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Unintended Consequences of Algorithmic Personalization

In the digital age, we have observed an exponential increase in data availability and a profound transformation propelled by the ubiquitous influence of algorithms and artificial intelligence (AI). This led to a fundamental change in how managers harness these data and technologies to design personalized interventions for customer management. On one hand, personalization offers substantial benefits to both businesses and consumers. Companies now have enhanced tools to optimize the efficiency of their marketing efforts, enabling better anticipation of customer decisions and more effective service delivery. Simultaneously, consumers enjoy the convenience of accessing more relevant offers and customized content.

However, this heightened capacity for precise targeting and personalization at a granular level also introduces significant challenges. It opens the door to achieving marketing objectives that may carry broader societal implications, such as discrimination and algorithmic bias. As we navigate this data-driven landscape, it is imperative for managers to delve into the consequences of data utilization and algorithmic decision-making in customer management. This approach involves recognizing both the potential benefits and the ethical challenges they may pose and evaluating the tradeoffs between them.

Exhibits 1, **2, 3**, and **4** provide brief media accounts of the unintended consequences of algorithmic personalization in different marketing contexts. Your job is to analyze each situation and answer the following questions for each one:

1. How did the company find itself in this situation? To what extent was this a result of a data issue, an algorithm issue, or a management issue?
2. Should the company do something about it? Why or why not.
3. If you think the company should do something about it, *what* should they do differently? What would be the consequences of following your recommendation?

Professors Eva Ascarza and Ayelet Israeli prepared this case. This case was developed from published sources. Funding for the development of this case was provided by Harvard Business School and not by the company. HBS cases are developed solely as the basis for class discussion. Cases are not intended to serve as endorsements, sources of primary data, or illustrations of effective or ineffective management.

Exhibit 1 Excerpt from an Article Appearing in *The New York Times*

Apple Card Investigated After Gender Discrimination Complaints

A prominent software developer said on Twitter that the credit card was "sexist" against women applying for credit

By Neil Vigdor

Something curious happened when a husband and wife recently compared their Apple Card spending limits. David Heinemeier Hansson vented on Twitter that even though his spouse, Jamie Hansson, had a better credit score and other factors in her favor, her application for a credit line increase had been denied. Mr. Hansson, a prominent software developer, wondered how his credit line could be 20 times higher, referring to Apple Card as a "sexist program" (with an expletive added for emphasis). The card, a partnership between Apple and Goldman Sachs, made its debut in the United States in August.

"My wife and I filed joint tax returns, live in a community-property state, and have been married for a long time," Mr. Hansson wrote Thursday on Twitter. "Yet Apple's black box algorithm thinks I deserve 20x the credit limit she does." Mr. Hansson's tweets caught the attention of more than just his 350,000 followers. They struck a nerve with New York State regulators, who announced on Saturday that they would investigate the algorithm used by Apple Card to determine the creditworthiness of applicants.

Algorithms are codes or a set of instructions used by computers, search engines and smartphone applications to perform tasks, from ordering food delivery to hailing a ride — and yes, applying for credit. The criteria used by the Apple Card are now being scrutinized by the New York State Department of Financial Services.

"Any algorithm that intentionally or not results in discriminatory treatment of women or any other protected class violates New York law," an agency spokeswoman said in a statement on Saturday night. "DFS is troubled to learn of potential discriminatory treatment in regards to credit limit decisions reportedly made by an algorithm of Apple Card, issued by Goldman Sachs, and the Department will be conducting an investigation to determine whether New York law was violated and ensure all consumers are treated equally regardless of sex," the statement said.

An Apple spokeswoman directed questions to a Goldman Sachs spokesman, Andrew Williams, who said that the company could not comment publicly on individual customers. "Our credit decisions are based on a customer's creditworthiness and not on factors like gender, race, age, sexual orientation or any other basis prohibited by law," Mr. Williams said. Mr. Hansson did not respond to an interview request on Saturday night.

In a subsequent tweet, Mr. Hansson said that the Apple Card's customer service representatives told his wife that they were not authorized to discuss the credit assessment process. Mr. Hansson said that customer service employees were unable to explain why the algorithm had designated her to be less creditworthy but had assured his wife that the bank was not discriminating against women.

An applicant's credit score and income level are used by Goldman Sachs to determine creditworthiness, according to a support page for the Apple Card. Past due accounts, a checking account closed by a bank for overdrafts, liens and medical debts can negatively affect applications, the page stated.

On Friday, a day after Mr. Hansson started railing on the Apple Card's treatment of female credit applicants, he said his wife got a "VIP bump" to match his credit limit. He said that didn't make up for the flawed algorithm used by Apple Card.

Mr. Hansson said many women had shared similar experiences with him on Twitter, and urged regulators to contact them. "My thread is full of accounts from women who've been declared to be worse credit risks than their husbands, despite higher credit scores or incomes," he said.

Source: Neil Vigdor, "Apple Card Investigated After Gender Discrimination Complaints," The New York Times, November 10, 2019, https://www.nytimes.com/2019/11/10/business/Apple-credit-card-investigation.html.

Exhibit 2 Excerpt from an Article in *USA Today*

Was your Uber, Lyft fare high because of algorithm bias?

By Coral Murphy Marcos

Requesting an Uber or Lyft to a lower-income community? That could cost you.

That is the finding of a study that analyzed transportation and census data in Chicago to see whether there was a disparity in what passengers were charged based on location. The team out of George Washington University in Washington, D.C., assessed more than 100 million trips between November 2018 and December 2019.

What they discovered was that ride-hailing companies charged a higher price per mile for a trip if either the pick-up point or destination had a higher percentage of non-white residents, low-income residents or high-education residents.

The team wrote in the study's conclusion that "While demand and speed have the highest correlation with ride-hailing fares, analysis shows that users of ride-hailing applications in the city of Chicago may be experiencing social bias with regard to fare prices when they are picked up or dropped off in neighborhoods with a low percentage of individuals over 40 or a low percentage of individuals with a highschool diploma or less."

The ride-hailing companies use machine-learning models to forecast which areas will have the highest demand at a given time, based on prior demand.

We reached out to Uber and Lyft for comment prior to publication. Lyft responded saying the "analysis is deeply flawed."

"The researcher acknowledges that the study was not based on actual demographic data of rideshare users," the Lyft statement read. "In fact, the study makes clear that speed and demand have the highest correlation with algorithmically generated fares and that individual demographic data is neither available to rideshare companies nor used in the algorithms that determine pricing. There are many factors that go into dynamic pricing – race is not one of them. We appreciate the researchers' attempt to study unintentional bias, but this study misses the mark."

"The lack of extensive algorithmic regulation and the black-box nature of ridehailing fare pricing algorithms leads to the concern of whether they may be exhibiting bias towards riders based on their demographics," write the authors, Aylin Caliskan and Akshat Pandey, describing why they undertook the study in the introduction.

This isn't the first research to examine disparities in service for minority communities. A UCLA doctoral dissertation by Anne Brown of UCLA's Institute for Transportation Studies published in 2018 found that African-Americans faced longer wait times for taxis, Uber and Lyft – and more cancellations – in Los Angeles than whites, Asians and Hispanics.

The current study comes amid a renewed national conversation about how African-Americans face bias in everyday interactions. Uber recently pledged to increase Black representation within its ranks amid Black Lives Matter protests.

Source: Coral Murphy Marcos, "Was your Uber, Lyft fare high because of algorithm bias?," *USA Today*, July 22, 2020, https://www.usatoday.com/story/tech/2020/07/22/uber-lyft-algorithms-discriminate-charge-more-non-white-areas/5481950002/. © Coral Murphy Marcos – USA TODAY NETWORK.

Exhibit 3 Excerpt from an Article appearing in *Wired*

Facebook's Ad System Might Be Hard-Coded for Discrimination

The social network says it shows users the most "relevant" ads, but a new study suggests the system perpetuates bias.

By Louise Matsakis

Civil rights groups, lawmakers, and journalists have long warned Facebook about discrimination on its advertising platform. But their concerns, as well as Facebook's responses, have focused primarily on ad targeting, the way businesses choose what kind of people they want to see their ads. A new study from researchers at Northeastern University, the University of Southern California, and the nonprofit Upturn finds ad delivery—the Facebook algorithms that decide exactly which users see those ads—may be just as important.

Even when companies choose to show their ads to inclusive audiences, the researchers wrote, Facebook sometimes delivers them "primarily to a skewed subgroup of the advertiser's selected audience, an outcome that the advertiser may not have intended or be aware of." For example, job ads targeted to both men and women might still be seen by significantly more men.

The study, which has not yet been peer-reviewed, indicates that Facebook's automated advertising system—which earns the company tens of billions of dollars in revenue each year—may be breaking civil rights laws that protect against advertising discrimination for things like jobs and housing. The issue is with Facebook itself, not with the way businesses use its platform. Facebook did not return a request for comment, but the company has not disputed the researchers' findings in statements to other publications.

Discrimination in ad targeting has been an issue at Facebook for years. In 2016, ProPublica found businesses could exclude people from seeing housing ads based on characteristics like race, an apparent violation of the 1968 Fair Housing Act. Last month, the social network settled five lawsuits from civil rights organizations that alleged companies could hide ads for jobs, housing, and credit from groups like women and older people. As part of the settlement, Facebook said it will no longer allow advertisers to target these ads based on age, gender, or zip code. But those fixes don't address the issues the researchers of this new study found.

"This is a stark illustration of how machine learning incorporates and perpetuates existing biases in society, and has profound implications," says Galen Sherwin, a senior staff attorney at the ACLU Women's Rights Project, one of the organizations that sued Facebook. "These results clearly indicate that platforms need to take strong and proactive measures in order to counter such trends."

In one experiment, the researchers ran ads for 11 different generic jobs in North Carolina, like nurse, restaurant cashier, and taxi driver, to the same audience. Facebook delivered five ads for janitors to an audience that was 65 percent female and 75 percent black. Five ads for jobs in the lumber industry were shown to users that were 90 percent male and 70 percent white. And in the most extreme cases, advertisements for supermarket clerks were shown to audiences that were 85 percent women and taxi driving opportunities to audiences that were 75 percent black.

The researchers ran a similar series of housing ads and found that, despite having the same targeting and budget, some were shown to audiences that were over 85 percent white, while others were shown to ones that were 65 percent black.

Facebook doesn't tell businesses the race of people who see their ads, but it does provide the general area where they are located. In order to create a proxy for race, the researchers used hundreds of thousands of public voting records from North Carolina, which include the voter's address, phone number, and their stated race. Using the records, they targeted ads to black voters in one part of the state and white voters in another; when looking at Facebook's reporting tools, they could then assume the users' race based on where they lived.

The study also found that ad pricing may cause gender discrimination, because women are typically more expensive to reach since they tend to engage more with advertisements. The researchers tested spending between $1 and $50 on their ad campaigns, and found that "the higher the daily budget, the smaller the fraction of men in the audience." Previous research has similarly shown that advertising algorithms show fewer ads promoting opportunities in STEM fields to women because they cost more to target.

The study's authors were careful to note that their findings can't be generalized to every advertisement on Facebook. "For example, we observe that all of our ads for lumberjacks deliver to an audience of primarily white and male users, but that may not hold true of all ads for lumberjacks," they wrote.

But the research indicates Facebook's highly-personalized advertising system does at least sometimes mirror inequalities already present in the world, an issue lawmakers have yet to address. The study could have implications for a housing discrimination lawsuit the Department of Housing and Urban Development filed against Facebook late last month. In the suit, HUD's lawyers allege Facebook's "ad delivery system prevents advertisers who want to reach a broad audience of users from doing so," because it discriminates based on whether it thinks users are likely to engage with a particular ad, or find it "relevant."

Regulators may also need to examine protections granted to Facebook under Section 230 of the Communications Decency Act, which shields internet platforms from liability for what their users post. Facebook has argued that advertisers are completely responsible for "deciding where, how, and when to publish their ads." The study shows that isn't always true, advertisers can't control exactly who sees their ads. Facebook is not a neutral platform.

It's not clear how Facebook might reform its advertising system to address the issues raised in the study. The company might need to exchange some efficiency in favor of fairness, says Miranda Bogen, a senior policy analyst at Upturn and another author of the research. Alex Stamos, Facebook's former chief security officer, similarly said on Twitter that the problem may only be solved "by having no algorithmic optimization of certain ad classes."

But that optimization is a large part of what makes Facebook valuable to advertisers. If lawmakers decide to regulate its algorithms, that could have damning implications for the company's business.

Source: Louise Matsakis, "Facebook's Ad System Might Be Hard-Coded for Discrimination," Wired, April 6, 2019, https://www.wired.com/story/facebooks-ad-system-discrimination/. © Condé Nast.

Exhibit 4 Excerpt from an Article Appearing in *Bloomberg*

Amazon Doesn't Consider the Race of Its Customers. Should It?

A prominent software developer said on Twitter that the credit card was "sexist" against women applying for credit

By David Ingold and Spencer Soper

For residents of minority urban neighborhoods, access to Amazon.com's vast array of products—from Dawn dish soap and Huggies diapers to Samsung flatscreen TVs—can be a godsend. Unlike whiter ZIP codes, these parts of town often lack well-stocked stores and quality supermarkets. White areas get organic grocers and designer boutiques. Black ones get minimarts and dollar stores.

People in neighborhoods that retailers avoid must travel farther and sometimes pay more to obtain household necessities. "I don't have a car, so I love to have stuff delivered," says Tamara Rasberry, a human resources professional in Washington, D.C., who spends about $2,000 a year on Amazon Prime, the online retailer's premium service that guarantees two-day delivery of tens of millions of items (along with digital music, e-books, streaming movies, and TV shows) for a yearly $99 membership fee. Rasberry, whose neighborhood of Congress Heights is more than 90 percent black, says shopping on Amazon lets her bypass the poor selection and high prices of nearby shops.

As Amazon has expanded rapidly to become "the everything store," it's offered the promise of an egalitarian shopping experience. On Amazon and other online retailers, a black customer isn't viewed with suspicion, much less followed around by store security. Most of Amazon's services are available to almost every address in the U.S. "We don't know what you look like when you come into our store, which is vastly different than physical retail," says Craig Berman, Amazon's vice president for global communications. "We are ridiculously prideful about that. We offer every customer the same price. It doesn't matter where you live."

Yet as Amazon rolls out its upgrade to the Prime service, Prime Free Same-Day Delivery, that promise is proving harder to deliver on. The ambitious goal of Prime Free Same-Day is to eliminate one of the last advantages local retailers have over the e-commerce giant: instant gratification. In cities where the service is available, Amazon offers Prime members same-day delivery of more than a million products for no extra fee on orders over $35. Eleven months after it started, the service includes 27 metropolitan areas. In most of them, it provides broad coverage within the city limits. Take Amazon's home town of Seattle, where every ZIP code within the city limits is eligible for same-day delivery and coverage extends well into the surrounding suburbs.

In six major same-day delivery cities, however, the service area excludes predominantly black ZIP codes to varying degrees, according to a Bloomberg analysis that compared Amazon same-day delivery areas with U.S. Census Bureau data. In Atlanta, Chicago, Dallas, and Washington, cities still struggling to overcome generations of racial segregation and economic inequality, black citizens are about half as likely to live in neighborhoods with access to Amazon same-day delivery as white residents.

The disparity in two other big cities is significant, too. In New York City, same-day delivery is available throughout Manhattan, Staten Island, and Brooklyn, but not in the Bronx and some majority-black neighborhoods in Queens. In some cities, Amazon same-day delivery extends many miles into the surrounding suburbs but isn't available in some ZIP codes within the city limits. The most striking gap in Amazon's same-day service is in Boston, where three ZIP codes encompassing the primarily black neighborhood of Roxbury are excluded from same-day service, while the neighborhoods that surround it on all sides are eligible. "Being singled out like that and not getting those same services as they do in a 15-minute walk from here is very frustrating," says Roxbury resident JD Nelson, who's been an Amazon Prime member for three years. "It's not a good thing, and it definitely doesn't make me happy." Rasberry was excited when Amazon announced Prime Free

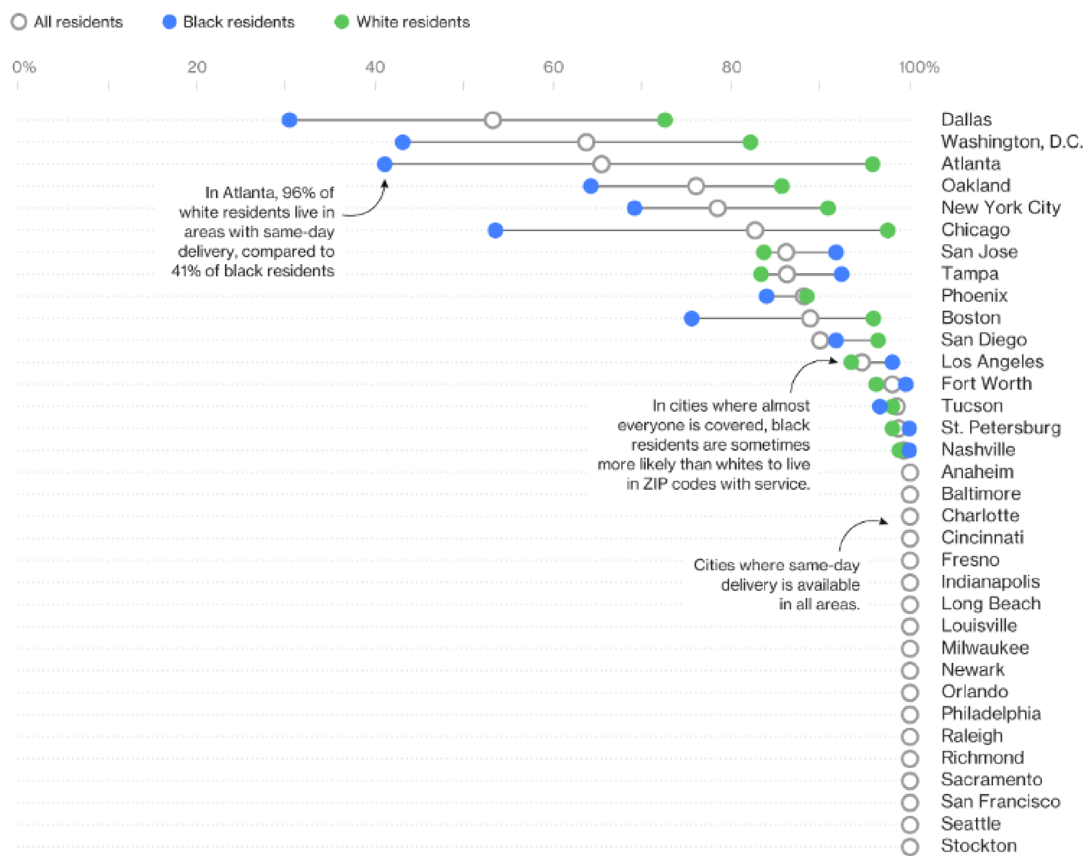
Same-Day was coming to Washington. But when she entered her ZIP code on the retailer's website, she was disappointed to find her neighborhood was left out. "I still get two-day shipping, but none of the superfast, convenient delivery services come here," she says. Rasberry pays the same $99 Prime membership fee as people who live in the city's majority-white neighborhoods, but she doesn't get the same benefits. "If you bring that service to the city," she says, "you should offer it to the whole city."

There's no evidence that Amazon makes decisions on where to deliver based on race. Berman says the ethnic composition of neighborhoods isn't part of the data Amazon examines when drawing up its maps. "When it comes to same-day delivery, our goal is to serve as many people as we can, which we've proven in places like Los Angeles, Seattle, San Francisco, and Philadelphia." Amazon, he says, has a "radical sensitivity" to any suggestion that neighborhoods are being singled out by race. "Demographics play no role in it. Zero."

Cities where Amazon offers broad one-day coverage appear to have something in common: close proximity to product warehouses, making it less expensive to reach all areas. "It's not the only variable. It's certainly one of them," says Berman. "It definitely has an impact if we have a fulfillment center that's outside a city, or we have a fulfillment center that happens to be on one side of it."

Amazon declined to reveal the locations of its same-day hubs, so it's difficult to tell how that works. In same-day cities Amazon hasn't yet surrounded with warehouses, the company must decide which neighborhoods are worth the cost of service and which aren't. That's where things get complicated.

Percentage of Residents Eligible for Same-Day Delivery



Source: Bloomberg analyis of data from Amazon.com and the American Community Survey

Source: David Ingold and Spencer Soper, "Amazon Doesn't Consider the Race of Its Customers. Should It?," *Bloomberg.com*, April 21, 2016, https://www.bloomberg.com/graphics/2016-amazon-same-day/.