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Investigating White Americans' Mental Images of Who Has Abortions and Its Impact on Attitudes Toward Abortion Policies

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Following the U.S. Supreme Court ruling to eliminate the federal right to abortion (the "*Dobbs* decision"), a new landscape of highly variable abortion policies emerged across the U.S. Given that individuals' attitudes toward those who have abortions wield significant power in shaping abortion policies, it is critical to understand the factors which underly these attitudes toward those who have abortions. The current work investigated whether White Americans' attitudes toward abortion may be related to their mental representations of those who have abortions, with implications for restrictive abortion policy support. Across three pre-registered online study sets ($N = 2414$) and one nationally representative sample ($N = 452$), the findings suggest that White Americans' mental representations of those who have abortions are suffused with racial and gender bias, particularly when imagining those who have abortions for non-medical reasons, and these visualizations impact abortion policy attitudes.

Following the U.S. Supreme Court ruling to eliminate the federal right to abortion (the "*Dobbs* decision"), a new landscape of diverse abortion policies emerged across the U.S. Given that individuals' attitudes toward abortion seekers may have significant power in shaping attitudes toward abortion policies[1,2], it is critical to understand the factors which underly these attitudes. The current work seeks to understand the role of racism and sexism in White Americans' attitudes toward abortions. In particular, we investigate whether White Americans' attitudes toward abortions may be related to prejudicial mental representations of those who have abortions, with implications for restrictive abortion policy support. We focus on White Americans as their attitudes have an outsized effect on policy and candidate endorsements due to the size and power of this group in the U.S. Greater understanding of how prejudice may be implicitly constructing imagery when considering policies offers important insight into how mental representations are a crucial aspect of political attitudes[3,4].

Factors which shape abortion attitudes

While there appears to be widespread support for safeguarding access to abortion – with 63% of Americans reporting that abortions should be legal in all or most cases – there is also significant diversity in these attitudes[5]. Divergent opinions on abortion access are related to Americans' religious affiliations, political party identification, gender identification, racial/ethnic identification, age, and education level[5,6].

Abortion attitudes are also related to the reason why abortions are being sought. Data from the General Social Survey, one of the largest national surveys which assess abortion attitudes, finds that support for abortion access differs between two broad categories of justifications. When reasons for seeking an abortion are deemed "hard," "difficult," or "traumatic," such as cases involving medical necessity (i.e., when the fetus cannot survive outside the womb or the fetus poses a threat to the pregnant person's life) or in difficult circumstances like rape or incest, Americans support for the right to an abortion is over 75%[7]. However, when reasons for seeking an abortion are deemed "soft," "easy," or "elective," such as not wanting more children, not wanting a relationship with the father, or lacking the financial means to support a child, support drops to 45-51%. For the sake of simplicity, our research relabels these two broad categories into "medical" reasons for having an abortion and "non-medical" reasons for having an abortion. To be clear, these two categories, medical and non-medical, are not mutually exclusive, but are often treated as such in people's minds. Thus, in addition to associations between demographic categories and abortion

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attitudes, the underlying reasons for seeking an abortion play a crucial role in shaping public attitudes toward abortion rights (see also[8]).

The abortion debate undoubtedly engages with sexist views. For example, those who oppose the right to abortions often cite stereotypes regarding the inherent nature of motherhood for women[9–11]. Additionally, stereotypes regarding promiscuity, irresponsibility, and blaming the woman for unwanted pregnancies are often highlighted to justify opposition toward abortion rights[12,13]. Indeed, previous research has found a consistent association whereby more negative attitudes toward women are associated with more negative attitudes toward abortion, regardless of the reason for seeking an abortion[9,14,15].

Critically, these negative stereotypes about those who have abortions are not only sexist, but also racist. For instance, stereotypes depict Black women as immoral, promiscuous, and hypersexual[16]. And, the rise of the 'Welfare Queen' stereotype in the 1980s portrayed Black women as uneducated, poor, and single mothers who allegedly have many children to exploit welfare programs[17,18]. Latinas are similarly stereotyped as fiery, adventurous, promiscuous, and sexually available[19,20]. Though these stereotypes originate from the legacy of slavery and constructs such as machismo and marianismo that developed through historical events[16,21], research finds that these stereotypes persist today[16,22,23]. Yet, little research has investigated how these stereotypes impact White Americans' abortion attitudes.

We propose that 'gendered racism'—a combination of sexist and racist ideologies[22,24] are integrally related to White Americans' mental representations of those who have abortions and their abortion attitudes. There is some indirect evidence for this assertion – using data from the American National Election Studies, Baker and colleagues[14] found that White Americans' racist and sexist attitudes predict oppositional attitudes toward abortion – particularly opposition toward having an abortion for non-medical reasons (e.g., the pregnant person does not want a child), controlling for political ideology. Further, qualitative interviews find that people's abortion imagery is suffused with racialized and sexist stereotypes[25]. However, research has yet to directly investigate the mental representations of those who have abortions.

If mental representations are suffused with gendered racist imagery, this may be a subtle mechanism whereby prejudice impacts attitudes toward abortion access policies. That is, gendered racism may be impacting policy attitudes without requiring people to mention these prejudices, and, perhaps for some, without even realizing that these prejudices are driving their own policy attitudes. If prejudiced imagery is triggered as a result of thinking about those who have abortions, these visualizations may, in turn, impact attitudes toward abortion access policies. Thus, it is critical to understand whether mental representations of those who have abortions represent gendered and racist prejudices and, if they do, whether this prejudiced mental imagery impacts policy attitudes.

Research overview

The current work directly assesses White Americans' mental representations of those who have abortions using the reverse correlation procedure, a data-driven technique that yields visual proxies of mental representations of a given category[26]. We anticipate that the mental representations of those who have abortions for non-medical reasons (e.g., the woman does not want a child) will be most representative of racialized and sexualized stereotypes, relative to mental representations of those who have abortions for medical reasons (e.g., the fetus cannot survive outside of the womb), or mental representations of those who have never had an abortion (Study Set 1). Further, among a nationally representative sample of White Americans we anticipate that participants who report stronger racist and sexist beliefs may visualize those who have abortions for non-medical reasons to be less representative of White Americans (Study Set 2). Finally, we anticipate that mental representations may lead people to be more supportive of restrictive abortion laws to the extent the representations align with stereotypes related to women's promiscuity and irresponsibility (Study 3).

Methods

The reverse correlation approach uses a three-phase design (for a review see[26]). First, in the *image generation* phase, participants were randomly assigned to select images that best represented: (1) someone who has never had an abortion, (2) someone who had an abortion for medical reasons, or (3) someone who had an abortion for non-medical reasons. Then, in the *image aggregation* phase, we aggregated these selected images from the image generation phase to create visual representations. Finally, in the *image rating* phase, we recruited another sample of participants who were naïve to how the images were generated and ask them to rate the images on the extent to which they represented racial/ethnic categories, stereotypically feminine traits, moral traits, and sexist stereotypes. All studies utilized preregistered protocols, and all preregistration links, study materials, data, and analytic code are posted on an open science platform: https://osf.io/qb35j/. All studies were approved by the Institutional Review Board at the first-author's institution. The data reported met the assumptions of statistical tests used, and, when they did not, we report statistical corrections made.

Study 1

Image generation phase. There is no formal *a priori* power analysis for the reverse correlation image generation phase. To try to gain a stable estimate of the effect size, we recruited 600 participants (200 in each condition). To account for attrition, we recruited $N = 650$ White participants from Amazon Mechanical Turk through CloudResearch (data collection began July 20, 2023 and was limited to those residing within the U.S.). We retained data from $N = 643$ monoracial White individuals who completed the reverse correlation task. See Table 1 for demographic details across all studies.

First, participants completed the reverse correlation task. This task begins with a single "base face," which, for our study, was a morph of 4 Black women, 4 Latinx women, and 4 White women selected from the Chicago Face Database (version 3.0[27]). The base face was pilot tested to ensure it was perceived to be multiracial (for details see Supplemental Materials). We added random visual noise to the base face image to create 720 unique variants used in this task.

Participants were told that this study was interested in three main categories related to abortion:

(1) Those who have never had an abortion.
(2) Those who had an abortion for medical reasons. For example, women may have had abortions because the pregnancy is a danger to the mother's life, or the pregnancy cannot survive outside of the mother due to genetic defect.
(3) Those who had an abortion for non-medical reasons. For example, women may have had abortions because they cannot afford another child, they do not want a child, or they do not want to be in a relationship with the father.

Participants were told they would be presented with several blurry images of women. On each trial ($N = 60$), all participants were presented with a grid of 12 images and asked to select one image which best represented the category they were assigned to in a between-subjects manipulation[28].

After completing the reverse correlation image generation task, participants were asked the following individual difference measures: (1) feeling thermometers toward different racial/ethnic groups, (2) modern sexist attitudes[29] ($\alpha = .93$), (3) sexualized stereotypes of Black women (modified version[30]; $\alpha = .95$), (4) symbolic anti-Black racism[31] ($\alpha = .94$), (5) stereotypes that Latinas are subordinate/submissive (modified version of Castillo, 2010; $\alpha = .91$), (6) sexualized stereotypes of Latinas (modified version of[32]; $\alpha = .92$), and (7) symbolic anti-Latinx racism[33] ($\alpha = .81$). These measures were presented in a random order.

Next, participants were asked about their abortion attitudes, including the extent to which they considered themselves pro-choice or pro-life. Participants were also asked the religion they affiliate with, how strongly

Table 1 | Participants' Demographics Across All Studies

Study Set 1				Study Set 2	Study 3
	Image Generation	Image Rating		Image Generation	Image Rating
		Race/Class/Femininity	Morality/ Benevolent Sexism/ Hostile Sexism		
Sample Size	643	220	247	452	394	910
Race/ Ethnicity	643 monoracial White	136 White, 36 Black, 16 Asian, 8 multiracial, 2 another race/ ethnicity, 18 identified as Hispanic, Latinx or Spanish origin, 21 did not respond	144 White, 30 Black, 3 Native American or Pacific Islander, 14 Asian, 8 multiracial, 4 another race/ethnicity, 24 identified as being Hispanic, Latinx, or Spanish origin, 44 did not respond	452 monoracial White	250 White, 28 Hispanic, 58 Black, 5 Native American or Pacific Islander, 29 Asian, 14 multiracial, 10 did not respond	910 monoracial White
Age	*M* = 43.45, *SD* = 13.29	*M* = 42.75, *SD* = 12.98	*M* = 44.80, *SD* = 14.85	*M* = 50.05, *SD* = 17.95	*M* = 36.83, *SD* = 12.07	*M* = 41.10, *SD* = 13.56
Gender Identity	236 men, 399 women, 8 another gender identity	94 men, 105 women, 21 did not respond	83 men, 116 women, 4 another gender identity, 44 did not respond	233 men, 216 women, 3 another gender identity	147 men, 229 women, 7 gender non-binary, 1 another gender identity, 10 did not respond	388 men, 468 women, 16 another gender identity, 38 did not respond
Political Party Affiliation	212 republicans, 209 independents, 200 democrats, 22 another party			127 republicans, 177 independents, 128 democrats, 14 another political party, 6 did not respond		167 republicans, 277 independents, 388 democrats, 40 another political party, 38 did not respond

Note. Political party affiliation was not asked for the Image Rating participants in Studies 1 and 2.

they feel a religious/spiritual identity, the extent to which they believe the Bible should be taken literally, and the extent to which they believe the government should try to help people live virtuously and avoid sin. Finally, participants reported their political party affiliation, liberalism/conservatism on social issues (e.g., abortion, gun rights, gay rights) and economic issues (e.g., taxation, government spending), as well as demographic items (gender, income, perceived socioeconomic standing, education, and race/ethnicity).

Image aggregation phase. Following best practices[34], we created ten subgroup images per condition (rcicr 0.3.0[28,35]). Subgroup images are created by taking a random subset of participants within a condition and aggregating their individual images together. See Fig. 1 for the average image for each condition.

Image rating phase

An *a priori* power analysis suggested we would need $N = 165$ to detect a small effect size ($f = .10$) with adequate power (1-β = 0.80; G*Power v 3.1.9.4[36]). To avoid rating fatigue, participants were separated into two groups: one group rated images on the perceived race/class/femininity of the images, and a second group rated images on the morality and benevolent sexism/hostile sexism of the images. We recruited $N = 200$ participants for each sample to ensure we met the desired sample size for each subset of ratings on Prolific Academic. For both samples, we retained data from participants who had a unique Prolific Identifier, passed the CAPTCHA, and consented to participate. There were $N = 220$ participants who rated perceived race/class/femininity, and $N = 247$ participants who rated perceived morality/benevolent sexism/hostile sexism. Data collection for both samples began December 15, 2023.

Participants in the race/class/femininity sample were asked to judge the extent to which the person was representative of the following racial/ethnic categories: Asian, Black/African American, Hispanic/Latinx, and White (*1* = not at all; *5* = definitely). They were also asked how wealthy or poor the person seemed (*0* = extremely poor; *50* = middle class; *100* = extremely wealthy). Finally, participants were asked the extent to which the person was representative of the following feminine traits: feminine, ladylike, modest, and pure (*1* = not at all; *6* = extremely). These items were averaged to create one dimension assessing perceived femininity. For all measures, rating reliabilities across images were sufficiently high (α's > .80).

Participants in the morality/benevolent sexism/hostile sexism sample were asked to judge the extent to which the person seemed moral, responsible, self-disciplined, promiscuous, and unprincipled (*1* = not at all; *6* = extremely). These items were averaged to create one dimension assessing perceived morality. We asked participants the extent to which two benevolent sexism statements should be applied to the pictured person: (1) "This person should be cherished and protected by men," and "This person should be set on a pedestal," (*1* = strongly disagree; *6* = strongly agree). These items were averaged to create one dimension assessing the application of benevolent sexism. Participants were also asked the extent to which two hostile sexism statements should be applied to the pictured person: (1) "This person seeks to gain power by getting control over men," and (2) "Once they get a man to commit to her, they keep him on a tight leash," (*1* = strongly disagree; *6* = strongly agree). These items were averaged to create one dimension assessing the application of hostile sexism.

For both samples, participants rated a total of 30 images in a random order: 10 subgroup images from each image generation condition. Participants were not told how these images were created.

Within each condition and rating type, responses to the 10 subgroup images were averaged to create a single rating type for each abortion condition.

Study 2

Next, we investigated whether image generators who reported stronger racist and sexist beliefs would create mental representations of those who had abortions for non-medical reasons that were perceived to be less

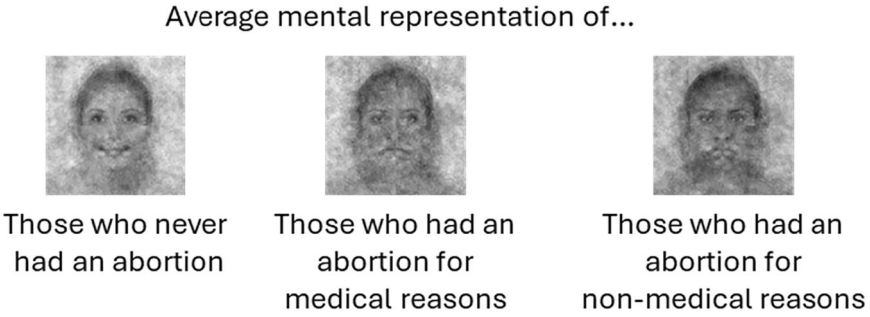


Fig. 1 | Average Images for Each Condition, Study 1.

Fig. 2 | Examples of Stimuli, Study 3.

representative of White Americans. To increase generalizability of the findings, we recruited a representative quota-sample of White Americans who generated images of those who had abortions for non-medical reasons.

Image generation phase. Ultimately, we were interested in investigating correlations between perceived race ratings of the images and image generators' individual difference measures. An *a priori* power analysis suggested we would need $N = 346$ to detect a small-to-medium correlation ($r = .15$) with adequate power ($1\text{-}\beta = .80$). We recruited 375 monoracial White participants from CloudResearch Prime Panels using a representative quota-sampling approach to recruit a sample representative of the U.S. on age, gender, income, and political party affiliation (data collection began June 19, 2024 and was limited to those residing within the U.S.). We retained data from $N = 452$ monoracial White individuals who completed the reverse correlation task.

The procedure was exactly the same as described for participants in the non-medical condition in the Image Generation portion of Study Set 1. See the Supplemental Online Materials for a replication and extension investigating mental images of those who had an abortion for medical and non-medical reasons.

Image aggregation phase. For all participants, we created individual-images (rcicr 0.3.0[28,35]) by superimposing the averaged noise patterns of all selected images for a given participant onto the base face.

Image rating phase. To ensure we had each image rated by approximately 20 participants, we recruited $N = 400$ raters from Prolific Academic to rate a subset of images. Our final sample size was $N = 394$.

To avoid rating fatigue, both rating samples were randomly assigned to rate a subset of 35 images. All images were presented in a random order, and participants were naïve to how the images were created. For each image, participants were asked: "How much do you see this person as being… Feminine, Asian, Black/African American, Hispanic/Latinx, White" (*1* = Not at all; *6* = Extremely). Participants also completed some demographic items for the purpose of characterizing the sample.

We created an average rating for each image on each rating dimension. These average ratings were then connected with the image generators' responses on the individual difference measures.

Study 3

In a final study, we investigated whether mental representations shaped participants' judgments that these women are responsible, their pregnancy was planned, and, in turn, if these judgments predicted attitudes toward restrictive abortion policies.

An *a priori* power analysis suggested we would need $N = 787$ participants to detect a small effect ($f = .2$) with adequate power ($1\text{-}\beta = 0.80$) for a two-group between-subjects ANCOVA[36]. To ensure we were adequately powered to detect a moderation effect by participants' individual differences (e.g., symbolic racism), we recruited $N = 1000$ monoracial White participants from Prolific Academic (data collection began May 15, 2024 and was limited to those residing in the U.S.). We retained data from $N = 910$ who were monoracial White, did not have duplicated Prolific identification numbers, passed the attention check, and consented to participate and have their data used.

Participants were asked to make judgments of a series of distorted and fuzzy photos. Participants were told the photos were distorted because the images were of women who sought information about having an abortion and the distortions served to protect their privacy. Participants were then randomly assigned to see a subset of 5 images of those who never had an abortion or 5 images of those who had an abortion for non-medical reasons that were generated in Study Set 1. Because those images also displayed smiles and frowns, we sought to avoid this potential confound of "facial expression" across the subgroup images by placing a black bar across the mouth of the images (see Fig. 2). Participants rated the extent to which each pictured person seemed responsible ("Compared to the typical person, how irresponsible or responsible does this woman seem?"; *1* = extremely irresponsible; *6* = extremely responsible) and how likely it was that this person had a pregnancy that was planned and desired (*0* = extremely unlikely; *100* = extremely likely).

After rating the images, the participants were then asked three items assessing the extent to which they agreed with stereotypes about those who have abortions; items such as "Instead of having an abortion, some women need to learn how to say no," (*0* = strongly disagree; *100* = strongly agree; $\alpha = .90$). Then, they were asked three items about the extent to which they believe abortions should be strictly regulated; items such as "Abortion should be strictly regulated by the government" (*0* = strongly disagree; *100* = strongly agree; $\alpha = .79$). Then participants were asked whether they

Table 2 | Means, Standard Errors, and Inferential Statistics for Image Ratings, Study 1

	Never		Medical		Non-medical		Omnibus *F*	*DF*	Omnibus p-value			
	M	SE	M	SE	M	SE				η_p^2	95% CI η_p^2	
White	2.74a	0.07	2.27b	0.05	1.76c	0.05	201.19	2, 410	<0.001	0.50	0.43	0.55
Black	1.53a	0.05	1.94b	0.05	2.5c	0.05	287.11	2, 410	<0.001	0.58	0.53	0.63
Hispanic/Latinx	2.61a	0.05	2.84b	0.05	2.83b	0.05	23.59	2, 410	<0.001	0.10	0.05	0.16
Asian	2.10a	0.06	1.90b	0.06	1.97c*	0.06	14.62	2, 410	<0.001	0.07	0.03	0.11
Feminine	4.10a	0.06	3.28b	0.07	3.11c	0.07	279.79	2, 410	<0.001	0.58	0.52	0.62
Wealthy	53.66a	0.68	44.18b	0.75	40.68c	0.88	233.35	2, 410	<0.001	0.53	0.47	0.58
Moral	4.44a	0.05	3.83b	0.05	3.61c	0.06	177.13	2, 426	<0.001	0.45	0.39	0.51
Benevolent Sexism	3.48a	0.09	3.00b	0.08	2.87c	0.08	101.04	2, 424	<0.001	0.32	0.25	0.39
Hostile Sexism	2.47a	0.08	2.89b	0.08	3.09c	0.09	67.86	2, 424	<0.001	0.24	0.17	0.31

Note. * indicates pairwise comparison between medical and non-medical was $p = .013$. All other pairwise significant differences were $p < .001$. Across each row, when means share a letter (e.g., both have an 'a') then these two means do not significantly differ from one another. When means do not share a letter (e.g., one is 'a' and one is 'b') then these two means significantly differ from one another.

believed: (1) abortion should be legal/illegal in all cases, (2) abortion at 14 weeks should be legal/illegal in all cases, and (3) abortion at 6 weeks should be legal/illegal in all cases (*0* = legal in all cases; *100* = illegal in all cases). Finally, participants were asked to determine how severely a woman should be punished if she had an illegal abortion (*0* = no punishment at all; *100* = the most severe punishment possible).

Next, participants completed the symbolic racism measure toward Black people[31] ($\alpha = .94$) and toward Latinos[37] ($\alpha = .85$). Participants were also asked the extent to which they were pro-life (*1* = strongly pro-choice; *6* = strongly pro-life), their political party affiliation, and the extent to which they were conservative on social and economic issues (*1* = strongly liberal; *6* = strongly conservative). Finally, participants were asked demographic items including income, perceived socioeconomic status, age, gender, education, and race/ethnicity.

Results

Study 1

We anticipated that those who generated images of a woman who had never had an abortion (vs. generated images of a woman who had an abortion for medical or non-medical reasons) would generate images that were rated as more representative of White Americans, higher social class, more feminine, more moral, more representative of benevolent sexism statements, and less representative of hostile sexism statements. Further, we anticipated that those who generated images of a woman who had an abortion for medical (vs. non-medical) reasons would generate images that were rated as more representative of White Americans, higher social class, more feminine, more moral, more representative of benevolent sexism statements, and less representative of hostile sexism statements.

To test these hypotheses, we conducted repeated measures ANOVAs with image type as the within-subjects factor. All omnibus ANOVAs were significant across all dependent variables (*F's* ranged from 14.62-287.11 and *p*-values were all < .001; see Table 2). Pairwise comparisons utilized a Least Significant Difference adjustment for multiple comparisons. Compared to images of those who had an abortion, regardless of the reason, images of those who never had an abortion were rated as more representative of White and Asian people, less representative of Black and Hispanic/Latinx people, more feminine, and wealthier, more moral, more representative of benevolent sexist statements, and less representative of hostile sexist statements. Compared to images of those who had an abortion for non-medical reasons, images of those who had an abortion for medical reasons were rated as more representative of White people, and less representative of Black and Asian people, more feminine, wealthier, more moral, more representative of benevolent sexist statements, and less representative of hostile sexist statements. Overall, these findings were consistent with our hypotheses.

Study 2

We investigated correlations between image generators' individual difference measures and the image rating dimensions (for additional regression analyses see Supplemental Materials). For results, see Table 3. Images of those who had abortions for non-medical reasons were rated as less representative of White people for image generators who more strongly endorsed feeling warmer toward White people relative to Black and Hispanic people, and greater symbolic racism toward Black people and Latinos. In addition, images were rated as less representative of White people for image generators who more strongly endorsed modern sexism, sexualized stereotypes about Black women, and the belief that the government should help people avoid sin. Images were rated as more representative of Hispanic people for image generators who more strongly endorsed symbolic racism and Latino symbolic racism. Overall, these data suggest that negative attitudes toward Black and Latinx people may shape image generators' mental representations of those who have abortions for non-medical reasons, such that they imagine such people to be less White. Next, we explored whether these racialized perceptions have downstream consequences for policy support.

Table 3 | Correlations Between Image Generators' Individual Difference Measures and Image Ratings of Perceived Race/Ethnicity and Femininity, Study 2

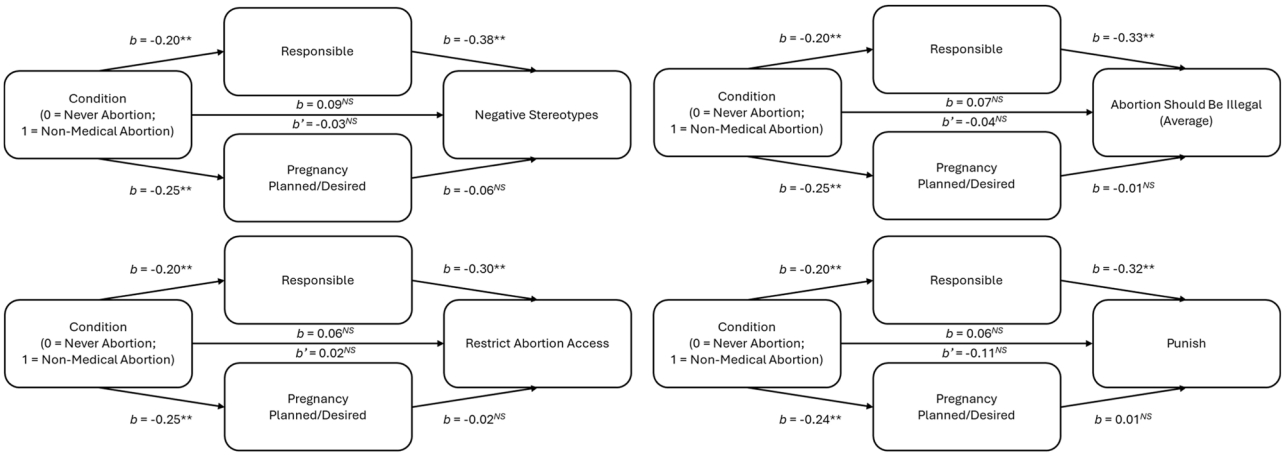
Images of women who had abortions for					
Non-medical reasons					
Average image rating perceive					
	Asian	**Black**	**Hispanic**	**White**	**Fem**
FT White	**0.10***	0.01	0.02	-0.07	-0.02
FT Black	0.06	-0.04	0.00	0.03	-0.02
FT Hispanic	0.05	-0.04	-0.03	0.03	-0.02
FT Asian	0.09	-0.03	-0.02	0.01	-0.03
FT W-B	0.02	0.05	0.02	**-0.09***	0.01
FT W-H	0.04	0.06	0.05	**-0.10***	0.00
Sym Racism	-0.05	0.07	**0.10***	**-0.11***	-0.03
Lat Sym Racism	-0.03	0.06	**0.11***	**-0.09***	-0.03
Modern Sexism	-0.01	0.05	0.05	**-0.10***	-0.07
Sex Stereo BW	0.03	0.04	0.02	**-0.11***	0.00
Sex Stereo Lat	0.04	-0.03	0.02	-0.06	-0.03
Latina Sub	-0.03	0.04	-0.05	-0.07	-0.09
Religiosity	0.03	0.03	-0.01	-0.08	-0.06
Gov't Avoid Sin	0.01	0.04	0.05	**-0.13****	-0.03
Pro-Life	-0.02	-0.02	0.07	-0.05	-0.04
Social Conserv	-0.06	0.06	0.07	-0.09	-0.02
Economic Conserv	-0.06	0.00	0.03	-0.04	-0.01
Man (1 = man)	0.00	0.00	0.00	-0.05	-0.04

Note. * indicates $p < .05$, and ** indicates $p < .01$. Fem = Feminine. FT = Feeling thermometer. W-B = White minus Black. W-H = White – Hispanic. Sym Racism = Symbolic Racism toward Black people. Lat Sym Racism = Symbolic Racism toward Latinos. Sex Stereo BW = Sexualized stereotypes toward Black women. Sex Stereo Lat = Sexualized stereotypes toward Latinas. Latina Sub = Latina Subordination Stereotypes. Religiosity = Belief that religion is central to one's identity. Gov't Avoid Sin = Belief that the government should help people avoid sin. Conserv = Conservative.

Study 3

We investigated whether perceived responsibility of the pictured people and whether the pregnancy was perceived to be planned and desired shifted depending on whether the reverse correlation subgroup image was generated by those who imagined someone who had never had an abortion vs. someone who had an abortion for non-medical reasons. To investigate this question, we averaged together the perceived responsibility rating toward each image, and we averaged together the perceptions that the pregnancy was planned and desired toward each image. Then, we tested whether these averages differed by condition using an independent samples *t*-test (for analyses investigating moderation by individual difference variables, and main effects for findings on non-preregistered variables, see the Supplemental Materials). As anticipated, images generated by those who imagined someone who had an abortion for non-medical reasons (vs. someone who had never had an abortion) were rated as less responsible ($M_{abortion} = 3.61$, $SD = 0.91$; $M_{never\ abortion} = 3.79$, SD = 0.87), and participants were less likely to think a pregnancy was planned and desired ($M_{abortion} = 38.10$, $SD = 18.16$; $M_{never\ abortion} = 42.68$, $SD = 18.41$), $t_{responsible}$ (893) = -2.98, $p = .003$, 95% CI_{Mdif} [-0.29, -0.06], $d = 0.20$; $t_{planned/desired}$ (885) = -3.73, $p < .001$, 95% CI_{Mdif} [-6.99, -2.17], $d = 0.25$ (please note, we did not find that the random assignment to a subset of 5 subgroup images moderated findings, p's > .300)

Finally, we investigated whether perceptions that the woman was responsible, and that the pregnancy was planned and desired, mediated the relationship between abortion condition and negative stereotypes about those who have abortions, policy support items, and perceptions that women who have illegal abortions should be severely punished using PROCESS (model 4[38]) with 5,000 bootstrapped resamples. All continuous variables were standardized prior to analyses. Because beliefs that abortions should be illegal, illegal after 6 weeks, and illegal after 14 weeks were highly related (r's > .80 p's < .001; $\alpha = .94$), we averaged these items together prior to standardizing. See Fig. 3 for specific paths and indirect effects. Perceived responsibility mediated the relationship between condition and the dependent variables. Participants rated the images of those who had an abortion (vs. never had an abortion) as less responsible, as reported above. Less perceived responsibility, in turn, predicted more negative stereotypes about those who had abortions, more



	Mediator Bootstrapped Indirect Effects					
	Responsibility			Planned/Desired		
DV	*b*	95% CI		*b*	95% CI	
Negative Stereotypes	0.08	0.03	0.13	0.02	0.00	0.04
Restrict Abortion Access	0.06	0.02	0.10	0.00	-0.01	0.02
Abortion Should be Illegal (Avg.)	0.07	0.02	0.11	0.00	-0.02	0.02
Punish	0.06	0.02	0.11	0.00	-0.02	0.01

Fig. 3 | Mediation Figures Predicting Negative Stereotypes, Attitudes that Abortion Should be Illegal, Support for Restricting Abortion Acess, and Punishment, Study 3. In all panels, the mediators are perceived responsibility and perceptions the pregnancy was planned and desired. In the top left panel, the mediators predict negative stereotypes about those who have abortions. In the top right panel, the mediators predict attitudes that abortion should be illegal. In the bottom left panel, the mediators predict support for restricting abortion access. In the bottom right panel, the mediators predict support for punishing those who have illegal abortions. *Note*. **$p < 0.01$. *NS* $p > 0.05$.

support for restricting abortion access, greater beliefs that abortions should be illegal, and greater punishment of women who had illegal abortions. (An alternative theoretical model was raised by a reviewer such that condition predicted perceptions the pregnancy was planned/desired, which then predicted perceived responsibility, which then predicted negative stereotypes/policy attitudes/punishment in a serial, rather than parallel, mediation model. Such a model also yielded statistically significant indirect effects and is reported in Supplemental Materials).

Discussion

The current work investigated White Americans' mental representations of those who have never had an abortion, those who had an abortion for medical reasons (e.g., the fetus cannot survive outside of the womb) and those who had an abortion for non-medical reasons (e.g., the woman does not want a child). In Study Set 1, participants were randomly assigned to generate mental representations of those who: (1) had never had an abortion, (2) had an abortion for medical reasons, or (3) had an abortion for non-medical reasons. Then, a separate sample of participants, who had no idea how these images were generated, rated aggregated images. Images of those who never had an abortion were perceived to be most representative of White Americans, wealth, femininity, and positive stereotypes, whereas, images of those who had an abortion for non-medical reasons were perceived to be least representative of White Americans, wealth, femininity, and positive stereotypes. Images of those who had an abortion for medical reasons fell in the middle. Together, this suggests that mental representations of those who have abortions, regardless of the reason, are suffused with racialized sexist stereotypes, and that these effects may be especially pronounced when abortions are sought for non-medical reasons.

In Study Set 2, we investigated whether image generators' attitudes were associated with how a naïve sample rates the perceived race/ethnicity and femininity of these images. To enhance generalizability of our findings, we included a nationally representative quota-sample of White Americans. The results suggest that negative attitudes toward Black and Latinx people predicted generating images of those who have abortions for non-medical reasons that are less representative of White Americans.

In Study 3 we investigated whether mental representations shaped people's perceptions that the pictured women are irresponsible, and that the pregnancy is not desired and, in turn, leads to more support for restrictive abortion policies. As anticipated, images generated by those who imagined someone who had an abortion for non-medical reasons (vs. someone who never had an abortion) were rated as less responsible, and participants were less likely to think the pregnancy was planned and desired. Further, perceptions that the pictured women were irresponsible mediated the relationship between condition (viewing images of those who had an abortion for non-medical reasons vs. those who never had an abortion) and general negative stereotypes about those who have abortions, restrictive abortion policy support, and perceptions that women who have illegal abortions should be severely punished.

Contributions and implications

The current work extends beyond previous work by directly assessing White Americans' spontaneous mental representations of those who have abortions using the reverse correlation procedure[26]. Unlike methods used in previous literature, this measure is a data-driven, indirect measure which produces images rich in detail that can illuminate properties (such as race, gender, and personality traits) not available to introspection or honest self-reporting[39]. Traditional approaches rely on the researcher to determine *a priori* which stereotypes about outgroup members will be assessed. Even implicit measures limit participants' use of spontaneous information by forcing participants to respond to specific categories, such as good/bad, threatening/safe, aggressive/docile—and such measures are influenced by the particular stimuli used (for a review see[26]). If a researcher were to utilize a similar approach by presenting participants with an array of images, the researcher cannot be certain without further investigation that the selected set holds the critical informational value to predict judgments[40]. Reverse correlation avoids these issues by randomly varying the stimuli used on each trial in ways that uniquely distort the facial features. This allows participants to freely adopt whatever selection strategy they want and in no way limits participants' spontaneous use of information. In fact, participants might not even be aware of the strategy they are adopting to select a picture[26]. Thus, if any bias emerges in the images, it has emerged freely and spontaneously, as opposed to in reaction to an experimenter's prompt or in reaction to the particular stimuli chosen by the researchers. Thus, this work takes an important first step beyond previous work by utilizing a cutting-edge, data-driven indirect measure.

In addition, because these mental representations likely shift depending on the reason the person is seeking an abortion, we investigate mental representations of those who have never had an abortion, those who had an abortion for medical reasons (e.g., the fetus cannot survive outside of the womb) and those who had an abortion for non-medical reasons (e.g., the woman does not want a child). Thus, this work investigates whether and how biased mental representations of those who have abortions may shape attitudes toward abortion rights.

This work investigates the causal implications of these biased mental representations. Previous work has found that discussions about abortion seekers evokes mental imagery suffused with racialized and sexist stereotypes[25], and that racist and sexist attitudes are related to abortion policy attitudes[14]. For example, Bruce and colleagues[25] interviewed individuals about who they imagine and found that in fact, people do draw on a shared set of images. They argue the images in people's minds allow them to think about and consider situations that they may have never encountered but are nevertheless asked to have an opinion on, such as abortion. This prior work suggests that perceptions of abortion seekers and attitudes toward abortion policies are related to racism and sexism. However, work has not yet investigated whether biased mental representations causally impact stereotypes about abortion seekers and, in turn, attitudes toward abortion policies. If biased representations causally impact these stereotypes and attitudes, this has significant implications for those seeking to prevent the use of prejudicial attitudes when developing and enacting public policy. Thus, the current work represents a significant contribution by investigating the causal impact of biased representations and identifying a mechanism linking biased representations to policy attitudes.

The current research also investigates the causal implications of racialized perceptions of abortion seekers. In particular, in Study 3 we find that when people are presented with images of abortion seekers, who were previously rated as more representative of Black/Latinx women (vs. White women) based on physiognomy and skin tone, they think these women are less responsible, that they are more likely to have unplanned pregnancies, and, in turn, are more supportive of restrictive policies. Thus, these biased representations cause shifts in White Americans' stereotypes toward abortion seekers and policy attitudes.

This work has implications for understanding how policymakers may use messaging to try to garner support for restrictive abortion policies. By highlighting stereotypes regarding motherhood and femininity, while simultaneously suggesting that abortion seekers are women who are irresponsible and immoral, these messages may trigger racialized representations of abortion seekers in White Americans' minds. As a result, these messages are making religious morals, sexist stereotypes, *and* gendered racial stereotypes salient. Together, these messages may motivate more support for restrictive abortion policies by subtly shifting the electorate's visualizations of the people affected by these policies. As a result, abortion policy attitudes may become more limiting without individuals ever needing to confront accusations of being racially biased from others or themselves.

Limitations and future directions

This work is limited by its focus on White Americans' mental representations and cannot speak to generalizability to other racial/ethnic populations. Based on previous work[14], we would anticipate different mental representations for those of different racial/ethnic groups. To better understand the factors which underpin Americans' attitudes toward abortion access

policies, it is crucial that future work recruit samples of Asian, Latino, and Black Americans as well as samples representing other racial identities.

In addition, while the methodological approach of using reverse correlation has several advantages (detailed in the introduction) there are also disadvantages. In particular, the prompting of generating images of women who had abortions for different reasons may have led participants to, in the moment, generate a stereotype and image of these women. Further, although participants were allowed to not respond to any of the reverse correlation trials, these participants were dropped from image aggregation as no data was provided. Thus, we are not able to measure those who do not have mental representations of the categories we assessed. Thus, the reverse correlation image generation approach should be considered in the broader context of the studies, multi-method approaches, and past research.

A related disadvantage of this approach is that it is difficult to tell which feature is driving participants' attitudes toward the images or their policy attitudes. We argue that it is likely the constellation of stereotypes including perceived race, social class, femininity, morality, which are jointly contributing to differences in the physiognomic mental representations of those who have never had an abortion, had an abortion for medical reasons, and had an abortion for non-medical reasons. However, the current approach cannot isolate or compare which stereotype is having the largest impact. This may be evaluated in future research using different methodological approaches.

This work did not ask participants whether they have had an abortion or whether they know anyone who has had an abortion. These questions were not asked for ethical and legal reasons, but we would imagine that these 'first-hand' experiences would certainly influence mental representations of those who have had an abortion[25].

Finally, this work does not investigate women who may present with non-traditional gender markers, or a wide range of different reasons that people may seek an abortion. We anticipate that these factors would significantly impact both mental representations of those who have abortions and attitudes toward abortion policies.

Conclusion

Understanding attitudes toward abortion access is critically important given the political landscape of in-flux abortion policies in the U.S. The current work suggests that White Americans' attitudes toward abortions are related to their mental representations of those who they believe seek abortion care. And, these mental representations are suffused with racial bias and sexist stereotypes, particularly when imagining those who have abortions for non-medical reasons. As a result, these mental representations may serve as a subtle mechanism which link racial and gender bias with attitudes toward abortion policies.

Data availability

Study materials, data, and analytic code are posted on an open science platform: https://osf.io/qb35j/.

Code availability

Analytic code is posted on an open science platform: https://osf.io/qb35j/.

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Author contributions

J.L. B.-I., E.C., S.E., J.A. L., W.C. III, and S.M. designed the research. J.L. B.-I. and E.C. performed the research. J.L. B.-I., E.C., J.A.L., and W.C. III analyzed data. J.L. B.-I. wrote the paper. J.L. B.-I., E.C., S.E., J.A.L., W.C. III, and S.M. provided critical feedback and edits.

Competing interests

The authors declare no competing interests.

Additional information

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