her hit rate. This yields an unbiased measure of accuracy wherein a score of 0 indicates an inability to detect the target (i.e., random responding) and 1 indicates perfect discrimination of disability and control ads[3]. Overall, accuracy was high (M = 0.82, SD = 0.23), indicating that participants were able to reliably detect the models' disabilities under these timing conditions. Accuracy, however, differed significantly between the 1-second (M = 0.79, SD = 0.25) and 2-second (M = 0.86, SD = 0.21) ad exposures, $t(296) = 2.54$, $p = .011$, $d = 0.30$, and was significantly lower than 85% in the short ($t(149) = 2.90$, $p = .004$, $d = 0.47$) but not in the long exposure condition ($t(147) = 0.51$, $p = .61$, $d = 0.08$). To test whether the disability premium was

[3] In preregistering this study, we described the disability detection analyses as "…we will run a simple chi-square test of exposure conditions on recognition of disabilities in models. Finally, we will test whether in each exposure condition recognition is greater or equal to 85% with a z-test." After collecting data for Study 3a, we realized that a) recognition-accuracy is better calculated as "hits – false alarms" according to signal detection theory, and b) the resulting recognition-accuracy scores should be compared with *t*-tests rather than chi-square/z tests.

due to participants being less likely to correctly recognize models with a disability in the short exposure conditions, we re-ran the disability premium analysis, but including only those participants with a recognition accuracy score of more than 85%. The results are qualitatively unchanged. Attitudes were still more positive toward disability ads than control ads under both short exposure ($M_{disability}$ = 1.84, SD = 0.50, $M_{control}$ = 1.65, SD = 0.36; $t(74) = 2.93$, $p = .005$, d = 0.34) and long exposure ($M_{disability}$ = 1.86, SD = 0.51, $M_{control}$ = 1.60, SD = 0.37; $t(147) = 6.10$, $p < .001$, $d = 0.47$).

STUDY 3B - COGNITIVE LOAD

The disability premium arises effortlessly

High and low cognitive load were introduced in Study 3b by having participants remember either two (e.g., XG) or six digits (e.g., XGQLVN).

Method

Participants. One hundred two students (M = 22.0 years, SD = 1.7; 32% males) at a European university participated in the lab for course credit. Participants were randomly assigned to the high or low cognitive load condition. Due to technical problems, the data of four participants were not recorded, leaving 98 valid participants in the analyses, two short of our preregistered sample size of 100.

Stimuli. Stimuli were the same as those used in Study 3a, including both target and filler ads.

Procedure. The procedure was highly similar to that of the prior study, including both an evaluation task followed by a disability detection task. In the evaluation task, before viewing each ad, participants first saw a string of letters that they were instructed to remember. The letter string was either 2 (e.g., XG) or 6 (e.g., XGQLVN) digits in the low and high load conditions, respectively, and a different letter string appeared before each ad. The ad then appeared onscreen for 5 seconds, during which time they were prevented from advancing or providing their evaluation.

After the 5 seconds, participants reported their brand attitude ("I like the brand;" 1 = strongly disagree, 7 = strongly agree), and then reported the letter string that they previously saw. They completed ten practice trials before the main study, and as in the prior study, they evaluated 12 filler ads (good, bad) and 12 experimental ads (disability, control) in random order. Next participants completed the disability detection task, which had the same trial structure as the evaluation task (i.e., letter string, 5 second ad exposure, respond), except that participants instead indicated whether the model in the ad had a disability, exactly as in the preceding study. After the disability detection task, at the request of the Research Ethics Committee, participants also reported their level of agreement (1 = strongly disagree; 7 = strongly agree) with the statement "The ads with disabled models caused me psychological distress."[4] Finally, participants reported their age and sex.

Results and Discussion

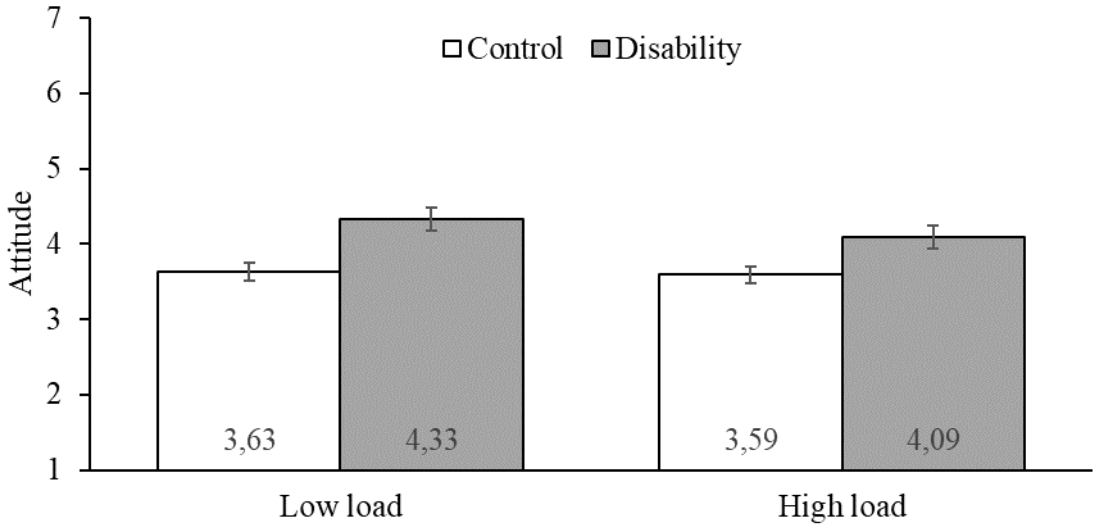
Manipulation check. As expected, participants were more likely to correctly recall the two-digit strings ($M_{2\text{-}digit}$ = 90.2%, SD = 3.31) than the six-digit strings ($M_{6\text{-}digit}$ = 73.8%, SD = 16.6, $t(54.3) = 6.91$, degrees of freedom were adjusted for heterogeneous variances, $p < .001$, $d = 1.88$).

Filler ads. A 2 (ad: good, bad; within-participants) × 2 (load: low, high; between-participants) mixed ANOVA revealed a significant main effect of ad-type, $F(1, 96) = 1285.65$, $p < .001$, $\eta^2 = .93$, indicating that participants evaluated the good ads more positively than the bad ads. Cognitive load had no effect ($F(1, 96) = 1.04$, $p = .31$, $\eta^2 = .011$), nor was the interaction significant ($F(1, 96) = 1.32$, $p = .25$, $\eta^2 = .014$). Attitudes were more positive toward good than bad ads under both low load ($M_{good} = 5.90$, $SD = 0.69$, $M_{bad} = 2.51$, $SD = 0.79$; $t(46) = 24.33$, $p < .001$, $d = 3.54$) and high load ($M_{good} = 5.90$, $SD = 0.66$, $M_{bad} = 2.29$, $SD = 0.75$; $t(50) = 26.45$, $p < .001$, $d = 3.69$). Thus, participants were able to reliably evaluate ads under these cognitive load conditions.

[4] We vehemently opposed asking this question, because it implies that the mere sight of a person with a disability is distressing to observers, and we believe this implication is insensitive to people with a disability. However, the Research Ethics Committee made the ethical approval of our study conditional upon including this item.

Disability premium. Results are illustrated in Figure 6. A 2 (ads: disability, control; within-participants) × 2 (load: low, high; between-participants) mixed ANOVA revealed a main effect of ads, indicating that participants evaluated the ads more positively with a model with a disability than with a control model, $F(1, 96) = 43.13$, $p < .001$, $\eta^2 = .31$. Cognitive load had no effect ($F(1, 96) = 0.66$, $p = .42$, $\eta^2 = .007$). Contrary to our preregistered prediction, the interaction of ads and cognitive load was not significant ($F(1, 96) = 1.31$, $p = .26$, $\eta^2 = .013$). Attitudes were more positive toward disability ads than control ads under both low load ($M_{disability} = 4.33$, $SD = 1.14$, $M_{control} = 3.63$, $SD = 0.87$; $t(46) = 5.55$, $p < .001$, $d = 0.81$) and high load ($M_{disability} = 4.09$, $SD = 1.04$, $M_{control} = 3.59$, $SD = 0.77$; $t(50) = 3.79$, $p < .001$, $d = 0.54$).

Figure 6. Attitudes ($M \pm SE$) toward ads under low and high cognitive load, Study 3b.



Disability detection. Performance on the disability detection task was calculated as in the preceding study.[5] Overall, accuracy was very high ($M = 0.93$, $SD = 0.09$), and did not differ significantly between the low ($M = 0.94$, $SD = 0.12$) and high ($M = 0.93$, $SD = 0.07$) cognitive load conditions, $t(96) = 0.35$, $p = .73$, $d = 0.07$. Thus, participants were able to reliably detect the models' disabilities under these conditions.

[5] Like in the previous study, we preregistered the wrong tests for this analysis. We report here the correct test according to signal detection theory.

STUDY 3C - PUPILLOMETRY AND EYE TRACKING

Disability effects on arousal and attention

Method

Participants. One hundred twenty students (*M* = 21.5 years, *SD* = 1.3; 35% males) at a European university participated in the lab for course credit. The eye tracker did not record data for one participant due to a technical problem, leaving 119 valid participants.

Stimuli. Stimuli were 20 ads, each with one disability version and one control version, created via the same procedure as in the preceding studies. Example stimulus ads, including the eye-tracking areas of interest (explained below), are displayed in Figure 7.

Figure 7. Example stimulus ads with areas of interest, study 3c.

Procedure. As in Studies 2 and 3, we created two experimental lists, such that each list included only one version (disability or control) of each ad, and each list included ten disability ads and ten control ads. Participants were randomly assigned to lists, and the 20 ads were presented in random order. Each trial started with a 1 second presentation of a fixation cross on an otherwise

blank screen, which was used for baseline measures of pupil dilation. Each ad appeared onscreen for three seconds, at which point participants rated the extent to which they agree (1 = strongly disagree, 7 = strongly agree) with two attitude statements ("I like the brand," "I like the ad;" $r = .70$, $p < .001$). While viewing the ads, participants' eye movements were recorded via a remote eye-tracker. We identified two areas of interest on each ad: one included the physical disability (or the corresponding non disability in the control ad) and the other included the brand name and logo (see appendix Figure 3). Although the two areas were of different sizes, more importantly, the areas of interest were identical across the disability and control versions of each ad. We collected measures of arousal (pupil dilation) and attention (fixations) in the two areas of interest. At the end of the task, participants reported their age and sex.

Results and Discussion

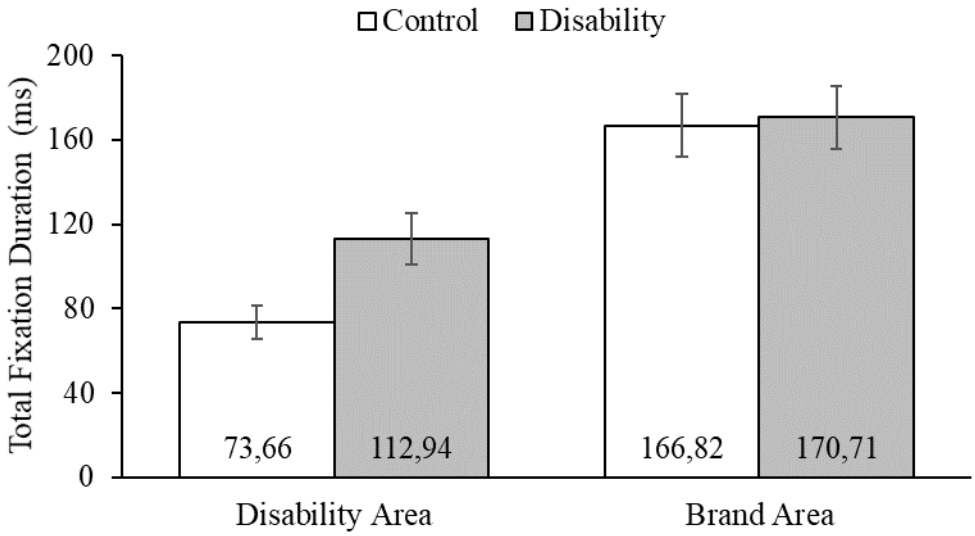
Disability premium. The disability premium was replicated ($M_{\text{disability}} = 3.82$, $SD = 1.06$, $M_{\text{control}} = 3.27$, $SD = .86$), $t(118) = 7.32$, $p < .001$, $d = 0.672$).

Pupil dilation. For control and disability ads, we calculated a measure of pupil dilation as the change in participants' pupil size between the 20 baseline (when participants looked at the fixation cross before each ad presentation) and 20 ad presentations. We then averaged this change-measure across the 10 trials in each ad-type condition per participant. Pupil dilation change did not differ for ads with models with a disability and ads with control models ($M_{\text{disability}} = 0.07$mm, $SD = 2.25$, $M_{\text{control}} = -0.07$mm, $SD = 2.25$), paired t-test: $t(118) = 1.11$, $p = .270$, $d = 0.047$), suggesting that the models with a disability did not increase physiological arousal or judgment uncertainty. Thus, once again, we found no evidence that the disability premium was due to a cognitive or emotional correction process for the sake of socially desirable responding.

Attention. Total fixation duration served as our measure of attention. Each ad was shown for three seconds, during which time the participant's eyes moved around the ad. The eyes typically fixate (i.e., remain focused on) a given area multiple times, for only a short duration each time.

Total fixation duration is the sum of the time fixated on the given area across those multiple fixations. Because fixation durations tend to be right-skewed, a common procedure is to log-transform them (Mould et al. 2012) after adding 1 to the durations (to avoid a problem of logging zeros). The statistical analyses reported below were on those transformed values. However, for ease of interpretation, we report the descriptive statistics in their original, raw values. A 2 (area: disability, brand) × 2 (model: disability, control) repeated measures ANOVA revealed a significant interaction $F(1, 118) = 5.29$, $p = .02$, $\eta^2 = .04$. As illustrated in Figure WA3, participants fixated longer on the disability area when the model had a disability (M = 112.94 ms, SD = 125.82) than when not (M = 73.66 ms, SD = 83.36), $t(118) = 3.83$, $p < .001$, $d = 0.353$). This simply confirms that people looked more at a partially-missing limb than at the corresponding whole limb in the control model. More importantly, participants fixated on the brand area equally long regardless of whether the ad included a model with a disability (M = 170.71 ms, SD = 162.22) or a control model (M = 166.09 ms, SD = 162.82), $t(118) = .50$, $p = .62$, $d = 0.049$) . Thus, the greater attention to the disability did not come at the cost of lesser attention to the brand.

Figure 8. Total fixation duration on disability AOI and brand AOI for disability and control ads, Study 3c (*M* ± *SE*).



STUDY 4: THE DISABILITY PREMIUM IS NOT DUE TO THE MODEL'S DETERMINATION

The results of study 1 suggest that models with a disability are perceived to be part of an admirable subgroup, rather than a stigmatized minority. We suggest that the acquisition of this membership may be due to the model's characteristics. Kunda and Oleson (1995) suggest that people assign extraordinary positive traits to individuals who exceed expectations. Similarly, consumers associate positive traits such as determination with underprivileged and disadvantaged brands that were able to succeed (i.e., "underdog effect," Paharia et al. 2011). We hypothesized that a similar process may occur for models with a disability, who may be perceived as "underdogs" and as more determined than other models in order to succeed. The greater perceived determination may then spill over to more favorable attitudes toward the brand and the advertised product. To test this account, in study 4 we manipulated a model's determination independently of the models' disability. We predicted (and preregistered) an interaction between determination and disability. Intuitively, one might expect that if perceived determination underlies the disability premium, then decreasing perceived determination of a model with a disability should attenuate the effect.

However, in a preliminary version of this study, we found that participants were reluctant to rate a model with a disability as being low in determination, even when that model was described as being low in determination. In other words, it seemed close to impossible to manipulate perceived determination of models with a disability, as they were always perceived as highly determined. Consequently, models with a disability are perceived as far more determined than control models under a low-determination scenario. Under a high-determination scenario, however, participants perceived models both with and without a disability as high in determination. Thus, we predicted an interaction in which the disability premium is larger when the models are low in determination.

Method

Participants. Eight hundred four respondents (M = 36.3 years, SD = 12.4; 35% males) on Prolific.com, all reporting current residence in the US, UK, or Canada, were paid £.20 for participating. This sample size is four more than the preregistered sample size. This experiment employed a 2 (model: disability, control; between-participants) × 2 (determination: high, low; within-participants) mixed design, with participants randomly assigned to evaluate either models with a disability or control models.

Stimuli. As in previous studies, we created two versions of two ads with two different models. In the disability condition, the models had a disability (missing an arm), whereas in the control condition they did not. To manipulate the models' determination, we created two scenarios. We called the models "Laura" and "Sara," and each ad was associated with a short description of the model as either high or low in determination. The high determination scenario stated: "When [Laura/Sara] finished high school, she was sure that she wanted to become a model. She worked very hard to perfect her portfolio, and eventually applied to Elite Icon modelling agency, where she was immediately offered a modelling gig. [Laura/Sara] is happy to be modelling as this is her dream career." The low determination scenario read: "When [Laura/Sara] finished high school, she didn't know what she wanted to do for a career. Her uncle owns Elite Icon modelling agency and

offered her a modelling gig. For now, the modelling is fine, but she is not sure that she wants to model as her career." We fully counterbalanced the models, their names, and the scenarios.

Procedure. After completing an attention check, participants viewed two ads featuring either models with a disability or nondisabled control models (between-participants), and read scenarios describing the model in the ad as either high or low in determination (within-participants). After viewing each ad, participants rated their attitudes (3 items measuring attitude toward the ad: "I like the ad; The ad is well made; My opinion regarding the ad is very positive", and 3 items measuring attitude toward the brand: "What is your attitude towards the brand Isle/Ies clothes: Unfavorable/Favorable; Bad/Good; Dislike/Like"($\alpha = .95$)), and then rated the model's perceived determination via two items adapted from Paharia et al. (2011; "Most people in my society view [Sara/Laura] as [determined/ passionate];" $r = .83$, $p < .001$) on a scale from 1 (strongly disagree) to 7 (strongly agree). The measure of determination served as a manipulation check. The ads were presented in random order, and after evaluating both ads and models, participants reported their age and sex.

Results and Discussion

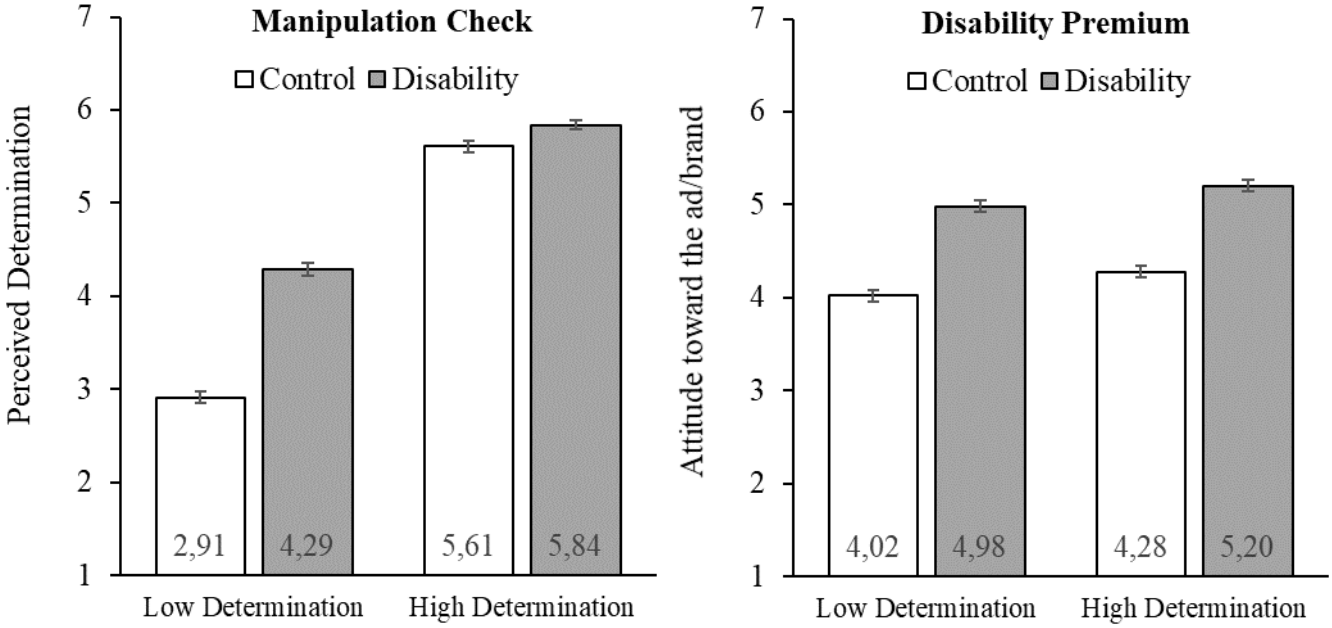
Three participants failed the attention check and were excluded from the analysis (as preregistered).

Manipulation check. A 2 (model: disability, control; between-participants) × 2 (determination: high, low; within-participants) mixed ANOVA revealed a significant main effect of the determination manipulation on perceived determination, $F(1, 799) = 1315.68$, $p < .001$, $\eta^2 = .622$. As intended, the models were rated more determined after the high-determination scenario ($M = 5.72$, $SD = 1.04$) than after the low-determination scenario ($M = 3.60$, $SD = 1.52$). Models with a disability were also perceived as more determined ($M = 5.06$, $SD = 0.89$) than control models ($M = 4.26$, $SD = 0.86$), as indicated by a significant main effect of model, $F(1, 799) = 169.75$, $p < .001$, $\eta^2 = .18$. As predicted, these main effects were qualified by a significant interaction, $F(1, 799) =$

98.10, $p < .001$, $\eta^2 = .11$. Among models described as low in determination, models with a disability were perceived as more determined than control models ($M_{disbility} = 4.29$, $SD = 1.42$ vs. $M_{control} = 2.91$, $SD = 1.29$, $t(799) = 14.51$, $p < .001$, $d = 1.03$). This difference was much smaller among models described as high in determination ($M_{disbility} = 5.84$, $SD = 0.91$ vs. $M_{control} = 5.61$, $SD = 1.55$, $t(799) = 3.10$, $p < .001$, $d = 0.22$), see figure 9.

FIGURE 9

Perceived determination (manipulation check) and attitudes (disability premium; $M \pm SE$) as a function a model's determination and disability, study 4.



Disability premium. We ran the same ANOVA as above on attitudes. Our manipulation of the models' determination significantly improved consumers' attitudes, $F(1, 799) = 36.10$, $p < .001$, $\eta^2 = .043$, as did models with a disability, $F(1, 799) = 147.63$, $p < .001$, $\eta^2 = .156$, replicating the disability premium. Contrary to our preregistered prediction, however, the model's determination did not moderate the disability premium, $F(1, 799) = 0.187$, $p = .67$, $\eta^2 < .001$. No matter whether models were described as low in determination ($M_{control} = 4.02$, $SD = 1.31$ vs. $M_{disability} = 4.98$, $SD = 1.18$, $t(799) = 10.90$, $p < .001$, $d = 0.77$) or high in determination ($M_{control} = 4.28$, $SD = 1.36$ vs. $M_{disability} = 5.20$, $SD = 1.07$, $t(799) = 10.67$, $p < .001$, $d = 0.75$), an equally strong disability premium was observed, see figure 9.

Discussion. Even though our manipulation of determination was powerful enough to make control models be perceived almost as determined as models with a disability, it did not affect the disability premium. The persistence of the disability premium across contexts of high and low determination suggests that it is not due to positive characteristics that consumers attribute to models with a disability. In particular, the present study suggests that the model does not improve attitudes through determination, but instead, consumers reward the brand that includes the model with a disability, no matter the model's level of determination.

STUDY 5: THE DISABILITY PREMIUM IS DUE TO THE BRAND ENDORSING INCLUSIVITY

Study 5 tested whether the disability premium is a consequence of consumers' favorable inferences about the brand that engages a model with a disability in its advertising. Disabilities are, sadly, stigmatized. Consumers might reward a brand that endorses models with disability to promote inclusivity. To test this proposition, we sought to manipulate the extent to which an advertisement expresses inclusivity. One way would be to reinforce the brand's inclusivity through a positive advertising message. Given the enormous effect size of the disability premium in our previous studies, however, we doubted whether it was feasible to amplify that effect size further. Therefore, we instead aimed to undo a brand's inclusivity, thereby reducing the magnitude of the disability premium. Specifically, for half of the participants in study 5, the advertisements included a pity-inducing slogan such as "I can't make new friends." The rationale was that inclusion of a pitiful slogan should effectively nullify the brand's effort to promote inclusivity because by inducing pity, the brand is depicting the model as part of a stigmatized minority and, therefore, an out-group member. Hence, we predicted (and preregistered) that such slogans would eliminate the disability premium.

Method

Participants. Six hundred two respondents (*M* = 37.3 years, *SD* = 11.5; 57% males) on Amazon Mechanical Turk, all reporting current residence in the US or Canada, were paid $.25 for participating. This sample size is two more than the preregistered sample size. They were randomly assigned to one condition of a 2 (model: disability, control) × 2 (slogan: absent, present) between-participants design.

Stimuli. Stimuli were developed from three base ads with three different models, with each model presenting a fictitious brand, yielding 6 ads (3 disability and 3 control). We then created two further versions of each ad by inserting a pitiful slogan, so in total we had 12 ads. Example ads are shown in figure 10.

Figure 10. Example stimulus ads with pitiful slogans, study 5.

Procedure. At the beginning of the study, participants completed a captcha and an attention check. Each participant then evaluated three ads, all from the same condition of the 2 (model: disability, control) × 2 (slogan: absent, present) design. After participants saw each ad, they were asked to rate their attitudes (3 items measuring attitude toward the ad: "I like the ad; The ad is well made; My opinion regarding the ad is very positive", and 3 items measuring attitude toward the brand: "What is your attitude towards the brand Isle/Ies clothes: Unfavorable/Favorable; Bad/Good; Dislike/Like" (α = .99)), and then to indicate the extent to which the ad evoked pity toward the model, measured with a single item ("This ad evokes pity for the model") on a scale from 1

(strongly disagree) to 7 (strongly agree). The pity measure served as a manipulation check. The three ads appeared in random order, and after evaluating all three ads, participants reported their age and sex.

Results and Discussion

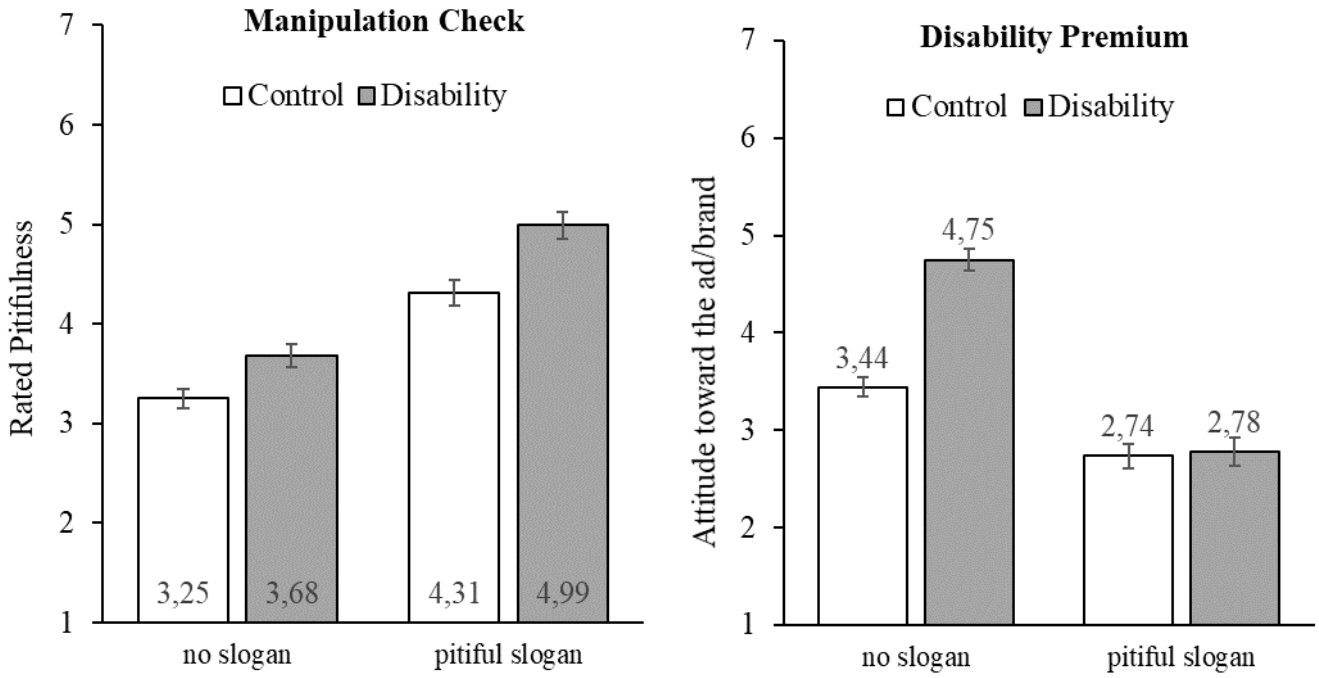
Twenty-three participants failed the attention check and were excluded from the analysis, as preregistered, leaving 579 valid participants. Results are displayed in figure 4.

Manipulation check. A 2 (model: disability, control) × 2 (slogan: present, absent) ANOVA on pity ratings showed that the ads with a pitiful slogan evoked more pity (M = 4.65, SD = 1.58) than those without a pitiful slogan (M = 3.47, SD = 1.27), as indicated by a significant main effect of slogan, $F(1, 575) = 102.61$, $p < .001$, $\eta^2 = 0.151$. Thus, our manipulation of pity was successful. The main effect of model was also significant, $F(1, 575) = 22.06$, $p < .001$, $\eta^2 = 0.037$, indicating that models with a disability evoked more pity (M = 4.32, SD = 1.63) than control models (M = 3.78, SD = 1.40), replicating the finding from study 1. The interaction of model and slogan was not significant ($F(1, 575) = 1.15$, $p = .29$, $\eta^2 = 0.002$) see figure 11.

Disability premium. The same 2 (model) × 2 (slogan) ANOVA on attitudes yielded a main effect of model, $F(1, 575) = 31.93$, $p < .001$, $\eta^2 = 0.053$, indicating a disability premium. A significant main effect of slogan indicated that the presence of a pitiful slogan decreased consumers' attitudes, $F(1, 575) = 125.35$, $p < .001$, $\eta^2 = 0.179$. More importantly, the predicted interaction was significant, $F(1, 575) = 27.99$, $p < .001$, $\eta^2 = 0.046$. As illustrated in figure 4, the disability premium occurred in the absence of a slogan ($M_{control}$ = 3.44, SD = 1.22 vs. $M_{disability}$ = 4.75, SD = 1.33), $t(291) = 8.77$, $p < .001$, d =1.03, just as in the preceding studies. However, the presence of a pitiful slogan eliminated this effect ($M_{control}$ = 2.74, SD = 1.47 vs. $M_{disability}$ = 2.78, SD = 1.69), $t(284) = 0.23$, $p = .818$, d =0.03 see figure 11.

FIGURE 11

Perceived pitifulness (manipulation check) and disability premium (attitudes toward the ad/brand; *M* ± *SE*) as a function of the model's disability and presence of a pitiful slogan, study 5.



Discussion. A brand that endorsed models with disabilities in its advertising signals to consumers that it is promoting inclusivity. Consumers value the brand's endorsement of inclusivity and reward the brand with higher attitudes, greater purchase intention, and increased preference in choice (Studies 1-3). Adding a pitiful slogan such as "I can't make new friends" nullifies the disability premium as it signals to consumers that the brand is, in fact, considering the model to be part of a stigmatized group. The disability premium occurs not because the model earned the in-group membership through his or her determination (Study 4), but rather because the brand promotes inclusivity by granting the membership. The effect occurs because consumers reward this virtuous choice. The present study demonstrates that when this apparently virtuous choice is nullified, the disability premium disappears.

GENERAL DISCUSSION

Inspired by advertising campaigns of Diesel and Nike, we investigated consumer reactions to advertising endorsers with a disability. Models with a disability evoked both negative and

positive emotions in consumers, but critically, they evoked stronger positive emotions such as admiration than negative emotions such as pity (study 1). Consequently, models with a disability elicited a net positive effect on consumers' ad and brand evaluations. In hypothetical evaluations of ads (study 1) and actual product choices in a consequential field experiment (study 2), we found a *disability premium*: Models with a disability enhance attitudes toward the ad and the brand, and increase purchase intentions and actual choice shares of the advertised products.

The disability premium appears to be a genuine consumer preference. Perhaps surprisingly, and contrary to our own predictions, we found no evidence that the disability premium is due to socially desirable responding. Our participants were not simply trying to look good to others or feel good about themselves. The effect arose consistently and reliably even when participants were under time pressure (study 3a) and cognitive load (study 3b). Moreover, consumers' physiological reactions also provided no evidence of an initial negative reaction that is subsequently corrected to appear more "good" or prosocial, as we found no effect on pupil dilation.

The disability premium could be due to consumers' perceptions of the model, or their inferences about the brand. Our result suggest that the effect is not attributable to positive perceptions of the model per se. For instance, although models with a disability are perceived as more determined than control models, manipulating the model's perceived determination had no effect on attitudes (study 4). Rather, the disability premium appears to arise from consumers' inferences about the brand. Brands that feature an endorser with a disability conspicuously express a value of social inclusivity, which improves consumers' brand attitudes. Consequently, when the brand explicitly rejects that apparent value of inclusivity, such as by reinforcing negative stereotypes about people with disabilities, the disability premium disappears entirely (study 5).

Theoretical Contributions

The present research provides several theoretical contributions. Most fundamentally, this research provides the first empirical demonstration of what may be considered *social value advertising*. In their advertisements, brands express their identity. Consumers choose brands that

develop, reinforce, or express their own identity. Consumers therefore choose brands that express an aspect of identity that they share or aspire to (McCracken, 1986, 1989; Reed et al. 2012). Traditionally, brands have sought to express personality traits, such as sincerity or excitement (Aaker 1997), warmth or competence (Aaker, Garbinsky, and Vohs 2012). More recently, however, brands have begun to express their social values, such as the many brands that publicly supported the Black Lives Matter movement in the wake of global protests for racial equality. Our research documents what the managers of those brands presumably know already: Contemporary consumers reward brands that express a social value with which they identify.

This conclusion is consistent with, but critically different from, a larger literature on cause-related marketing. Of course, the many benefits of cause-related marketing are by now well established (Varadarajan and Menon 1988), including their positive effects on consumers' brand choices (Barone, Miyazaki, and Taylor 2000). The prior research, however, has focused on companies' more or less extensive actions of social responsibility. The present research differs, and is far more generalizable, in that a simple advertising element symbolizes the brand's social value. Moreover, whereas companies require explicit promotions to publicize their social responsibility campaigns, brands can express their social values more simply and more subtly. In our studies, for instance, the mere inclusion of a model with a disability substantially improved consumers' brand attitudes and significantly increased their choice of the advertised brand. Diesel did not establish, operate, donate to, or otherwise promote any charity supporting people with disabilities. Nor did Diesel explicitly confirm or deny that it supports social inclusivity. Rather, solely via their choice of Jillian Mercado as model, Diesel revealed an aspect of its identity that many consumers identify with. This entailed no corporate social responsibility action or investment, and no explicit promotion of the brand's position or efforts.

A second and more specific contribution of this research is to demonstrate, for the first time, the disability premium. This effect is incredibly robust, reliable, and persistent. We repeatedly

observed effect sizes between $d = 0.3$ and 1.0, and contrary to our preregistrations, the effect proved extraordinarily difficult to attenuate.

The disability premium is not merely an "underdog effect." The underdog effect is a consumer preference for brands that present a narrative of struggling against external disadvantages (Paharia et al. 2011). Two factors differentiate the disability premium from the underdog effect. First, although people with disabilities may indeed be viewed as underdogs, the brands that include them in their advertisements need not be underdogs. For instance, we suspect that few people would consider Nike or Diesel to be underdog brands, but their ads nonetheless can elicit a disability premium. Second, the disability premium operates via a different psychological process. The underdog effect relies on consumers' perceptions that the brand exhibits passion and determination. Our research shows that the disability premium, in contrast, is independent of determination. Rather, the disability premium arises from consumers' perceptions of the brand's social values.

The disability premium contradicts most classic models of persuasion and advertising (Kahle and Homer 1985; Kang and Herr 2006; Petty and Cacioppo 1986), which suggest that brand endorsers should be likable, credible, and/or similar to the target consumers. Presumably, people with physical disabilities are no more or less likable or credible than others without a visible disability. And in fact, people with physical disabilities are visually and saliently different from the majority of consumers without disabilities. Yet, despite their average likability and credibility and their dissimilarity from the consumer majority, models with a physical disability dramatically improve consumers' attitudes toward the advertised brand.

Relatedly, the present research also contradicts a classic phenomenon in the advertising literature. Much early research revealed a "matching effect" wherein ads were most effective when the brand endorser was of the same race or ethnicity as the target consumers (Deshpandé and Stayman 1994; Grier and Brumbaugh 1999; Grier and Deshpandé 2001). For instance, although Black models were persuasive to Black consumers, they were not persuasive to Caucasian consumers. There were exceptions, of course (e.g., Michael Jordan), but essentially only if those

endorsers were likable or credible enough to overcome their dissimilarity to the majority target. The present research investigates a different and highly stigmatized minority. And contrary to the matching effect, we found that a model with a disability was extremely persuasive to the majority of consumers.

Along the same lines, this research contributes one of the few demonstrations of indirect targeting. Typically, brands directly appeal to their target consumers via messaging or imagery that reflects or resembles those consumers. For instance, Harley-Davidson targets male consumers via highly masculine messages. Sometimes, though, brands appeal to their target consumers indirectly. For instance, brands can use ambiguous imagery to appeal to homosexual males, without alienating the heterosexual male majority (Puntoni, Vanhamme, and Visscher 2011). The present research demonstrates a stronger form of indirect targeting, in that the advertising imagery saliently differs from the target consumers. The ads in our research do not target the minority. Rather, they target the majority by including a minority. Diesel and Nike indirectly targeted majority consumers without disabilities by including a model with a disability.

The disability premium is consistent with identity-based models of consumer behavior (e.g., Reed et al. 2012). Because consumers' brand choices are an expression of their identity, consumers who share the value of social inclusivity reward brands that express social inclusivity in their ads, even if that expression is merely implicit. Although our results are consistent with identity-based consumption (e.g., Escalas and Bettman 2017; Miller, Fournier, and Allen 2012; Paharia et al. 2011), such an effect had not previously been shown in the domain of social values, and hence our research provides an important new source of evidence for identity-based consumption.

Whereas nearly all prior studies have investigated who endorses the brand, we instead investigated who the brand endorses. In our research, the brand is effectively endorsing people with disabilities, rather than vice versa. And that is why our effect is driven by brand perception rather than endorser perception. Our results suggest that it is not only brand symbolism and characteristics of brand endorsers such as gender and race that can provide identity-endowing aspects to

consumers. Rather, the values that a brand stands for seem to become more and more important. By featuring a model with a disability, a brand takes a public stance on rejecting stereotypes about people with disabilities. Likewise, Nike's "Just Do It" campaign featuring Colin Kaepernick signaled to its consumer audience that it supports the Black Lives Matter movement. Consuming Nike products hence not only bestows an athletic self-identity on its customers, but also an ideological identity defined by its support of social equality.

Consumer Welfare

This research also has novel and important implications for consumer welfare. People with disabilities are viewed by others through a lens of personal tragedy (Darcy 2002) and pity (Cuddy, Fiske, and Glick 2007). They tend to be ignored by the popular media, and when do they make the headlines or the cinemas, they tend to be portrayed negatively (New York Times 2018). In the context of advertising, however, our research reveals that contemporary consumers do not merely tolerate models who are not canonically perfect physical specimens; they appear to actually crave them. Thus, including models with a disability in advertisements is mutually beneficial. For people with disabilities, an increased presence in advertisements can not only provide more public representation, but also more positive representation for this traditionally-stigmatized minority. And for consumers more generally, brands that include people with disabilities in their advertisements can serve as a conspicuous means of expressing their own social values through their consumption. Essentially, when brands reveal their social values, consumers vote with their wallets.

Managerial Implications

Historically, advertisers and brand managers have rarely included people with disabilities in their advertisements, presumably due to the prevailing wisdom that doing so could harm the brand's image by transferring negative associations from the endorser to the brand (Cagley and Cardozo 1970). However, current practice and our findings paint a very different picture. Stereotypes, stigmata, and minorities are social constructs that evolve over time (Hutchison et al. 2014), and most consumers no longer react negatively to brand endorsers from minority groups, nor to

endorsers with whom they have little in common. In fact, our research shows that consumers strongly prefer brands that include people with disabilities in their advertisements, and hence brands can reap rewards for expressing their prosocial value of inclusivity. In the future, consumers may bestow a premium not only to models with a physical disability but also to models with mental impairments. In addition, consumers' perceptions regarding minorities may change and include groups that so far have not been focused on, for instance, Muslims or the poor.

We also tested whether the disability premium can have negative consequences for the brand by diverting attention away from the brand information in advertisements (Erfgen, Zenker, and Sattler 2015). We showed that models with a disability do attract consumers' attention, but this does not happen at the expense of attention to brand information. Evidently, marketers could be more socially inclusive in their advertising campaigns without fear that this will distract attention from the brand itself.

Limitations and Future Directions

This research has many important limitations, which also provide opportunities for additional research. One serious limitation is that the present studies were conducted within a single cultural context. Our studies used samples drawn from Western, Educated, Industrialized, Rich, and Democratic (WEIRD) societies (Henrich, Heine, and Norenzayan 2010), and our analyses were aggregated across individuals. Certain types of individuals within these societies, and indeed samples from altogether different cultures, may well react very differently to models with a disability (cf. Webb and Mohr 1998). We believe that identifying individual differences and cultural factors that moderate the disability premium is an important goal that we hope future research will address.

Another limitation is that the present studies only examined consumer responses to endorsers of one particular minority. We chose to focus on people with disabilities because, unlike ethnic and sexual orientation minorities, they have not previously been included in consumer research. And we chose to focus on physical disabilities because we used print ads, and physical

disabilities tend to be visible in such ads. It therefore remains to be seen whether endorsers with non-obvious mental disabilities (e.g., dyslexia) or genetic disorders (e.g., Asperger Syndrome) also evoke a disability premium. And more generally, our focus on people with disabilities meant that our investigation did not include any other minorities, such as ethnic (e.g., Black), sexual (e.g., homosexual), and religious (e.g., Muslim) minorities. Again, we consider these to be important and worthy topics for further research.

To be sure, our research has many other limitations, and leaves many other questions unanswered. For instance, do people with disabilities always favorably view ads that include a model with a disability, or might they feel "used" in some circumstances? Do members of other minority groups, such as homosexuals, also exhibit the disability premium? How might consumers react if a luxury brand with a reputation for exclusivity were to include a model with a disability in its ads? Unfortunately, in this first investigation of the disability premium, we are unable to address many relevant and important questions. More positively, however, we hope that our research will motivate much more research on this important but under-investigated topic.

REFERENCES

Aaker, Jennifer L (1997), "Dimensions of brand personality," *Journal of Marketing Research*, 34 (3), 347-56.

Aaker, Jennifer L., Anne M. Brumbaugh, and Sonya A. Grier (2000), "Nontarget markets and viewer distinctiveness: The impact of target marketing on advertising attitudes," *Journal of Consumer Psychology*, 9 (3), 127-40.

Aaker, Jennifer L., Emily N. Garbinsky, and Kathleen D. Vohs (2012), "Cultivating admiration in brands: Warmth, competence, and landing in the "golden quadrant"," *Journal of Consumer Psychology*, 22 (2), 191-94.

Abrams, Dominic, Joanne Thomas, and Michael A. Hogg (1990), "Numerical distinctiveness, social identity and gender salience," *British Journal of Social Psychology*, 29 (1), 87-92.

Barone, Michael J., Anthony D. Miyazaki, and Kimberly A. Taylor (2000), "The influence of cause-related marketing on consumer choice: does one good turn deserve another?" *Journal of the Academy of Marketing Science,* 28 (2), 248-62.

Block, Carl E. (1972), "White backlash to Negro ads: fact or fantasy?," *Journalism Quarterly*, 49 (2), 258-62.

Bradley, Margaret M., Laura Miccoli, Miguel A. Escrig, and Peter J. Lang (2008), "The pupil as a measure of emotional arousal and autonomic activation," *Psychophysiology,* 45 (4), 602-07.

Bradshaw, John (1967), "Pupil size as a measure of arousal during information processing," *Nature*, 216 (5114), 515-16.

Buckley, Cara (2020), "For the Disabled in Hollywood, Report Finds Hints of Progress," *New York Times*, https://www.nytimes.com/2020/02/05/arts/television/disabled-hollywood.html.

Caballero, Marjorie J., and William M. Pride (1984), "Selected effects of salesperson sex and attractiveness in direct mail advertisements," *Journal of Marketing,* 48 (1), 94-100.

Cagley, James W., and Richard N. Cardozo (1970), "White response to integrated advertising," *Journal of Advertising Research,* 10 (2), 35-9.

Chng, Chwee Lye, and Alan Moore (1991), "Can attitudes of college students towards AIDS and homosexuality be changed in six weeks? The effects of a gay panel," *Health Values: Health Behavior, Education & Promotion*, 15 (2), 41-9.

Cohen, David L., and John L. Peterson (1981), "Bias in the courtroom: Race and sex effects of attorneys on juror verdicts," *Social Behavior and Personality: an International Journal,* 9 (1), 81-7.

Coltheart, Max (1980), "Iconic memory and visible persistence," *Perception & Psychophysics* 27 (3), 183-228.

Crocker, Jennifer, and Brenda Major (1989), "Social stigma and self-esteem: The self-protective properties of stigma," *Psychological Review*, 96 (4), 608-30.

Cuddy, Amy JC, Susan T. Fiske, and Peter Glick (2007),"The BIAS map: behaviors from intergroup affect and stereotypes," *Journal of Personality and Social Psychology*, 92 (4), 631-48.

Darcy, Simon (2002), "Marginalised participation: Physical disability, high support needs and tourism," *Journal of Hospitality and Tourism Management,* 9 (1), 61–73.

De Gee, Jan Willem, Tomas Knapen, and Tobias H. Donner (2014), "Decision-related pupil dilation reflects upcoming choice and individual bias," *Proceedings of the National Academy of Sciences*, 111 (5), 618–25.

Deshpandé, Rohit, and Douglas M. Stayman (1994), "A Tale of Two Cities: Distinctiveness Theory and Advertising Effectiveness," *Journal of Marketing Research*, 31 (1), 57-64.

Dovidio, John F., Brenda Major, and Jennifer Crocker (2000), “Stigma: introduction and overview,” In *The Social Psychology of Stigma*, eds. T. F. Heatherton, R. E.Kleck, M. R. Hebl, New York, NY: Guilford Press, 1–30.

Erfgen, Carsten, Sebastian Zenker, and Henrik Sattler (2015), “The vampire effect: When do celebrity endorsers harm brand recall?,” *International Journal of Research in Marketing*, 32 (2), 155–63.

Escalas, Jennifer Edson, and James R. Bettman (2003), “You are what they eat: The influence of reference groups on consumers’ connections to brands,” *Journal of Consumer Psychology*, 13 (3), 339-48.

Escalas, Jennifer Edson, and James R. Bettman (2005), “Self-construal, reference groups, and brand meaning,” *Journal of Consumer Research*, 32 (3), 378-89.

Escalas, Jennifer Edson, and James R. Bettman (2017), “Connecting With Celebrities: How Consumers Appropriate Celebrity Meanings for a Sense of Belonging,” *Journal of Advertising*, 46 (2), 297-308.

Faul, Franz, Edgar Erdfelder, Axel Buchner, and Albert-Georg Lang (2009), "Statistical power analyses using G* Power 3.1: Tests for correlation and regression analyses," *Behavior Research Methods*, 41(4), 1149-1160.

Fiske, Susan T., Amy JC Cuddy, Peter Glick, and Jun Xu (2002), “A model of (often mixed) stereotype content: Competence and warmth respectively follow from perceived status and competition,” *Journal of Personality and Social Psychology*, 82 (6), 878–902.

Forehand, Mark R., Rohit Deshpandé, and Americus Reed II (2002),” Identity salience and the influence of differential activation of the social self-schema on advertising response,” *Journal of Applied Psychology*, 87 (6), 1086-099.

Goffman, Erving (1963), *Stigma: notes on the management of spoiled identity*, Goffman, NJ: Penguin Books.

Goldberg, Raymond (1982), "Attitude change among college students toward homosexuality," *Journal of the American College Health Association*, 30 (6), 260–68.

Grier, Sonya A., and Anne M. Brumbaugh (1999), "Noticing cultural differences: Ad meanings created by target and non-target markets," *Journal of Advertising*, 28 (1), 79–93.

Grier, Sonya A., and Rohit Deshpandé (2001), "Social dimensions of consumer distinctiveness: The influence of social status on group identity and advertising persuasion," *Journal of Marketing Research*, 38 (2), 216–24.

Henrich, Joseph, Steven J. Heine, and Ara Norenzayan (2010), "Most people are not WEIRD," *Nature*, 466 (7302), 29-9.

Hess, Eckhard H., and James M. Polt (1964), "Pupil size in relation to mental activity during simple problem-solving," *Science*, 143 (3611), 1190–192.

Hutchison, Keith A., Jessi L. Smith, and Amber Ferris (2013), "Goals can be threatened to extinction: Using the Stroop task to clarify working memory depletion under stereotype threat," *Social Psychological and Personality Science*, 4 (1), 74–81.

Jones, Edward E. (1984), *Social stigma: The psychology of marked relationships*, NY: Freeman.

Kahle, Lynn R., and Pamela M. Homer (1985), "Physical Attractiveness of the Celebrity Endorser: A Social Adaptation Perspective," *Journal of Consumer Research*, 11 (4), 954–61.

Kahneman, Daniel, and Jackson Beatty (1966),"Pupil diameter and load on memory," *Science*, 154 (3756), 1583-585.

Kang, Yong-Soon, and Paul M. Herr (2006), "Beauty and the Beholder: Toward an Integrative Model of Communication Source Effects," *Journal of Consumer Research*, 33 (1), 123–30.

Kraus, Lewis, Eric Lauer, Rachel Coleman, and Andrew Houtenville (2018), *2017 Disability Statistics Annual Report,* Durham, NH: University of New Hampshire.

Kunda, Ziva, and Kathryn C. Oleson (1995), "Maintaining stereotypes in the face of disconfirmation: Constructing grounds for subtyping deviants," *Journal of Personality and Social Psychology*, 68 (4), 565-79.

La Vito, Angelica (2018), "Nike's Colin Kaepernick ads created $163.5 million in buzz since it began—and it's not all bad," *CNBC,* https://www.cnbc.com/2018/09/06/nikes-colin-kaepernick-ad-created-163point5-million-in-media-exposure.html.

Leary, Mark R., and Robin M. Kowalski (1990), "Impression management: A literature review and two-component model," *Psychological Bulletin*, 107 (1), 34-7.

Lee, Tatia, and Michael Rodda (1994), "Modification of attitudes toward people with disabilities," *Canadian Journal of Rehabilitation*, 7 (4), 229–38.

Li, Li, and Dennis Moore (1998), "Acceptance of disability and its correlates," *The Journal of Social Psychology,* 138 (1), 13-25.

McCracken, Grant (1986), "Culture and consumption: A theoretical account of the structure and movement of the cultural meaning of consumer goods," *Journal of Consumer Research,* 13 (1), 71-84.

McCracken, Grant (1989), "Who is the celebrity endorser? Cultural foundations of the endorsement process," *Journal of Consumer Research*, 16 (3), 310-21.

McGuire, William J. (1985), "Attitudes and attitude change," In *Handbook of Social Psychology,* eds. G. Lindzey and E. Aronson, New York: Random House, 223–346.

Mick, David G. (1996), "Are studies of dark side variables confounded by socially desirable responding? The case of materialism," *Journal of Consumer Research*, 23 (2), 106–19.

Mijović-Prelec, Danica, and Drazen Prelec (2010), “Self-deception as self-signalling: a model and experimental evidence,” *Philosophical Transactions of the Royal Society B: Biological Science*s, 365 (12), 227-40.

Mill, Ravi D., Akira R. O’Connor, and Ian G. Dobbins (2016), “Pupil dilation during recognition memory: Isolating unexpected recognition from judgment uncertainty,” *Cognition,* 154 (11), 81–94.

Miller, Felicia M., Susan Fournier, and Chris T. Allen. (2012), "Exploring relationship analogues in the brand space," *In Consumer-brand relationships,* Routledge, 56-82.

Morin, Stephen F. (1977), "Heterosexual bias in psychological research on lesbianism and male homosexuality," American Psychologist, 32 (8), 629-37.

Moscovici, Serge (1975), “Reply to a critical note on two studies of minority influence,” *European Journal of Social Psychology,* 5 (2), 261–63.

Mould, Matthew S., David H. Foster, Kinjiro Amano, and John P. Oakley (2012), "A simple nonparametric method for classifying eye fixations," *Vision Research,* 57(3), 18-25.

Muse, William V. (1971), “Product-Related Response to Use of Black Models in Advertising,” *Journal of Marketing Research*, 8 (1), 107–09.

Neuberg, Steven L., and Catherine A. Cottrell (2008), “Managing the Threats and Opportunities Afforded by Human Sociality,” *Group Dynamics,* 12 (1), 63–72.

Noel, Richard C., and Mary J. Allen (1976), “Sex and ethnic bias in the evaluation of student editorials,” *The Journal of Psychology,* 94 (1), 53–8.

Oakes, Jeannie (1987), “Tracking in secondary schools: A contextual perspective,” *Educational Psychologist,* 22 (2), 129–53.

Paharia, Neeru, Anat Keinan, Jill Avery, and Juliet B. Schor (2011), “The Underdog Effect: The Marketing of Disadvantage and Determination through Brand Biography,” *Journal of Consumer Research,* 37 (5), 775–90.

Paulhus, Delroy L. (1984), “Two-component models of socially desirable responding,” *Journal of Personality and Social Psychology,* 46 (3), 598–608.

Petty, Richard E., and John T. Cacioppo (1986), “The elaboration likelihood model of persuasion,” In *Communication and persuasion,* ed. L. Berkowitz, New York, NY: Springer, 1–24.

Puntoni, Stefano, Joelle Vanhamme, and Ruben Visscher (2011), "Two birds and one stone," *Journal of Advertising,* 40 (1), 25-42.

Qualls, William J., and David J. Moore (1990),” Stereotyping effects on consumers' evaluation of advertising: Impact of racial differences between actors and viewers,” *Psychology & Marketing,* 7 (2), 135–51.

Reed II, Americus, Mark R. Forehand, Stefano Puntoni, and Luk Warlop (2012), “Identity-based consumer behavior,” *International Journal of Research in Marketing*, 29 (4), 310-21.

Sherman, Jeffrey W., Steven J. Stroessner, Frederica R. Conrey, and Omar A. Azam (2005), “Prejudice and stereotype maintenance processes: Attention, attribution, and individuation,” *Journal of Personality and Social Psychology*, 89 (4), 607–22.

Solomon, Michael R., Richard D. Ashmore, and Laura C. Longo (1992), "The beauty match-up hypothesis: Congruence between types of beauty and product images in advertising," *Journal of Advertising,* 21 (4), 23-34.

Solomon, Paul J., Ronald F. Bush, and Joseph F. Hair Jr. (1976), “White and black consumer sales response to black models,” *Journal of Marketing Research*, 13 (4), 431–34.

Stanislaw, Harold, and Natasha Todorov (1999),"Calculation of signal detection theory measures," *Behavior Research Methods, Instruments, & Computers*, 31 (1), 137-149.

Urai, Anne E., Anke Braun, and Tobias H. Donner (2017), "Pupil-linked arousal is driven by decision uncertainty and alters serial choice bias," *Nature Communications,* 8 (1), 1–11.

U.S. Equal Employment Opportunity Commission (1990), Americans with Disabilities Act, Washington, DC: Government Printing Office.

Van't Veer, Anna, Mariëlle Stel, and Ilja Van Beest (2014),"Limited capacity to lie: Cognitive load interferes with being dishonest," *Judgment and Decision Making*, 9 (3), 199-206.

Varadarajan, P. Rajan, and Anil Menon (1988), "Cause-related marketing: A coalignment of marketing strategy and corporate philanthropy," *Journal of Marketing,* 52 (3), 58-74.

Watson, David, Lee Anna Clark, and Auke Tellegen (1988), "Development and validation of brief measures of positive and negative affect: the PANAS scales," *Journal of Personality and Social Psychology*, 54 (6), 1063-1070.

Webb, Deborah J., and Lois A. Mohr (1998), "A typology of consumer responses to cause-related marketing: From skeptics to socially concerned," *Journal of Public Policy & Marketing*, 17 (2), 226-238.

Wells, Susan J. (2001), "Is the ADA Working?," *HR Magazine*, 45 (4), 38–46.

Whittler, Tommy E. (1989), "Viewers' processing of actor's race and message claims in advertising stimuli," *Psychology & Marketing*, 6 (4), 287–309.

Whittler, Tommy E., and Joan DiMeo (1991), "Viewers' reactions to racial cues in advertising stimuli," *Journal of Advertising Research,* 31 (6), 37–46.

Wooten, David (1995), "One of a Kind in a Full House: Some Consequences of Ethnic and Gender Distinctiveness," *Journal of Consumer Psychology*, 4 (3), 205-24.

World Health Organization (2011), *World Report on Disability*, Geneva, WHO Library Cataloguing-in-Publication Data.

4. A WINDOW TO THE BRAND'S SOUL: HOW MODELS' EYES AFFECT CONSUMERS' ATTITUDES

Ranging from beauty products to technology, the use of beautiful models is certainly popular among advertisements. For instance, cosmetics brands such as L'Oréal or LaRoche Posay traditionally promote the effectiveness of their beauty-enhancing products using advertisements with close-ups on beautiful women's faces. The rational for this tactic is intuitive: By pairing a product with a beautiful face, consumers might evaluate the product more favorably. Indeed, research has confirmed that physically attractive faces improve consumers' evaluations of the advertisement (Baker and Churchill 1977; Caballero and Pride 1984; Chaiken 1979; Kahle and Homer 1985). The facial cues' attractiveness (e.g., small nose and chin) induces a physiological reaction in the observer (Foster et al. 1998).

Though prior research in marketing has focused on the effect of certain facial characteristics, such as face familiarity (Tanner and Ahreum 2012) and smile (Cheng, Mukhopadhyay, and Williams 2020; Wang et al. 2017), on consumers' perceptions, it has overlooked the impact of another important facial feature, namely the eyes. As they are the first cue automatically processed when viewing a face (Adolphs et al. 2005; Kano and Tomonaga 2009), eyes can capture the viewers' attention and influence their impressions even at a very brief exposure (Illicic, Baxter, and Kulczynski 2016). One essential feature of the eyes is their pupils. By either dilating or constricting, pupils provide observers with information about a person's inner states (Bradley et al. 2008; Bradshaw 1967; Rieger and Savin-Williams 2012). However, previous research has suggested that dilated pupils might have both positive (e.g., arousal; Hess 1975) and negative (e.g., fear; Bradley et al. 2008) signaling qualities, providing very little and mixed results on whether and how pupil size affects observers' perceptions. Moreover, those few studies that tested the impact of pupil size on viewers' perceptions focused on dynamic changes in pupils, in the context of social interactions

and used black and white images (e.g., Kret, Fischer, and De Dreu 2015). These stimuli are rarely used in marketing contexts, where pupils may be static, and the color is ubiquitous, leaving open questions of whether and how a model's pupil size affects consumers' evaluations of advertisements.

In the present article, we investigated whether models with constricted (vs. dilated) pupils in advertisements affect consumers' attitudes toward the advertisement. By considering how constricted and dilated pupils are opposite mechanisms - in that dilated and constricted pupils respectively reduce and increase iris exposure - we argue that smaller pupils are more attractive for a very simple reason: They reveal more color to the viewer. As more colorful and brighter eyes enhance the model's physical attractiveness (Gründl et al. 2012), we propose that constricted pupils improve consumers' attitudes towards the advertisement.

Six studies support this prediction and shed light on why the effect occurs: constricted pupils – by making the eye appear brighter and more colorful – leads to enhanced physical attractiveness, which subsequently improve consumers' attitudes toward the advertisement. In studies 1A and 1B we investigated the main effect of constricted pupils on the model's physical attractiveness. We find that constricted pupils make the model appear more physically attractive using both eye-shots (study 1A) and head-shots (study 1B), and regardless of the model's gender, level of attractiveness, iris color and the observer's iris color and gender. In study 2 we tested the positive effect of constricted pupils on consumers' attitudes toward the advertisement. Given that prior research suggests that pupil dilation increases trust toward the target (Kret, Fischer, and De Dreu 2015) and demonstrates that attractiveness has positive spillover effects on other attributes (i.e., beauty premium: Hamermesh and Biddle 1994), in studies 3A and 3B we examined whether constricted pupils, by increasing perceptions of the models' attractiveness, also increase perceptions of trust. We find that constricted pupils improve consumers' attitudes toward the advertisement, an effect that is driven by the perception of the model's increased attractiveness and trustworthiness . Finally, in study 4, we examine whether consumers rely more on the eye's aesthetic features or on their

physiological reaction (i.e., pupil mimicry) to inform their judgments. We find that despite consumers assimilate to the model's pupil size; they do not use their physiological reaction as a source of information, ruling out pupil mimicry as an alternative mechanism for our observed effects.

THEORETICAL FRAMEWORK

Literature in psychology and psychophysiology has suggested that eyes constitute a notable facial feature that attracts the viewer's attention at a very brief exposure (Adolphs et al. 2005; Kano and Tomonaga 2009). As pupils dilate automatically (Prochazkova and Kret 2017), their size provides a reliable reflection of a person's emotional states and social interests. For instance, pupils dilate when a person is sexually attracted to someone else (Rieger and Savin-Williams 2012), is emotionally aroused (Bradley et al. 2008; Partalaa and Surakkaa 2003), is performing a cognitively effortful task (Bradshaw 1967) or is interested in a specific activity (Hess and Polt 1960). In this article, we examined how these different pupil sizes (i.e., dilated and constricted) are perceived by others. In particular, how does pupil size affect consumers' attitudes towards the advertisement?

Despite observers naturally process others' pupil dilation, surprisingly few studies have investigated how pupils affect people's perceptions (Kret, Fischer, and De Dreu 2015). Neuroscience research suggests that people automatically detect changes in others' pupil size, which causes the activation of the observers' amygdala and other specific brain regions (Amemiya and Ohtomo 2012; Harrison, Gray, and Critchley 2009). When observers process dynamic changes in others' pupils, they assimilate to their pupil sizes (i.e., "pupil mimicry"; Fawcet et al. 2016).

This ability to mimic others' pupils is innate in infants (Fawcet et al. 2016) and chimpanzees (Kret, Tomonaga, and Matsuzawa 2014), and it is correlated with increased empathy (Harrison, Critchley, and Wilson 2007). For this reason, prior research has suggested that observing others' dynamic pupil changes might affect perceptions and behaviors via social contagion (Kret, Fischer, and De Dreu 2015). For instance, some studies found that people with dilating pupils are more

prone to be approached (Brambilla, Biella, and Kret 2019), chosen as a partner (e.g., Kret, Fischer, and De Dreu 2015), and elicit more ethical behaviors in their observers (Van Breen et al. 2018).

An important characteristic of those psychophysiological and neuroscientific studies (e.g., Brambilla, Biella and Kret 2019; Kret, Fischer, and De Dreu 2015) that tested the impact of pupils on observers' perceptions via social contagion is that they used stimuli where pupils changed dynamically to resemble a social interaction. However, given that these dynamic pupil changes were noticeable to participants, it remained unclear whether static images would produce similar results (Kret and Dreu 2019, p. 1309). When people observe pupils that change dynamically, the dilation and the constriction are salient and more likely to induce social contagion. In static pupils, dilation and constriction become less noticeable. Therefore, static pupils might not trigger social contagion, leaving observers forming their perceptions on the eye's pure aesthetic features. Crucially, the eyes' aesthetic properties influence judgments (Baudouin and Tiberghien 2004; Cunningham, Barbee, and Pike 1990; Glocker et al. 2009). For instance, large eyes (Baudouin and Tiberghien 2004; Cunningham, Barbee, and Pike 1990) and darker limbal rings, the dark ring around the iris of the eye (Peshek et al. 2011) increase attractiveness because they indicate health (Brown and Sacco 2018). Might pupils also affect attractiveness?

Pupil size and Attractiveness

Research in psychology and economics has shown that beauty influences a wide range of outcomes. Physical attractiveness influences a person's life success both professionally and personally, leading to better jobs, better wages and better spouses (Hamermesh 2011; Hamermesh and Biddle 1994). Using this "beauty premium" in marketing contexts, companies typically insert highly attractive models in their campaigns to improve consumers' evaluations of their advertisements and, consequently, increase their sales (Baker and Churchill 1977; Kahle and Homer 1985). For this strategy to succeed, a key question is which physical characteristics make a person look more beautiful. We propose that pupils are a subtle facial cue that impacts consumers'

attitudes because - by influencing the beauty of the eyes – pupils affect consumers' perceptions of the model's physical attractiveness.

The pupil is defined as the dark central circle in the eye, and the iris is the surrounding colored ring. They are complementary, in that dilated (large) and constricted (small) pupils respectively reduce and increase iris exposure. To investigate whether people could easily predict what the impact of pupil size on physical attractiveness would be, we asked 202 participants whether they think the size of a person's pupils affects the person's attractiveness and only 55% responded affirmatively. Furthermore, when forced to guess, 47% guessed that constricted pupils were more attractive, and 53% thought dilated pupils were more attractive (see the Appendix Prediction Study). These results suggest that despite pupil's sizes might affect observers' perceptions at an unconscious level, laypeople cannot consciously predict whether and how pupils affect physical attractiveness.

Dilated pupils (i.e., smaller iris) and constricted pupils (i.e., bigger iris) might send diverging signals to observers. During the Renaissance, Italian women used the herb belladonna cosmetically to induce dilated pupils, which were thought to be attractive. Indeed, positive arousal (e.g., sexual attraction) induces pupil dilation. Because dilation might make the person appear interested and willing to cooperate, observers might like them more. In line with this, classic research has suggested that people with larger pupils might be evaluated more favorably on positive attributes than people with smaller pupils (Hess 1975). However, negative arousal (e.g., fear; Bradley et al. 2008) also causes pupil dilation. Based on this alternative account, dilated pupils might make the person appear as more distant, less approachable and, therefore, less likable.

So, are dilated or constricted pupils more attractive? Prior research suggested that a pupil's size is informative of the target's emotional state and indicated that perceptions' of the target's emotional state influence his attractiveness. However prior research has provided mixed evidence (Demos et al. 2008). Some studies found that dilated pupils are more attractive (Cunningham 1986;

Gründl et al. 2012; Hess 1975; Kret and De Dreu 2019), whereas others found no effect (Amemiya and Ohtomo 2012; Demos et al. 2008). Furthermore, some of those studies presented dynamic pupils that either constrict or dilate within trials (Kret and De Dreu 2019), which may induce different effects from static images of pupils. Moreover, most of those studies used black-and-white images (Cunningham 1986; Hess 1975; Kret and De Dreu 2019), limiting the ecological validity of these stimuli in marketing contexts, where colors are ubiquitous.

We propose that constricted pupils may be more attractive, for a very simple reason: A smaller pupil means a larger iris, and hence constricted pupils show brighter, more colorful eyes. Indeed, research on pupil dynamics has demonstrated that pupil size decreases at several levels of luminance (Bergamin et al. 1998). In simpler words, eyes with constricted pupils transmits more light, resulting in more iris color showed to observers. Crucially, such eye color can influence perceived physical attractiveness (Laeng, Mathisen, and Johnsen 2007). We therefore predict that constricted (vs. dilated) pupils improve the model's physical attractiveness and, consequently, consumers' attitudes towards advertisements.

OVERVIEW OF EMPIRICAL STUDIES

Previous research focused on the impact of pupils on human behaviors in the context of social interactions (Cunningham 1986; Gründl et al. 2012; Hess 1975; Kret and De Dreu 2019; Kret 2015). Most of previous studies in marketing looked at factors that influences pupil's size. This study investigates how pupil's size influences consumers' perceptions and attitudes.

Studies 1A and 1B demonstrate that constricted pupils increase perceptions of the models' attractiveness when consumers are exposed to eye-shots and headshots. Importantly, these studies

show that the effect generalizes to both male and female models, both highly and average attractive models, and different iris colors, and it holds regardless of the observer's iris color and gender.

Study 2 finds that constricted pupils positively affect attitudes when participants are exposed to advertisements with female and male models of a well-known cosmetic brand (Nivea). Studies 3A and 3B replicate our previous findings using two different brands (Clarins and La-Roche-Posay) and demonstrates that the positive effect of constricted pupils on consumers' attitudes toward the advertisement is driven by the enhanced perception of the model's physical attractiveness, which in turn increases trustworthiness. Finally, in contrast to previous literature in psychology suggesting that pupil size affects consumers' attitudes via pupil mimicry (Kret and De Dreu 2019), study 4 shows that, despite occurring, pupil mimicry does not explain the effect. Taken together, these findings suggest that, in the context of advertising, consumers might rely more on the pure aesthetic features of the model rather than their physiological reaction to form their evaluation.

All studies were preregistered and received ethical approval by the Research Ethics Committee at the authors' university.

STUDY 1A (eye-shots): CONSTRICTED PUPILS INCREASE PERCEPTIONS OF ATTRACTIVENESS

Study 1A tested whether constricted (vs. dilated) pupils increase perceptions of the model's physical attractiveness. Many prior studies on pupil size used stimuli cropped closely around the eyes (e.g., Brambilla, Biella, and Kret 2019; Kret, Fischer, and De Dreu 2015; Kret and De Dreu 2019; Van Breen et al. 2018). We therefore tested this main hypothesis by using "eye-shots" and an evaluation task. Moreover, we tested the generalizability of the effect across eye colors (i.e., blue or green vs. brown) and gender of the model. Before testing our hypothesis in the main experiment, we conducted a pilot study. We also pre-tested the sets of experimental stimuli in each of the two

studies (see table 1 in the appendix). Because they reveal brighter and more colorful irises, we predicted that models whose pupils are constricted are perceived as more physically attractive.

Methods

Pilot study. One hundred forty-one students (age 19-28, M = 21.33, SD = 1.45; 48.9% males) participated in this lab study for partial course credit. Standard practice in our lab is to collect 50 participants per condition in all lab-based studies, unless there is specific reason to deviate. Specifically, we decided a priori to include half of our participant allocations for the semester in which the study was conducted, which amounted to approximately 140 participants. Experimental stimuli consisted of 20 pairs of faces: ten with blue or green irises and ten with brown irises. Within each pair, one version was edited to have constricted pupils (10-15% of the iris diameter) and the other had dilated pupils (45-50% of the iris diameter).The pictures were selected from an Editing Quality Pretest (N = 80). Editing Quality Pretest to ensure that they were approximately equal in perceived naturalness (i.e., not overly edited).

In this pretest, we initially sampled 30 different female faces from online advertisements. The set included a mixture of female models with blue, green, and brown irises, and the images were cropped to include only the eye region. We created two versions of each picture: one in which the pupils were constricted (*M* = 13% of the iris diameter, Range = 10-15%) and one in which the pupils were dilated (*M* = 48%, Range = 45-50%). These pupil manipulations are consistent with those used in previous studies (e.g., Kret and De Dreu, 2019; Kret et al., 2015). This resulted in 60 edited photos. The two versions of each face were counterbalanced across different lists, so that participants did not evaluate both versions of any face. Additionally, in order to reduce the length of the pretest, we further divided the faces across two lists, thereby creating a total of four lists with no duplication of faces within any list. Eighty respondents on Prolific were informed that "We are interested in identifying pictures with poor editing," and for each picture they rated the extent to which "the editing makes the model appear unnatural," on a scale from 1 ("not at all") to 7 ("very much"). One participant failed the attention check and therefore was excluded from analyses.

From this pretest we selected ten pairs of pictures with brown-eyed models and ten pairs with blue- or green-eyed models, minimizing the difference between conditions in terms of editing quality. Indeed, a 2 (iris color: blue or green vs. brown) × 2 (pupil size: constricted vs. dilated) ANOVA confirmed that there was no difference in editing quality between constricted (M = 4.03, SE = .15) and dilated pupils (M = 4.05, SE = .15), $F(1, 77) = .012$, $p = .91$. Nor was there an effect of iris color or its interaction with pupil size, both $p > .28$. Thus, experimental stimuli consisted of 40 photos of female models (20 faces × 2 pupil sizes), half with blue or green irises and half with brown irises, and the photos were matched for the quality of editing.

Thus, experimental stimuli consisted of 40 photos of female models (20 faces × 2 pupil sizes), half with blue or green irises and half with brown irises, and the photos were all matched for how natural they appeared. We created two experimental lists, so that each list included the constricted pupil version of 10 pictures and the dilated-pupil version of the other 10 pictures. The two versions of each picture were counterbalanced across lists, so that each participant evaluated only one version (either dilated or constricted) of each face. Within each list, half of the models had blue or green eyes, and half had brown eyes. Thus, each list included 20 different faces: 5 constricted blue/green eyes, 5 constricted brown eyes, 5 dilated blue/green eyes, and 5 dilated brown eyes.

Participants were randomly assigned to one of the two lists. Note that participants evaluated only one version of each face (i.e., with either constricted or dilated pupils). Participants reported their age and gender, and then read the general task instructions. Each picture first appeared onscreen alone for 5 seconds, during which time participants were prevented from advancing to the next page. After 5 seconds, a 3-item measure of physical attractiveness appeared below the picture (“Please rate to what extent you consider the model in the picture...unattractive vs attractive; ugly vs beautiful; not sexy vs sexy; adapted from Ohanian 1990; Cronbach $\alpha = .91$). All items were measured on a scale from 1 to 7. After rating all 20 pictures, participants reported their own eye color (blue, green or brown).

Overall, the same models were judged more attractive when their pupils were constricted (M = 4.84, SD = .85) than when they were dilated (M = 4.74, SD = .79). A 2 (iris color: blue or green vs. brown) × 2 (pupil size: constricted vs. dilated) repeated measures ANOVA confirmed a significant main effect of pupil size, $F(1, 140) = 4.64$, $p = .033$, $\eta^2 = .032$. The main effect of iris color was also significant, $F(1, 140) = 33.76$, $p < .001$, $\eta^2 = .194$. Models with blue or green eyes (M = 4.94, SD = .84) were judged more attractive than models with brown eyes (M = 4.64, SD = .82). Iris color and pupil size did not interact, $F(1, 140) = .04$, $p = .843$, indicating that models with constricted pupils were perceived as more attractive, regardless of their eye color.

Next, we conducted a preregistered (http://aspredicted.org/blind.php?x=8kt5ks), high-powered, confirmatory experiment that was identical to the Pilot Study, but with a new set of both female and male eye-shots.

Participants (Study 1A). Sample size was based on power analysis (G*Power). Given the effect size in the Pilot Study ($\eta^2 = .032$), a repeated-measures ANOVA would require 102 participants to achieve power of .95. To ensure high power, however, we decided a priori to include our entire participant allocation for the semester in which the study was conducted. Thus, 257 students (age 18-31, M = 20.98 years, SD = 1.61; 39% males) participated for course credit.

Stimuli development (Study 1A). Stimuli consisted of 40 pairs of faces: 10 males with blue or green irises, 10 males with brown irises, 10 females with blue or green irises, and 10 females with brown irises. The pictures were modified in Adobe Photoshop. The original pupils in the photos were erased, the coloring of the iris was copied and pasted into the vacated space, and then the new pupils were pasted into the center of the iris. As is standard, pupil size was measured as a proportion of iris diameter (e.g., Gründl et al. 2012). The faces were cropped closely around the eye region (see Figure 1), and for each face we created one version in which the pupils were constricted (20% of the iris diameter) and one in which the pupils were dilated (50%). These pupil manipulations are consistent with those used in previous studies (e.g., Kret and De Dreu 2019; Kret, Fischer, and De Dreu 2015). Thus, there were 80 stimuli in total (2 sexes × 2 iris colors × 10

targets × 2 pupil sizes). The faces were obtained from an informal internet search, and were selected from an Editing Quality Pretest. The constricted and dilated versions of the faces were matched for editing quality.

The *Editing Quality Pretest* was conducted in two rounds. We initially sampled 60 different faces from the internet (15 males with blue or green irises, 15 males with brown irises, 15 females with blue or green irises, and 15 females with brown irises). The images were cropped to include only the person's eye region. We then followed the same procedure of the Pilot Study to modify pupil size. We created two versions of each picture: one in which the pupils were constricted (20% of the iris diameter) and one in which the pupils were dilated (50% of the iris diameter). These pupil manipulations are consistent with those used in previous studies (e.g., Kret and De Dreu 2019; Kret, Fischer, and De Dreu 2015). This resulted in 120 edited photos. The two versions of each face were counterbalanced across different lists, so that participants did not evaluate both versions of any face. Fifty respondents on Prolific were informed that "We are interested in identifying pictures with poor editing," and for each picture they rated the extent to which "the editing makes the person appear unnatural," on a scale from 1 ("not at all") to 7 ("very much"). From this pretest we selected ten pairs of pictures with brown-eyed females and ten pairs with blue or green-eyed females, minimizing the difference between conditions in terms of how well edited the pictures appeared. However, several of the pairs of male faces were rated significantly different in editing quality. We therefore decided to replicate the above procedure with another pretest including male faces only. We subsequently sampled 30 different male faces from the internet (15 with blue or green irises, 15 with brown irises). Fifty respondents on Amazon Mechanical Turk followed the same procedure described above. Three participants failed the attention check and therefore were excluded from the analysis. From this pretest we selected ten pairs of pictures with brown-eyed males and ten pairs with blue- or green-eyed males, minimizing the difference between conditions in terms of editing quality. We then merged the data from the two rounds of pretesting (females and males), and conducted a 2 (iris color: blue or green vs. brown) × 2 (pupil size: constricted vs. dilated) × 2 (sex:

male vs. female) mixed ANOVA on the 80 selected photos. There was a significant sex × iris color interaction, $F(1, 95) = 5.48$, $p = .021$. The photos of blue and green-eyed females appeared less natural (i.e., higher scores) than the brown-eyed females, whereas the photos of males were equally natural across iris colors. More importantly, however, there was no difference in editing quality between constricted ($M = 4.00$, $SD = 1.08$) and dilated pupils ($M = 3.89$, $SD = 1.04$; $F(1, 95) = 1.34$, $p = .25$), nor did pupil size interact with sex ($p = .66$) or iris color ($p = .58$), nor was the 3-way interaction significant ($p = .83$). Thus, photos with constricted or dilated pupils were matched for quality of editing. Examples of the stimuli are shown in Figure 13.

Figure 13. Examples of edited female and male eye-shots used in study 1A.

Procedure (Study 1A). At the beginning of the study, participants indicated their sex and age. They were then funneled to an experimental list including only opposite-sex faces. Within each target-sex condition, the stimuli were further divided among two experimental lists. Each list included the constricted-pupil version of 10 faces and the dilated-pupil version of the other 10 faces. The two versions of each face were counterbalanced across lists, so that each participant evaluated only one version (either dilated or constricted) of each face. Within each list, half of the faces had blue or green eyes, and half had brown eyes. Thus, each list included 20 different opposite-sex eye-shots: 5 constricted blue/green eyes, 5 constricted brown eyes, 5 dilated blue/green eyes, and 5 dilated brown eyes. On each trial, the face first appeared on-screen alone for 5 seconds, during which time participants were prevented from advancing to the next page. After 5 seconds, the question "How attractive is this face?" appeared below the face. Participants responded on a slider scale from 0 ("very unattractive") to 100 ("very attractive"). The slider was preset on 50 at the beginning of each trial. After rating all 20 faces, participants reported their own eye color (options: blue, green, or brown).

Results (Study 1A). As predicted, faces appeared more attractive with constricted pupils (M = 51.84, SE = .82) than with dilated pupils (M = 47.98, SE = .83). A 2 (iris color: blue/green vs. brown; within) × 2 (pupil size: constricted vs. dilated; within) × 2 (target sex: male vs female; between) mixed ANOVA confirmed a significant main effect of pupil size, $F(1, 255) = 46.74$, $p < .001$, $\eta^2 = .16$. There was a significant iris color x gender interaction ($F(1, 255) = 117.42$, $p < .001$, $\eta^2 = .32$), such that male participants rated female targets more attractive with blue or green eyes (M = 60.83, SD = 12. 79) than with brown eyes (M = 45.47, SD = 15.73), whereas female participants rated male targets more attractive with brown eyes (M = 45.72, SD = 15.43) than blue or green eyes (M = 43.98, SD = 13.00). Some prior research has found that effects of eyes on perceived attractiveness may depend on the respondent's own eye color (Laeng, Mathisen, and Johnsen 2007). Of our 257 participants, 171 had brown eyes and 86 had blue or green eyes. Following our preregistered plan, we conducted a 2 (target iris color) × 2 (target pupil size) × 2 (participant iris

color) mixed ANOVA. Participant iris color did not interact with target iris color or pupil size, both $p > .27$. Thus, regardless of the participant's eye color and the target's eye color, faces appeared more attractive with constricted pupils than with dilated pupils.

Discussion. Using eye-shots and an evaluation task, study1A showed that constricted (vs. dilated) pupils increase consumers' perceptions of the model's physical attractiveness, regardless of the model's eye color and participant's eye color. In this study, we purposely used eye-shots to maximize the viewers' focus on the eyes and establish the main effect. However, as advertisements less frequently feature eye-shots compared to whole faces, in the next study we replicate the effect using headshots. Furthermore, study 1A tested the effect across a large set of stimuli, with models varying in physical characteristics and level of attractiveness. However, to more clearly establish the robustness of our effect across different level of attractiveness, in the next study, we pre-test and include both highly and average attractive models. Lastly, in this study, participants were asked to rate models of their opposite gender and it might be that pupils lose their signaling qualities when evaluating a person of the same sex. In the next study, we examine whether the effect holds when viewers evaluate a person of their same sex, by asking participants to evaluate both male and female models.

STUDY 1B (head-shots): CONSTRICTED PUPILS INCREASE PERCEPTIONS OF ATTRACTIVENESS

Study 1B sought to replicate the main effect, by testing whether constricted pupils increase perceptions of the model's physical attractiveness using headshots. Unlike the previous study, we asked participants to choose between two pictures of the same model in two different poses, for both genders. Importantly, pictures were manipulated such that in one picture the model had constricted pupils and in the other one, dilated pupils. Furthermore, we manipulated the model's level of attractiveness, by including both highly and average attractive models. We predicted that constricted pupils would be chosen as more attractive. This study entailed a series of three stimulus pretests, a pilot experiment, and finally a preregistered confirmatory experiment (see table 5).

Table 5. Results of the stimulus pretests. Pilot Study 1A, and preregistered Study 1A.

Target Characteristics			Pilot Study				Preregistered Study			
			Pretest 1		Study		Pretest 2		Study	
			Editing Quality		Attractiveness		Editing Quality		Attractiveness	
Sex	Iris Color	Pupil Size	*M*	*SE*	*M*	*SE*	*M*	*SE*	*M*	*SE*
Female	Blue/green	Constricted	4.19	0.21	4.99	0.09	4.43	0.17	62.82	1.48
		Dilated	3.99	0.21	4.90	0.08	4.39	0.18	58.84	1.35
	Brown	Constricted	3.87	0.22	4.69	0.09	3.97	0.17	49.84	1.48
		Dilated	4.11	0.21	4.56	0.08	3.87	0.15	45.47	1.55
Male	Blue/green	Constricted	—	—	—	—	3.82	0.18	46.08	1.19
		Dilated	—	—	—	—	3.73	0.18	41.89	1.09
	Brown	Constricted	—	—	—	—	3.78	0.18	48.61	1.19
		Dilated	—	—	—	—	3.57	0.16	45.72	1.25

Note. In Pretest 1 (N = 80), after editing the faces to have constricted or dilated pupils, participants rated the extent to which "the editing makes the person appear unnatural" on a 1-7 scale (note: lower scores indicate more natural-looking photos). In the Pilot Experiment (N = 141), participants rated the faces on a 3-item measure of physical attractiveness on a 1-7 scale. Pretest 2 (N = 100) replicated the procedure of Pretest 1, but with a new set of female and male faces. In the Preregistered Experiment (N = 257), participants evaluated the attractiveness of opposite-sex faces on a slider scale from 0 ("very unattractive") to 100 ("very attractive").

Methods

Stimulus Development. First we sought to identify target females and males that varied in attractiveness (i.e., one attractive female, one average female, one attractive male, and one average male), in order to test the generality of the presumed effect. Next, for each of the selected target people, we sought to identify two photos that were similarly attractive. Finally, after manipulating the pupils of the selected photo pairs, we sought to ensure that those photos were equally well edited.

In the *Target Attractiveness Pretest,* our goal was to ensure that the four people (i.e., two females, two males) selected for the study were perceived to be of different levels of attractiveness. In other words, we aimed to identify one male and one female that were perceived as highly attractive, and one male and one female that were perceived as less attractive. The target people were chosen from an informal internet search, with the constraint that we needed at least three different photos (i.e., in different poses) for each target. The four selected targets are shown in figure 14.

Figure 14. Unedited headshots of the attractive female (top left), used in study 1B.

Forty-nine respondents from Prolific online research panel were asked to evaluate all four target people, in random order. For each target, we used a single photo cropped around the head (i.e., headshot only), with the target facing the camera directly. Participants were asked "How attractive is this face?", rating the faces on a scale from 1 ("very unattractive") to 7 ("very attractive"). Results confirmed that the four targets differed substantially in attractiveness (see table 2). One female was perceived as significantly more attractive than the other ($t(48) = 5.54$, $p < .001$), and one male was perceived as significantly more attractive than the other ($t(48) = 7.59$, $p < .001$).

In the *Photo Selection Pretest*, our goal was to identify two pictures (i.e., two different poses) for each of the four targets that were perceived as similarly attractive. We sampled three or four photos of each person, and for each person we combined all possible pairs of photos. This resulted in a total of sixteen pairs of photos. One hundred respondents on Prolific were shown all sixteen pairs of photos and were instructed to select from each pair the photo in which the person appears "more attractive." Both the order in which the pairs appeared and the position (left vs. right) of the pictures within each pair were randomized. None of the participants failed the attention check, so all were included in analyses. We selected, for each person, the pair of photos that were best matched for attractiveness (see table 6).

Table 6. Results of the stimulus pretests. Pilot study 1B, and preregistered study 1B.

		Pretest 1			Pretest 2		Pretest 3		Pilot Study	Preregistered Study
		Rated Attractiveness			Attractive		Editing Quality		Attractive	Attractive
Sex	Attractiveness	*M*	*SE*	Pose	Choice	Pupil Size	*M*	*SE*	Choice	Choice
Female	Attractive	5,78	0,14	A	50%	Constricted	2,92	0,23	43%	54%
						Dilated	2,82	0,22	36%	29%
				B	50%	Constricted	2,94	0,23	64%	71%
						Dilated	3,00	0,21	57%	46%
	Average	4,63	0,17	A	31%	Constricted	2,94	0,21	50%	32%
						Dilated	2,96	0,25	16%	22%
				B	69%	Constricted	2,50	0,22	84%	78%
						Dilated	2,86	0,24	50%	68%
Male	Attractive	5,12	0,18	A	49%	Constricted	2,72	0,25	41%	52%
						Dilated	2,60	0,21	36%	35%
				B	51%	Constricted	3,36	0,23	64%	65%
						Dilated	3,00	0,20	59%	48%
	Average	3,57	0,18	A	48%	Constricted	2,38	0,23	57%	49%
						Dilated	2,90	0,26	33%	25%
				B	52%	Constricted	3,12	0,26	67%	75%
						Dilated	3,70	0,28	43%	51%

Note. In Pretest 1 (N = 49), participants rated the attractiveness of two female and two male faces on a 1-7 scale. In Pretest 2 (N = 100), participants chose which of two unedited poses made the person "appear more attractive." In Pretest 3 (N = 100), after editing the faces to have constricted or dilated pupils, participants rated the extent to which "the editing makes the person appear unnatural" on a 1-7 scale (note: lower scores indicate more natural-looking photos). In the Pilot Study (N = 99), participants chose which of two edited poses (constricted vs. dilated pupils) made the person "appear more attractive." One pose within each pair had constricted pupils, and the other had dilated pupils (counterbalanced across two experimental lists). The preregistered study (N = 252) was identical to the Pilot Study

Having thus selected two photos for each of four target people, we next edited the targets' pupils to be constricted or dilated. In the manipulation of pupil's size we followed the same procedure that we used in study 1A. Like in study 1A, we created two versions of each picture: one in which the pupils were constricted (20% of the iris diameter) and one in which the pupils were dilated (50%). This resulted in sixteen experimental photos (4 targets × 2 poses × 2 pupil sizes).

Finally, to ensure that the manipulated images did not differ in the quality of editing, 100 respondents on Prolific participated in an *Editing Quality Pretest*. We created two experimental lists, so that each list included the constricted-pupil version of four pairs and the dilated-pupil version of the other four pairs The two versions of each picture were counterbalanced across lists, so that each participant evaluated only one version (either dilated or constricted) of each picture. Participants were randomly assigned to one of the two lists, and rated the extent to which "the editing makes the person appear unnatural," on a scale from 1 ("not at all") to 7 ("very much"). None of the participants failed the attention check, so all were included in the analyses. For each of the eight photos (4 people × 2 poses), an independent *t*-test confirmed no significant difference in editing quality between the constricted and dilated versions of the photo, all $p > .13$ (see table 2). These eight photos therefore were used as stimuli in the Pilot Study (below) and in the pre-registered Study 1B.

Pilot Study. In this pilot study, participants viewed the four matched pairs of photos (4 targets × 2 poses), and for each pair they judged which photo made the person appear more attractive. Critically, one photo within each pair had constricted pupils, and the other had dilated pupils (counterbalanced across two experimental lists).

Ninety-nine respondents (age 18-73, $M = 34.23$ years, $SD = 12.38$; 39% males) recruited from Prolific participated. All reported current residence in the US, UK, or Canada. To ensure that participants paid attention to the task, we included an attention check at the beginning of the study. All participants passed this attention check, so all were included in the analysis.

Participants then viewed four pairs of photos, one pair for each target person. Within each pair, the two photos showed the target in two different poses. Also within each pair, one photo had constricted pupils and the other had dilated pupils. We created two experimental lists, so that the photos with constricted pupils in one list were dilated in the other list, and vice versa. To be clear, each participant saw only one version (constricted or dilated) of each photo. Participants were randomly assigned to one of the lists, the four pairs of photos within each list appeared in random order, and the left/right position of the pictures was also randomized. Participants reported their age and sex, and for each pair of photos they were asked "In which photo do you think the person appears more attractive?".

We calculated for each participant the proportion of trials (out of four) in which the photo with constricted pupils was chosen as more attractive. As predicted, a one-sample *t*-test revealed that participants chose the photo with constricted pupils significantly more often than chance (M = .60, SD = .25, $t(98) = 3.97$, $p < .001$, $d = .40$).

Finally, we conducted a preregistered (https://aspredicted.org/blind.php?x=8rp2qk), high-powered, confirmatory Study 1B (described below) that was identical to the Pilot Study. See table 2 for stimulus characteristics, and see figure 2 for example stimuli.

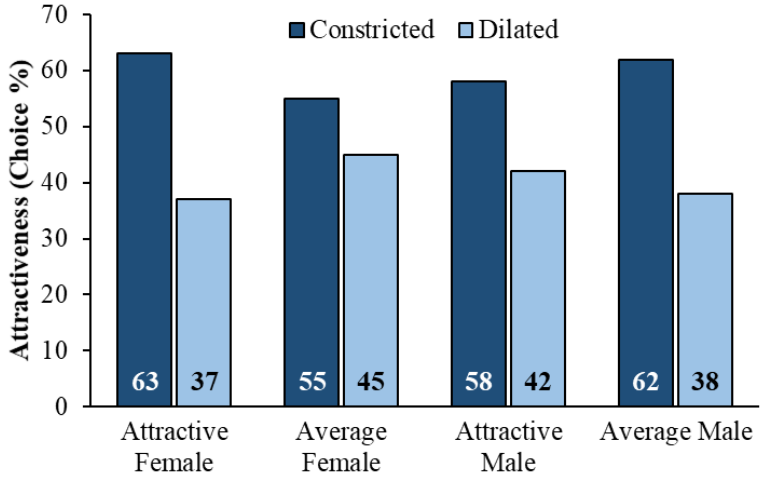
Participants (Study 1B). Sample size was based on power analysis (G*Power). Given the effect size in the Pilot study ($d = .40$), a two-tailed one-sample *t*-test would require 84 participants to achieve power of .95. To ensure high power, however, we tripled that recommended N. Thus, we recruited 252 respondents (age 18-75, M = 33.04 years, SD = 11.66; 41% males) from Prolific online platform. All reported current residence in the US, UK, or Canada. They were paid £.20 for participating.

Procedure (Study 1B). This study included the same set of stimuli from the Pilot Study. Participants first reported their age and sex, and completed an attention check. All participants passed this attention check, so all were included in the analysis. Participants then completed four trials of a 2-alternative forced choice task. Each trial consisted of one of the four target people

shown in two different poses. Within each trial, the target's pupils were constricted in one photo and dilated in the other. To counterbalance the combination of poses and pupils, we created two experimental lists, so that the photos with constricted pupils in one list were dilated in the other list, and vice versa. Each participant saw only one version (constricted or dilated) of each photo. Participants were randomly assigned to one of the lists, the four trials appeared in random order, and the left/right position of the pictures was also randomized. On each trial, participants were asked "In which photo do you think the person appears more attractive?".

Results (Study 1B). We calculated for each participant the proportion of trials in which the photo with constricted pupils was chosen as more attractive. As predicted, a one-sample *t*-test revealed that participants chose the photo with constricted pupils significantly more often than chance (M = .60, SD = .27, $t(251) = 5.54$, $p < .001$, d = .35). Moreover, following our preregistered analysis plan, we tested whether the targets' sex and attractiveness affected participants' choices. We conducted a logistic regression on choice (constricted vs. dilated), including the target's sex (female vs. male) and attractiveness (attractive vs. average) as predictors, clustering standard errors by participants. Neither the target's sex nor attractiveness significantly predicted participants' choices (both *ps* > .49). Thus, constricted pupils were judged as more attractive regardless of the target person's sex and attractiveness (figure 15).

Figure 15 Results of study 1B. Faces with constricted pupils were chosen as more attractive than faces with dilated pupils, regardless of the target person's sex and attractiveness.



Discussion. Using a choice task and manipulating the model's level of attractiveness, Study 1B showed that constricted pupils are chosen as more attractive. Importantly, this study demonstrates that the effect generalizes across different levels of attractiveness and replicates when viewers evaluate models of their same sex. Given that attractiveness is typically appreciated by consumers in a wide range of marketing contexts, we tested whether constricted pupils improve consumers' attitudes towards advertisements in the next study.

STUDY 2: CONSTRICTED PUPILS IMPROVE ATTITUDES

Study 2 tested whether constricted (vs. dilated) pupils influence consumers' attitudes toward advertisements. Participants evaluated ads with female models with constricted or dilated pupils. The study was pre-registered (https://aspredicted.org/blind.php?x=p6zv77). We predicted that models with constricted pupils will enhance consumers' attitudes.

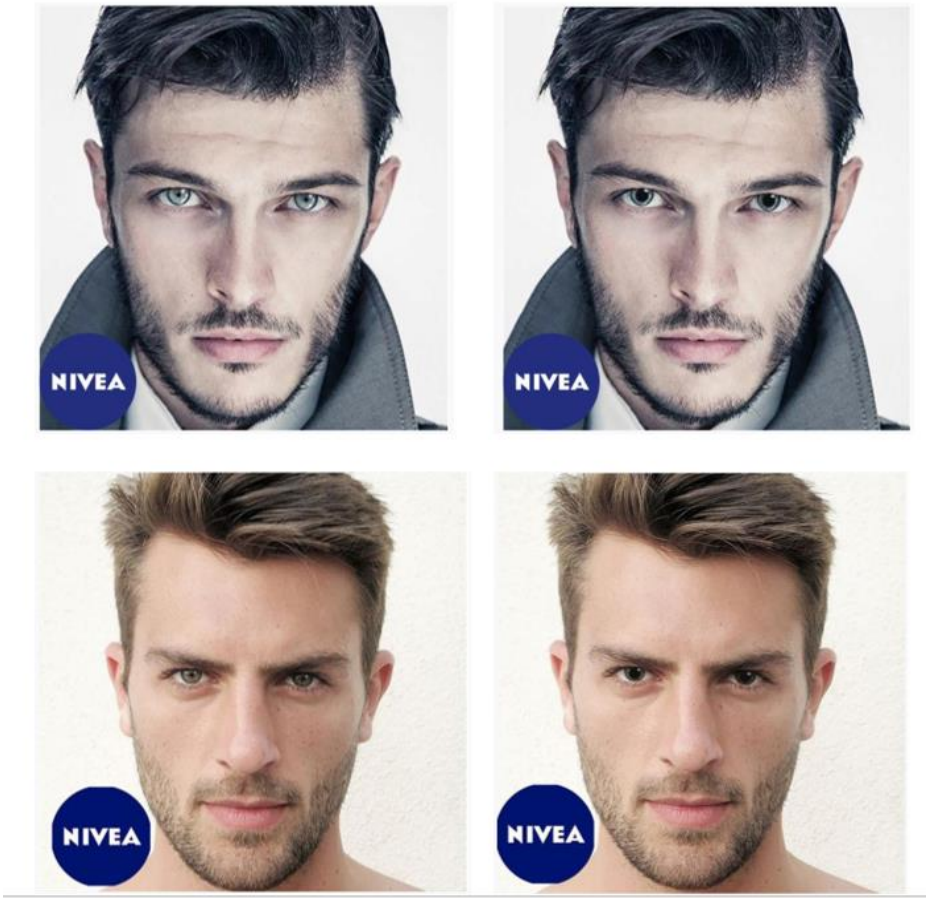
Methods

Stimuli development. We selected forty pictures, twenty female models and twenty male models, from an internet search. We next edited the targets' pupils to be constricted or dilated. The pictures were modified using the same procedure of studies 1A and 1B. We created two versions of each picture: one in which the pupils were constricted (15 - 20% of the iris diameter) and one in which the pupils were dilated (60 - 65%). This resulted in eighty experimental photos (40 targets × 2 pupil sizes).

To ensure that the manipulated images did not differ in the quality of editing, 60 respondents on Prolific participated in an *Editing Quality Pretest*. We created two experimental lists, so that each list included the constricted-pupil version of forty pictures (20 females and 20 males) and the dilated-pupil version of the other forty pictures. The two versions of each picture were counterbalanced across lists, so that each participant evaluated only one version (either dilated or constricted) of each picture. Participants were randomly assigned to one of the two lists and rated

the extent to which "the editing makes the model look unnatural," on a scale from 1 ("not at all") to 7 ("very much"). None of the participants failed the attention check, so all were included in the analyses. An independent *t*-test confirmed no significant difference in editing quality between the constricted and dilated versions of twenty photo, all $p > .15$. Among these stimuli we selected four pictures, two females and two males (see figure 16). To those pictures we added a logo of a popular brand of skincare products (Nivea). This resulted in eight advertisements (4 targets x 2 pupil sizes).

Figure 16. Examples of edited ads used in study 2.



Participants. The sample size of study 2 replicated the sample size of the previous studies. Two hundred and fifty-four respondents (age 18-72, $M = 35.07$ years, $SD = 12.45$; 39% males) all recruited from Prolific Academic participated. All reported current residence in the US, UK, or Canada. They were paid £.20 for participating.

Procedure. To ensure that participants paid attention to the task, we included an attention check at the beginning of the study and one at the end of the study. Two participants failed one of the two attention checks and following our preregistration plan we excluded them from the analysis. We created two experimental lists, so that the photos with constricted pupils in one list were dilated in the other list, and vice versa. Replicating previous studies' procedure, each participant saw only one version (constricted or dilated) of each photo. Participants were randomly assigned to one of the lists, and the four pairs of photos within each list appeared in random order. After participants were exposed to each ad, we asked them to rate their attitudes toward the ad. Attitudes toward the ad were measured using two items ("I like this ad; this ad is good") rated on a scale from 1 (strongly disagree) to 7 (strongly agree). The items in the scale were randomized. After participants rated the ads, they reported their age, sex and eye color. Before being redirected to the Prolific page to get paid, they could also leave a comment about the study.

Results. As predicted ad attitudes improve when the models' pupils are constricted (M = 4.08, SD = 1.33) compare to dilated (M = 3.86, SD = 1.31). A 2 (pupil size: constricted vs. dilated; within) × 2 (target sex: male vs female; within) mixed ANOVA confirmed a significant main effect of pupil size, $F(1, 251) = 7.02$, $p = .009$, $\eta^2 = .03$. There was also a significant main effect of gender, such that attitudes toward the ad were more positive when a female model was present in the ad (M = 4.10, SD = 1.21) compared when a male model was present (M = 3.83, SD = 1.35 , $F(1, 251) = 13.87$, $p < .001$, $\eta^2 = .05$). However, the interaction between pupil size and target gender was not significant $F(1, 251) = .89$, $p = .344$, $\eta^2 = .04$.

Of our 252 participants included in the analysis, 116 had brown eyes and 136 had blue or green eyes. Following our preregistered plan, we conducted a 2 (target pupil size) × 2 (target sex) x 2 (participant iris color) mixed ANOVA. Participant iris color did not interact with pupil size or target sex, nor there was a three-way interaction, all $p > .35$. To test the role of participant's sex, we conducted a 2 (target pupil size) x 2 (target sex) x 2 (participant sex) mixed ANOVA. Results confirmed that participant's sex did not interact with pupil size or target sex, nor there was a three-way interaction, all $p > .13$. Thus, regardless of the model's sex, participant's eye color and participant's sex, attitudes toward the ad were more positive when the model's pupils were constricted than dilated.

Discussion. Study 2 showed that ads featuring models whose pupils are constricted (vs dilated) are liked more by consumers. As in the previous study, the positive impact of constricted pupils on consumers' attitudes generalizes to both male and female models and holds regardless of participants' eye color. Taken together, these results suggest that constricted pupils improve consumers' attitudes towards the advertisement because consumers perceive the model as more physically attractive. We therefore more directly test this underlying mechanism in the next study.

STUDIES 3A AND 3B: PERCEPTION OF MODELS' ATTRACTIVENESS IMPROVEATTITUDES TOWARD THE AD

Study 3 replicated our previous findings and tested whether the positive impact of constricted pupils on consumers' attitudes toward the ad is driven by the model's physical attractiveness. Given that prior research suggests that pupil dilation increases trust toward the target (Kret, Fischer, and De Dreu 2015) and demonstrates that attractiveness has positive spillover effects on other attributes (i.e., beauty premium: Hamermesh and Biddle 1994), we examined whether constricted pupils, by increasing perceptions of the models' attractiveness, also increase perceptions of trust. Studies 3A and 3B were conducted in the lab with the same design as Study 2, differing from one another only in the model's eye color and the brand (Study 2A used LaRoche-Posay ads with blue-eyed models; 2B used Clarins ads with brown-eyed models). We collected the data from the studies separately, but we aggregated them before analyzing the results. Study 3B was preregistered https://aspredicted.org/blind.php?x=yr589a. We predicted that constricted pupils enhance the model's perceived attractiveness, trustworthiness and consumers' attitude toward the ad. We also examined whether attractiveness and trustworthiness explained the positive impact of constricted pupils on consumers' ad evaluations.

Methods

Participants. One hundred and five respondents (age 19-25, M = 21.38 years, SD = 1.01; 35% males) participated in Study 3A.One hundred respondents (age 18-24, M = 21.65 years, SD = 1.19; 40% males) participated in Study 3B. In both studies, students were rewarded one course credit for their participation.

Stimuli development. In Study 3A, we used as stimuli twenty different advertisements of a famous cosmetic brand (La Roche-Posay) with faces of female models. In Study 3B, we created twenty different advertisements, by selecting pictures of twenty faces of female models from an online search, and then added the logo of another famous cosmetic brand (Clarins). The pictures were modified using the same procedure of previous studies. We created two versions of each

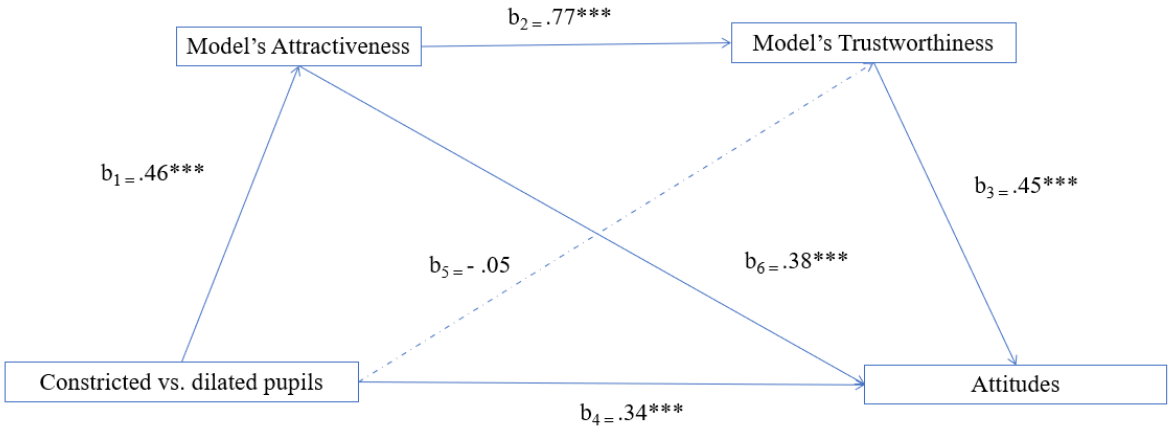
picture: one in which the pupils were constricted (10 - 25% of the iris diameter) and one in which the pupils were dilated (60 - 75%).

Procedure. Studies 3A and 3B followed the same procedure. We created two experimental lists, so that the photos with constricted pupils in one list were dilated in the other list, and vice versa. Participants were randomly assigned to one of the lists and the twenty pairs of ads within each list appeared in random order. Participants saw only one version of each ad. Each ad first appeared onscreen alone for 5 seconds, during which time participants were prevented from advancing to the next page. After they were exposed to each ad, we asked them to rate their attitudes toward the ad, and their perceptions of the model's physical attractiveness and trustworthiness. Attitudes toward the ad were measured using two items ("I like this ad; this ad is good") rated on a scale from 1 (strongly disagree) to 7 (strongly agree). Perception of the model's physical attractiveness was measured using one item ("The model is attractive") rated on a scale from 1 (strongly disagree) to 7 (strongly agree). Perception of the model's trustworthiness was measured using one item ("The model appears trustworthy") rated on a scale from 1 (strongly disagree) to 7 (strongly agree). Participants reported their age, sex and were free to leave a comment about the study.

Results. Replicating the results of previous studies, a 2 (pupil size: constricted vs. dilated, within) x 2 (iris color: blue vs. brown, between) mixed ANOVA revealed a main significant effect of pupil size on attractiveness, such that models appeared more attractive with constricted pupils (M = 5.02, SD =.81) than with dilated pupils (M = 4.56, SD = .94; $F(1, 204) = 96.25$, $p < .001$, η^2 = .33). There was also a main significant effect of pupil size on trustworthiness, such that model appeared more trustworthy when pupils were constricted (M = 4.52, SD = .83) than dilated (M = 4.22, SD = .84; $F(1, 204) = 20.80$, $p < .001$, $\eta^2 = .09$). Lastly, as in Study 2, we qualified for a main significant effect of pupil size on ad attitude, such that consumers liked the ad more when the model's pupils were constricted (M = 4.23, SD = .95) than dilated (M = 3.90, SD = .92; $F(1, 204)$ = 43.37, $p < .001$, $\eta^2 = .18$).

Mediation analysis. To test if constricted pupils influence consumers' attitudes via the perception of the model attractiveness and trustworthiness, we estimated a multiple-step mediation using model 1 in MEMORE (Montoya 2019). Figure and estimated path coefficients and results on all indirect effects are reported in figure 15. As predicted, we found a significant indirect effect (.16; 95% CI from .11 to .22) for the mediation path through the perception of the model's attractiveness and trustworthiness. The indirect effect through the model's trustworthiness was not significant, showing that trustworthiness influences attitudes only via attractiveness. In conclusion, study 3 demonstrated that constricted pupils' positive impact on ad attitudes is driven by the model's perceived physical attractiveness and trustworthiness. These findings show that constricted (vs. dilated) pupils improve consumers' attitudes toward the ad because they make the model appear more physically attractive and, consequently, more trustworthy.

Figure 17. Mediation analysis studies 3A and 3B.



- Multiple step mediation analysis with 5,000 bootstrap bias corrected CI samples (model 1 in MEMORE; Montoya 2019). Coefficients significantly different from zero are indicated by asterisk (*p<.05; **p<.01; ***p<.001).
- The total indirect effect was significant (.31; 95% CI from .22 to .41)
- The indirect effect through model's attractiveness and trustworthiness was significant (.16; 95% CI from .11 to .24)
- The indirect effect through model's attractiveness was significant (.17; 95% CI from .11 to .24)
- The indirect effect through model's trustworthiness was not significant (-.02; 95% CI from - .09 to .04)

Discussion. Studies 3A and 3B identified the underlying mechanism as the increased perceptions of the model's physical attractiveness. Also, this study provided evidence that, by increasing the model's physical attractiveness, constricted pupils also affect the extent to which consumers perceive the model as trustworthy. This all follows through to ad attitude: Models with

constricted (vs. dilated) pupils improve consumers' attitudes towards the advertisement. Prior research (e.g., Fawcet et al. 2016) explained the positive impact of pupil size on several outcomes via pupil mimicry, which is the tendency to assimilate to another person's pupil dilation. It might be that the positive impact on consumers' attitudes that we found in our studies is a consequence of participants' tendency to mimic the model's pupil size. However, differently from our studies, prior studies tested the impact of dynamic changes in the model's pupil size. Therefore, we test whether pupil mimicry arises when consumers are exposed to static pupil sizes and, if this is the case, whether it is pupil mimicry that explains the positive effect on consumers' attitudes.

STUDY4: PUPIL MIMICRY DOES NOT INFLUENCE CONSUMERS' ATTITUDES

Study 4 replicated our previous findings and tested pupil mimicry as an additional mechanism explaining the positive impact of constricted (vs. dilated) pupils on ad attitude. We predicted that pupil mimicry is also observed in static stimuli and explored whether it influences attitudes toward the ad.

Methods

Participants. Seventy-eight participants (age 19-24, *M* = 21.65 years, SD = 1.12; 33% males) participated to a lab study and were rewarded one course credit for their participation. Due to a technical problem, responses from one participant were not recorded.

Stimuli. Stimuli consisted of twenty different advertisements for a famous cosmetic brand (La Roche-Posay) with female models. The pictures were modified using the same procedure as previous studies. We created two versions of each picture: one in which the pupils were constricted (10 -25% of the iris diameter) and one in which the pupils were dilated (60 -75 %).

Procedure. We created two experimental lists so that the photos with constricted pupils in one list were dilated in the other list, and vice versa. Participants were randomly assigned to one of the lists. The twenty pairs of ads within each list appeared in random order. A blank screen serving as a baseline for participants' pupil size preceded each stimulus. Participants were exposed to the blank screen for two seconds. Participants were then exposed to twenty ads, eight seconds each.

Importantly, while viewing both the blank screen and the ads, participants' pupil size was recorded via a remote eye-tracker. After each ad, we asked participants to rate their attitudes toward the ad and their perceptions of the model's physical attractiveness and trustworthiness. Attitudes toward the ad were measured using two items ("I like this ad; this ad is good") rated on a scale from 1 (strongly disagree) to 7 (strongly agree). Perception of the model's physical attractiveness was measured using one item ("The model is attractive") rated on a scale from 1 (strongly disagree) to 7 (strongly agree). Perception of the model's trustworthiness was measured using one item ("The model appears trustworthy") rated on a scale from 1 (strongly disagree) to 7 (strongly agree). Participants reported their age and sex at the end of the study.

Results. Replicating the results of previous studies, models appeared more attractive with constricted pupils (M = 5.27, SD = .84) than with dilated pupils (M = 4.90, SD = .92; $t(76)$ = 6.15, $p < .001$, $\eta^2 = .33$). Again, the model appeared more trustworthy with constricted pupils (M = 4.70, SD = .86) than with dilated pupils (M = 4.47, SD = .86; $t(76) = 3.25$, $p = .002$, $\eta^2 = .12$). Finally, ads with models with constricted pupils improved consumers' attitudes more (M = 4.26, SD = 1.02) than ads with models with dilated pupils (M = 3.95, SD = 1.02; $t(76) = 4.48$, $p < .001$, $\eta^2 = .20$).

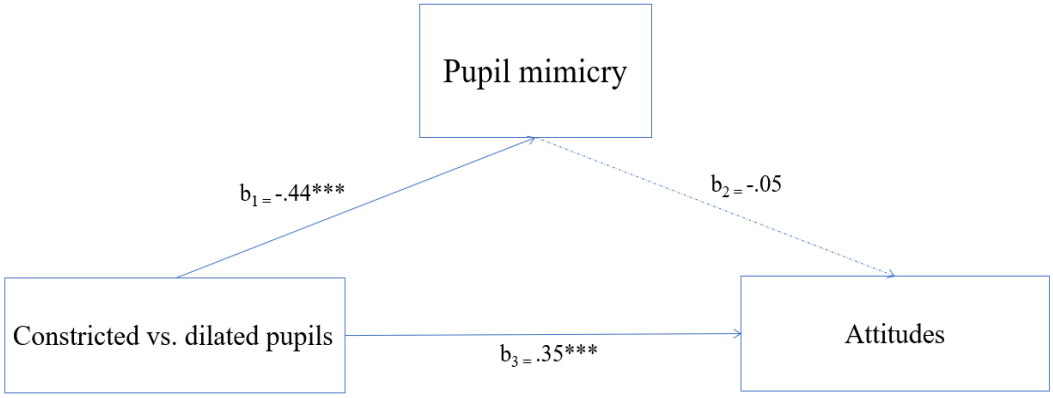
To examine whether pupil mimicry occurred, for each stimulus, we calculated a measure of *pupil mimicry* as the change in participants' pupil's size. We subtracted the baseline pupil size (when participants were exposed to the blank screen) from the pupil size on the stimulus (when participants were exposed to the model). We then averaged the means of the twenty stimuli across the two conditions (constricted and dilated). Given the possibility of measurements errors and presence of outliers due to the eye tracker, we used the following exclusions rules for the values in each trial: (1) if the eye tracker failed to record either the pupil size on the blank page or the corresponding ad, we removed both of them and (2) if the eye tracker successfully recorded both the pupil size on the blank page and the corresponding ad, we removed those trials that reported pupil sizes that deviated ±2.5 SD from the mean.

Results show that participants' eyes dilate significantly more when they saw a model with dilated pupils (M = 1.97, SD = 1.36) rather than constricted pupils (M = 1.60, SD = 1.42, $t(76)$ = -2.95, p = .004, η^2 =.10), suggesting that pupil mimicry occurs also in presence of static stimuli. These findings replicated when we considered the participant's pupil size on the model's eye region instead of the entire ad, confirming that participants automatically mimic the model's pupil size, with larger pupils for ads where models had dilated pupils (M = 2.12, SD = 1.47) than for ads where models had constricted pupils (M = 1.68, SD = 1.45, $t(76)$ = -2.89, p = .005, η^2 =.10)

Mediation analysis (attractiveness and trustworthiness). To test whether constricted pupils influence consumers' attitudes via perceptions of the model's attractiveness and trustworthiness, we estimated multiple-step mediation using model 1in MEMORE (Montoya 2019). Figure and estimated path coefficients and results on all indirect effects are reported in figure 16. Replicating the findings of studies 3A and 3B, we found a significant indirect effect (.15; 95% CI from .07 to .29) for the mediation path through the perception of the model's attractiveness and trustworthiness. In addition, the indirect effect through the model's trustworthiness was not significant, showing that trustworthiness influences attitudes only via attractiveness.

Mediation analysis (pupil mimicry). In order to test whether constricted pupils influence consumers' attitudes via pupil mimicry, we estimated a multiple-step mediation using model 1in MEMORE (Montoya 2019). Figure and estimated path coefficients and results on all indirect effects are reported in figure 17. We did not find a significant indirect effect (-.02; 95% CI from -.08 to .01) for the mediation path through pupil mimicry.

Figure 18. Mediation analysis study 4.



- Multiple step mediation analysis with 5,000 bootstrap bias corrected CI samples (model 1 in MEMORE; Montoya 2019). Coefficients significantly different from zero are indicated by asterisk (*p<.05; **p<.01; ***p<.001).
- The indirect effect through pupil mimicry was not significant (-.02; 95% CI from -.08 to .01)

Discussion. Study 4 replicated previous findings by additionally ruling out pupil mimicry as an alternative mechanism of pupil's size on attitudes. Though consumers assimilate to the model's pupil size as a physiological reaction, they then do not use this cue in their evaluation process. Participants instead relied more on the pure aesthetical features of the model: Because they make the eyes more colorful and brighter, constricted pupils make the model appear more attractive, therefore trustworthy and, consequently, consumers like the advertisement more. However, this and previous studies tested the impact of constricted pupils in cosmetic brands, where the importance of the aesthetic features of the models is high. In contexts where physical attractiveness is less relevant (e.g., pro-social behavior; Fisher and Ma 2014), consumers might rely less on the model's aesthetic features, and the positive effect of constricted pupils might be attenuated.

GENERAL DISCUSSION

Ranging from beauty products to technology, the use of beautiful models is certainly widespread among advertisements. Prior research in marketing has focused on the effect of specific facial characteristics, such as face familiarity (Tanner and Ahreum 2012) and smile (Cheng, Mukhopadhyay, and Williams 2020; Wang et al. 2017) on consumers' perceptions. However, previous scholars overlooked the impact of another important facial feature, namely the eyes. In the present article, we identify the pupil's size as a subtle facial cue that affects consumers' attitudes. Specifically, we found that models with constricted (versus dilated) pupils are perceived as more physically attractive when consumers evaluate the target's eyeshots (study 1A) and the full face (study 1B). Also, in the context of advertising (study 2), consumers' attitudes increased when the model's pupils are constricted, and this enhancement is explained by increasing perceptions of the model's attractiveness (studies 3A and 3B). Despite finding that consumers automatically assimilate to the model's pupil size, our results show that pupil mimicry does not affect evaluations (study 4).

Thus, in advertising, consumers seem to be more directly influenced by the ad's aesthetic properties than by their physiological reactions.

The present paper provides several theoretical contributions. Most importantly, it provides the first empirical demonstration that the model's pupil size affects consumers' evaluation of an advertisement. Few studies investigate pupils' impacts on others' perceptions, and no studies investigated them in the marketing context. Also, while previous research showed that dilating pupils positively affects observers' behaviors (Kret, Fischer, and De Dreu 2015; Brambilla, Biella, and Kret 2019), we find the opposite: constricted pupils positively influence perceptions of the model's attractiveness and ad evaluations. Lastly, previous literature focused on the observers' assimilation to others' pupil sizes (pupil mimicry). However, the present article shows that pupil mimicry does not influence consumers' attitudes.

The discrepancy in this finding might be due to several reasons. First, these findings might reveal a difference between dynamic vs. static pupil sizes. As dynamic changes are more noticeable to participants, it might be that pupil mimicry's effect disappears when stimuli are static. Second, our results might suggest a difference in the effect of pupil size according to the contexts. In the context of social interactions, pupil dilation might affect observers' perceptions via social contagion. In contrast, in the marketing contexts, consumers are more concerned with the model's aesthetical features and the ad. Thus, despite being present, social contagion does not influence consumers' evaluation. One last explanation of our divergent findings could be that prior studies used black-and-white images, which could not test the alternative hypothesis that more colorful eyes are more attractive.

One possibility that explains why constricted pupils – thus brighter eyes - appear more attractive is that they signal vitality and reproductive fitness. In fact, youthful, healthy eyes contain bright irises, dark limbal rings, and bright white sclera, whereas with old age or physical illness, the irises and sclera may dim, and the limbal rings fade. The investigations of these alternatives provide

opportunities for additional research. One limitation of this research is that we tested our hypothesis by using white and young models. Future research can test if the effect is robust across different ethnicity and age range.

The use of beautiful models in advertising is a common and effective practice. The present work provides evidence that a small facial feature, such as a pupil's size, can impact the perception of the model's attractiveness and, therefore, consumers' attitudes. The manipulation of the pupil is a cheap and quick tool that marketers can apply to increase the advertisement's aesthetic feature and, therefore, consumers' attitudes.

Previous literature suggests that dilating pupils positively influences perceptions of the target. This assumption is also supported by a lay belief that dilated pupils might be more attractive. For example, during the Renaissance, Italian women used the herb belladonna cosmetically to induce dilated pupils, which were thought to be beautiful. In the present work, we show that people value the aesthetic properties of the eyes and that in some specific contexts, such as advertising (where stimuli are colorful and static), constricted pupils compare to dilated pupils are preferred.

REFERENCES

Adolphs, Ralph, Frederic Gosselin, Tony W. Buchanan, Daniel Tranel, Philippe Schyns, and Antonio R. Damasio (2005), "A mechanism for impaired fear recognition after amygdala damage," *Nature*, 433 (7021), 68-72.

Amemiya, Shiori, and Kuni Ohtomo (2012), "Effect of the observed pupil size on the amygdala of the beholders," *Social Cognitive and Affective Neuroscience*, 7 (3), 332-41.

Baker, Michael J., and Gilbert A. Churchill Jr. (1977), "The impact of physically attractive models on advertising evaluations," *Journal of Marketing Research*, 14 (4), 538-55.

Baudouin, Jean-Yves, and Guy Tiberghien (2004), "Symmetry, averageness, and feature size in the facial attractiveness of women," *Acta Psychologica*, 117 (3), 313-32.

Bergamin, Oliver, Andreas Schoetzau, Keiko Sugimoto, and Mario Zulauf (1998),"The influence of iris color on the pupillary light reflex," *Graefe's Archive for Clinical and Experimental ophthalmology*, 236 (8), 567-70.

Bradley, Margaret M., Laura Miccoli, Miguel A. Escrig, and Peter J. Lang (2008), "The pupil as a measure of emotional arousal and autonomic activation," *Psychophysiology*, 45 (4), 602-07.

Bradshaw, John L. (1969), "Background light intensity and the pupillary response in a reaction time task," *Psychonomic Science*, 14 (6), 271-72.

Brambilla, Marco, Marco Biella, and Mariska E. Kret (2019), "Looking into your eyes: Observed pupil size influences approach-avoidance responses," *Cognition and Emotion*, 33 (3), 616-22.

Brown, Mitch, and Donald F. Sacco (2018), "Put a (limbal) ring on it: Women perceive men's limbal rings as a health cue in short-term mating domains," *Personality and Social Psychology Bulletin*, 44 (1), 80-91.

Caballero, Marjorie J., and William M. Pride (1984),"Selected effects of salesperson sex and attractiveness in direct mail advertisements," *Journal of Marketing*, 48 (1), 94-100.

Chaiken, Shelly (1979),"Communicator physical attractiveness and persuasion," *Journal of Personality and Social Psychology,* 37 (8), 1387-97.

Cheng, Yimin, Anirban Mukhopadhyay, and Patti Williams (2020), "Smiling Signals Intrinsic Motivation," *Journal of Consumer Research*, 46 (5), 915-35.

Cunningham, Michael R. (1986), "Measuring the physical in physical attractiveness: quasi-experiments on the sociobiology of female facial beauty," *Journal of Personality and Social Psychology*, 50 (5), 925-35.

Cunningham, Michael R., Anita P. Barbee, and Carolyn L. Pike (1990),"What do women want? Facialmetric assessment of multiple motives in the perception of male facial physical attractiveness," *Journal of Personality and Social Psychology,* 59 (1), 61-72.

Demos, Kathryn E., William M. Kelley, Sophia L. Ryan, F. Caroline Davis, and P. J. Whalen (2008), "Human amygdala sensitivity to the pupil size of others," 18 (12), 2729-734.

Fawcett, Christine, Victoria Wesevich, and Gustaf Gredebäck (2016), "Pupillary contagion in infancy: Evidence for spontaneous transfer of arousal," *Psychological Science,* 27 (7), 997-1003.

Fisher, Robert J., and Yu Ma (2014), "The price of being beautiful: Negative effects of attractiveness on empathy for children in need," *Journal of Consumer Research*, 41 (2), 436-50.

Foster, Craig A., Betty S. Witcher, W. Keith Campbell, and Jeffrey D. Green (1998),"Arousal and attraction: Evidence for automatic and controlled processes," *Journal of Personality and Social Psychology*, 74 (1), 86-101.

Glocker, Melanie L., Daniel D. Langleben, Kosha Ruparel, James W. Loughead, Jeffrey N. Valdez, Mark D. Griffin, Norbert Sachser, and Ruben C. Gur (2009), "Baby schema modulates the brain reward system in nulliparous women," *Proceedings of the National Academy of Sciences,* 106 (22), 9115-119.

Gründl, Martin, Sebastian Knoll, Marita Eisenmann-Klein, and Lukas Prantl (2012), "The blue-eyes stereotype: do eye color, pupil diameter, and scleral color affect attractiveness?," *Aesthetic Plastic Surgery,* 36 (2), 234-40.

Hamermesh, Daniel S. (2011), *Beauty pays: Why attractive people are more successful*, Princeton University Press.

Hamermesh, Daniel S., and Jeff E. Biddle (1994),"Beauty and the Labor Market, 84 AM," *Economic Review,* 1174, 1186-192.

Harrison, Neil A., C. Ellie Wilson, and Hugo D. Critchley (2007), "Processing of observed pupil size modulates perception of sadness and predicts empathy," *Emotion*, 7 (4), 724-29.

Harrison, Neil A., Marcus A. Gray, and Hugo D. Critchley (2009), "Dynamic pupillary exchange engages brain regions encoding social salience," *Social Neuroscience,* 4 (3), 233-43.

Hess, Eckhard H. (1975),"The role of pupil size in communication," *Scientific American*, 233 (5), 110-19.

Hess, Eckhard H., and James M. Polt (1960), "Pupil size as related to interest value of visual stimuli," *Science,* 132 (3423), 349-50.

Ilicic, Jasmina, Stacey M. Baxter, and Alicia Kulczynski (2016), "The impact of age on consumer attachment to celebrities and endorsed brand attachment," *Journal of Brand Management,* 23 (3), 273-88.

Kahle, Lynn R., and Pamela M. Homer (1985), "Physical attractiveness of the celebrity endorser: A social adaptation perspective," *Journal of Consumer Research,* 11 (4), 954-61.

Kano, Fumihiro, and Masaki Tomonaga (2009), "How chimpanzees look at pictures: a comparative eye-tracking study," *Proceedings of the Royal Society B: Biological Sciences,* 276 (1664), 1949-955.

Kret, Mariska E. (2015), “Emotional expressions beyond facial muscle actions. A call for studying autonomic signals and their impact on social perception,” *Frontiers in Psychology*, 6, 711.

Kret, Mariska E., Agneta H. Fischer, and Carsten KW De Dreu (2015),"Pupil mimicry correlates with trust in in-group partners with dilating pupils," *Psychological Science,* 26 (9), 1401-410.

Kret, Mariska E., and Carsten KW De Dreu (2019),"The power of pupil size in establishing trust and reciprocity," *Journal of Experimental Psychology: General,* 148 (8), 1299-311.

Kret, Mariska E., Masaki Tomonaga, and Tetsuro Matsuzawa (2014), "Chimpanzees and humans mimic pupil-size of conspecifics," *PLoS One,* 9 (8), e104886.

Laeng, Bruno, Ronny Mathisen, and Jan-Are Johnsen (2007),"Why do blue-eyed men prefer women with the same eye color?," *Behavioral Ecology and Sociobiology,* 61 (3), 371-84.

Montoya, Amanda Kay (2019), "Moderation analysis in two-instance repeated measures designs: Probing methods and multiple moderator models," *Behavior Research Methods,* 51 (1), 61-82.

Ohanian, Roobina (1990), "Construction and validation of a scale to measure celebrity endorsers' perceived expertise, trustworthiness, and attractiveness," *Journal of Advertising,* 19 (3), 39-52.

Partala, Timo, and Veikko Surakka (2003),"Pupil size variation as an indication of affective processing," *International Journal of Human-Computer Studies,* 59 (1-2), 185-98.

Peshek, Darren, Negar Semmaknejad, Donald Hoffman, and Pete Foley (2011), "Preliminary evidence that the limbal ring influences facial attractiveness," *Evolutionary Psychology,* 9 (2), 137–146.

Prochazkova, Eliska, and Mariska E. Kret (2017), "Connecting minds and sharing emotions through mimicry: A neurocognitive model of emotional contagion," *Neuroscience & Biobehavioral Reviews,* 80 (9), 99-114.

Rieger, Gerulf, and Ritch C. Savin-Williams (2012), "Gender nonconformity, sexual orientation, and psychological well-being," *Archives of Sexual Behavior,* 41 (3), 611-21.

Tanner, Robin J., and Ahreum Maeng (2012),"A tiger and a president: Imperceptible celebrity facial cues influence trust and preference," *Journal of Consumer Research,* 39 (4), 769-83.

Van Breen, Jolien A., Carsten KW De Dreu, and Mariska E. Kret (2018), "Pupil to pupil: The effect of a partner's pupil size on (dis) honest behavior," *Journal of Experimental Social Psychology*, 74 (11), 231-245.

Wang, Ze, Huifang Mao, Yexin Jessica Li, and Fan Liu (2017), "Smile big or not? Effects of smile intensity on perceptions of warmth and competence," *Journal of Consumer Research*, 43 (5), 787-805.

APPENDIX
Prediction Study

We investigated whether people have an intuition on whether and how pupil size (constricted vs. dilated) affects a person's physical attractiveness.

Methods

Participants. Two hundred and two US-based respondents (*M* = 38 years, *SE* =.81; 45% males) recruited on Amazon Mechanical Turk were paid $0.10 for participating.

Procedure. After providing consent and reporting their age and sex, participants were informed that they would be asked their opinion about eyes.

Participants were screened through a comprehension check. Participants first read a brief explanation about pupils: "As you may know, the human eye has a pupil (the dark circle in the middle) and an iris (the colored ring around the pupil). The pupil is said to be "constricted" when it becomes smaller, or "dilated" when it becomes larger. Please make sure, before advancing to the next page, that you know what pupils and irises are, and what pupil constriction and dilation are."

Then participants answered three questions, on separate pages, but in this order: (1) "What is the difference between the pupil and the iris?" Options: (a) "The pupil is the dark circle, the iris is the colored ring," (b) "the pupil is the colored ring, the iris is the dark circle." (2) "When is the pupil said to be "constricted"?" Options: (a) "when it becomes larger," (b) "when it becomes smaller." (3) "When is the pupil said to be "dilated"?" Options: (a) "when it becomes larger," (b)

"when it becomes smaller." Participants were allowed to proceed only if they answered the three questions correctly. Response options within each question were randomized. Participants then were asked: "Do you think that the size of a person's pupils affects the person's attractiveness?" Options: (a) "Yes," (b) "No." Then, on the next page, they were asked: "Assuming that pupil size DOES affect attractiveness, which size do you think makes people look more attractive?" Options: (a) "Constricted," (b) "Dilated." Response options within each question were randomized.

Results There is no consensus in lay intuitions about whether pupil size affects a person's physical attractiveness. Only 55% of participants answered positively, whereas 45% thought that pupil size does not affect a person's attractiveness (χ^2 (1) = 2.40, p = .122). Moreover, when forced to guess, 53% of participants thought that dilated pupils would make the person more attractive, whereas 47% believed that constricted pupils were more attractive (χ^2 (1) = .97, p = .325).