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Examining Mental Health and Bullying Concerns at the Intersection of Sexuality, Gender, Race, and Ethnicity Among a National Sample of Sexual and Gender Diverse Youth

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Abstract

Purpose: Most extant scholarship that examines the health experiences of sexual and gender diverse youth (SGDY) is limited in the ability to apply an intersectional framework due to small sample sizes and limitations in analytic methods that only analyze the independent contribution of social identities. To address this gap, this study explored the well-being of youth at the intersection of ethnic, racial, sexual, and gender identities in relation to mental health and bullying.
Methods: Data were from a U.S. national survey of SGDY aged 13–18 years, collected in 2022 ($N = 12{,}822$). Exhaustive Chi-square Automatic Interaction Detection analysis identified intersectional social positions bearing the greatest burden of negative health-related experiences (depression, anxiety, and past 30-day in-person victimization).
Results: Transgender boys were among those at the highest prevalence for compromised mental health and peer-based in-person victimization. Although the primary distinguishing factor was transgender identity for depression and anxiety, there were no racial/ethnic distinctions, corroborating some previous scholarship. Asian cisgender and transgender girl SGDY shared the lowest burden of peer-based in-person victimization in school.
Conclusion: Our findings suggest a need for scholars, health professionals, and other stakeholders to better understand the mechanisms that drive negative health experiences and in-person victimization experiences at the intersections of sexual, gender, racial, and ethnic identities.

Keywords: gay, intersectionality, mental health, race/ethnicity/culture

Introduction

In the United States nearly 2 million youth identify as LGBT.[1] For decades, research has documented the health disparities experienced by sexual and gender diverse youth (SGDY) compared with their heterosexual and cisgender counterparts.[2] These disparities (e.g., higher levels of depression)[3] continue to increase in magnitude over time[4] despite substantial advancement in the rights for sexual and gender diverse (SGD) individuals. SGDY are a heterogeneous population;[5] within-group differences in health and health-related experiences occur at the intersection of race, ethnicity, sexual orientation, and gender identity but are often obscured in the literature focused on SGDY health disparities.[6]

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The intersectionality framework[7] focuses on the social forces that drive the disadvantage and oppression among populations based on intersecting social identities (e.g., co-occurring experiences of heterosexism and racism).[8] However, many quantitative studies of SGDY are limited in their ability to apply an intersectional framework because of small sample sizes lacking diversity and analytic methods that only analyze the independent contribution of social identities (e.g., multiple regression). Thus, understandings of health disparities experienced by diverse populations of SGDY are underdeveloped.[8]

Although SGDY experience disparities across multiple health outcomes and health-related experiences,[3] mental health and well-being (e.g., depressive symptoms and anxiety) have been of primary focus.[2] There is robust evidence that SGDY experience higher levels of anxiety and depressive symptoms relative to heterosexual youth.[2,3,9,10] Bisexual youth in particular share a disproportionate burden of mental distress compared with their monosexual counterparts,[3] oftentimes explained by bi-erasure (i.e., tendency to ignore and/or erase bisexuality) and biphobia.[11]

A growing body of research has begun to document higher odds of depression symptoms among transgender individuals relative to cisgender peers.[12,13] And while limited in the application of intersectionality frameworks, there are equivocal findings regarding rates of depression and anxiety across ethnically/racially diverse samples of SGDY. Some studies have documented that multiracial and Latina/e/o/x youth who identify as transgender and nonbinary report greater mental health problems,[14] whereas other studies focused on experiences of sexual minority youth have found worse mental health outcomes in White relative to non-White youth.[15]

In other studies, Latina/e/o/x individuals who identified as lesbian, gay, and bisexual had a higher prevalence of major depressive disorders relative to their Black peers who also identified as lesbian, gay, and bisexual,[16] and multiracial SGD individuals more frequently experience depressive symptoms when compared with monoracial SGD individuals.[17] Extant intersectional research has largely been limited in considering only two identities at a time or by collapsing identities into single categories because of small cell sizes (e.g., $n = 28$ asexual individuals),[17] and for the intersectional groups they consider (e.g., $n = 27$ transgender/nonbinary youth whose race/ethnicity was either Black/African American, Asian, American Indian/Alaska Native, or Native Hawaiian/Pacific Islander).[14]

Although several factors drive the documented health disparities among SGDY, one experience in particular—peer-based victimization—has been linked to negative health outcomes for SGDY.[2,18] Compared with their cisgender heterosexual peers, SGDY experience higher levels of victimization,[19,20] which has been linked to elevated experiences of mental health problems.[20] Some studies document that victimization experiences differ across sexual, gender, and ethnic identity; yet, few studies have explored the intersections across multiple marginalized identities.[21,22]

Research has shown that SGDY who are bisexual, transgender, assigned male at birth, Black, or multiracial are more likely to experience victimization at school.[22–27] In studies focused on differences at the intersection of gender identity and sexual orientation, gender diverse youth who also held a nonheterosexual identity reported the highest levels of victimization.[21,27] Recent research with large statewide data found that Black, multiracial, and Native American youth who were questioning their gender *and* who identified as queer or questioning their sexual identity reported more frequent sexuality-based bullying compared with their White, Latina/e/o/x, and Asian peers who identified with similar SGD identities.[21]

Another study found important within-group variation in relation to victimization experiences such that sexual orientation modified some effects of ethnicity and race, and gender modified some effects of sexual orientation.[22] Taken together, these findings suggest that victimization may vary considerably across subgroups of SGDY. Although emerging intersectional work has used large-scale data to investigate differences in victimization among intersectional groups of SGDY,[21,27] these studies used limited measures of social identity (e.g., limited options for youth to select newer/expansive identities)[21,26] or only focus on one state at a time.[27]

Current study

Using a novel statistical approach[28] to examine intersectionality, this study built on existing research examining depressive/anxiety symptoms and victimization to better understand which subgroups of youth at the intersections of race, ethnicity, sexual orientation, and gender identity may be disproportionately vulnerable to disparities in mental health and peer-based in-person victimization.

Methods

Study design

Data were from the *LGBTQ National Teen Survey*, fielded between February and October 2022. To be eligible to participate, respondents needed to identify as SGDY, be 13–18 years of age, and reside in the United States at the time of survey completion. Validated participants who finished the entire survey were offered $5 Amazon or Starbucks gift cards. The Institutional Review Board at the University of Connecticut approved all study protocols. Informed assent was obtained from all youth participants included in the study. A waiver of parental consent was obtained.

Participant recruitment

Most adolescents were recruited through social media advertisements or unpaid posts. Graphics that depicted diverse SGDY reached 1.05 million individuals using Facebook/Instagram. Community partners also leveraged Reddit, Discord, Twitch, TikTok, and Instagram. The Human Rights Campaign advertised in-person and online to high school gender and sexuality alliances, university lesbian, gay, bisexual, transgender, and queer (LGBTQ+) centers, and youth pride events in June 2022.

Data validation procedures

Several strategies were established a priori to prevent ineligible and mischievous responders from completing the survey. IP addresses were obtained in the screener to ensure participants had not already completed the screener and were in the United States. Survey links were not distributed on public channels, such as Twitter; instead, a screener was

utilized to prevent ineligible participants from taking the survey and being remunerated.

To deter fraudulent responses, the research team enacted a multistep verification process, including automatic verification and remuneration of participant identity when they provided a K-12 or college school e-mail (e.g., .edu, .org). If participants did not have a school e-mail, they verified their identity in one of two ways: (1) sent a photo to the research team of an identification with the option to redact their photo, or (2) met with a research assistant through video chat. Two research assistants processed all payments and identity verification to ensure that duplicate IDs were not submitted and there was not systematic manipulation of images of IDs.

Data screening procedures

A total of 37,221 individuals completed the study screener assessing age, U.S. location, sexual orientation, and gender identity. Of those, 24,570 (66.0%) met inclusion criteria. Approximately 25% of participants who met inclusion criteria quickly exited the survey (i.e., did not answer all demographic questions). The research team removed these cases ($n = 6200$), resulting in 18,370 participants to be screened for valid data. In total, 792 participants were removed in the post hoc data screening process: 412 for not reporting a valid age and 380 due to fraudulent and/or international e-mails. After removing fraudulent and/or mischievous cases, the final analytic sample was 17,578.

Measures

Ethnic/racial identity. To assess ethnic identity, participants responded to the question, ''Are you Hispanic or Latina/e/o/x?'' Response options were ''No'' and ''Yes.'' To assess racial identity, participants responded to the question ''What is your race? (select all that apply).'' Response options are reported in Table 1. For the current analysis, American Indian/Alaska Native and Native Hawaiian/Pacific Islander SGDY were combined as one group. SGDY categorized as missing on race/ethnicity were retained in a ''missing'' category for analytic purposes.

Gender identity. Participants reported their current gender identity through a select-all-that-applies item (see Table 1 for response options). If a participant selected more than one gender identity, they responded to the question ''If you had to choose ONE, which of the following best represents your current gender identity?'' If they wrote-in a gender identity, or wrote in multiple identities, they were recoded as ''something not listed.'' Participants who wrote-in an identity that matched existing options were back-coded into that option. For the current analysis, SGDY who reported their gender as gender nonconforming, gender fluid, gender queer or nonbinary were recoded as nonbinary. Moreover, due to small sample sizes, ''questioning'' and ''something not listed'' responses were combined into one category. SGDY categorized as missing on gender identity were retained in a ''missing'' category for data analytic purposes.

Sexual orientation. Participants responded to the question: ''Which of the following BEST describes you? Check one.'' Response options are reported in Table 1. Participants who wrote in an identity that matched existing options were back-coded into that option. For the current analysis, due to small cell sizes, participants who responded ''questioning,'' ''straight,'' or ''something not listed'' were combined into one category for analytic purposes.

Table 1. Characteristics of the Analytic Sample ($N = 12{,}822$ Adolescents)

	n	%
Social positions		
Race		
White	9136	71.3
Bi-/multiracial	1326	10.3
Black or African American	730	5.7
Asian	557	4.3
American Indian, Alaska Native, Native Hawaiian Pacific Islander	203	1.6
Other race	827	6.4
Missing	43	0.3
Ethnicity		
Non-Hispanic/Latinx	10,531	82.1
Hispanic/Latinx	2262	17.6
Missing	29	0.2
Gender identity and modality		
Nonbinary, gender nonconforming, gender queer, or gender fluid	3949	30.8
Nonbinary	2079	16.2
Gender fluid	949	7.4
Gender queer	552	4.3
Gender nonconforming	369	2.9
Transgender boy	2373	18.5
Cisgender boy	2120	16.5
Cisgender girl	1960	15.3
Questioning/other	1433	11.2
Questioning	831	6.6
Other gender identity not listed	602	4.7
Transgender girl	943	7.4
Missing	44	0.3
Sexual orientation		
Gay or lesbian	3739	29.2
Bisexual	3513	27.4
Pansexual	1897	14.8
Queer	1275	9.9
Questioning/other	1257	9.8
Other sexual orientation not listed	655	5.1
Questioning	437	3.4
Straight	165	1.3
Asexual	1141	8.9
Bullying and mental health concerns		
In-person victimization experience (past 30 days)		
Ever	7264	57.0
Never	5475	43.0
Clinical anxiety symptoms (past 2 weeks)		
Yes	6811	63.4
No	3936	36.6
Clinical depressive symptoms (past 2 weeks)		
Yes	5892	54.8
No	4853	45.2

In-person victimization. Participants responded to the 4-item University of Illinois Victimization Scale.[29] This scale asked about experiences that had happened in person in the past month, such as ''I got hit and pushed by other students.'' Response options include ''never'' (1) to ''7 or more times'' (5). A mean scale score was computed; a higher score

indicates more frequent victimization in the past 30 days ($\alpha = 0.88$). The mean score was then dichotomized to reflect SGDY who had a mean score of 1, and thus reported no victimization (=0) and SGDY who reported any victimization with a mean score greater than 1 (=1). Bullying victimization was coded this way given prior research that highlights the negative consequences of any level of victimization.[30]

Depression and anxiety symptoms. Participants responded to the 4-item Patient Health Questionnaire-4.[31] This scale asks participants about problems they were bothered by for the past 2 weeks, such as feeling nervous, anxious, or on edge. Response options range from ''Not at all'' (0) to ''Nearly every day'' (3). The anxiety items ($\alpha = 0.87$) and depression items ($\alpha = 0.80$) were analyzed separately. A sum score was computed for the anxiety and depression subscales. If a participant scored three or higher on the subscale, they met the cutoff for anxiety or depression symptoms (=1); if the participant scored below three on the subscale, they did not meet the cutoff for anxiety or depression symptoms (=0), as validated by scale developers.[32]

Statistical analysis

The present analysis utilized data from 12,822 participants (72.9% of the full sample) who responded to at least one survey item related to in-person victimization, anxiety symptoms, or depressive symptoms. Because most participants who were excluded from the analytic sample responded only to demographic items, multiple imputation was not used. Compared with participants excluded from the analytic sample, participants in the analytic sample were more likely to be non-Hispanic/Latinx (χ^2 (1, $N = 16{,}202$) = 11.04, $p < 0.001$); more likely to be White (χ^2 (5, $N = 16{,}185$) = 147.53, $p < 0.001$); and more likely to be transgender boys or transgender girls (χ^2 (5, $N = 17{,}448$) = 418.95, $p < 0.001$).

We used exhaustive Chi-square Automatic Interaction Detection (CHAID) analyses with a Bonferroni correction and 10-fold cross validation for our primary analyses. Exhaustive CHAID is a data-driven decision-tree approach recommended for quantitative intersectional research.[28,33,34] Using successive chi-square tests, exhaustive CHAID iteratively cycles through all interactions among independent variables, splitting between categories that differ significantly (Bonferroni adjusted $p < 0.05$) with regard to the prevalence of dependent variables (i.e., in-person victimization, anxiety symptoms, and depressive symptoms).

Exhaustive CHAID repeats this process until a ''terminal node'' is reached (which includes no additional significant differences across any independent variable). Terminal nodes are the final groups in this decision tree—groups that cannot be split further by independent variables. A minimum parent node size of 40 and child node size of 20 was set in the present analysis to avoid overfitting, but to allow for the CHAID models to identify significant differences among small intersectional subgroups. Our sample size was large enough to detect significant differences in prevalence among many subgroups (e.g., White transgender boys ($n = 1586$) compared with Black transgender boys ($n = 82$)). Index scores are included in tables to demonstrate the proportion of adolescents in a given node reporting bullying, and mental health concerns relative to the overall sample means. All analyses were conducted in SPSS version 29.

Results

Characteristics of the study sample are reported in Table 1. Three figures (Supplementary Figs. S1–S3) that show the exhaustive CHAID tree structures for each outcome are provided as Supplementary Material.

Intersecting social positions associated with in-person victimization

Transgender, gender diverse, and gender questioning youth—many of whom were not White—were part of the

Table 2. Terminal Nodes for In-Person Victimization Experience Among Sexual and Gender Diverse Adolescents (Past 30 Days; Overall Sample Average = 57% Victimized in the Past 30 Days; $N = 12{,}739$)

Node sample size	*Prevalence (%)*	*Index (%)*[a]	*Race*	*Ethnicity*	*Gender identity*	*Sexual orientation*
76	68.4	120.0	Native	--	Cis girl; cis boy; trans girl	
2355	64.3	112.8		--	Trans boy	
2319	62.0	108.7	Bi/multiracial; Native; White; missing	--	NB+; quest/other; missing	LG; pansexual; quest/other
1584	58.6	102.7	Bi/multiracial; Native; White; missing	--	NB+; quest/other; missing	Bi; queer
681	55.4	97.1	Black/African American; other identity	--	NB+; quest/other; missing	
4651	52.7	92.5	Bi/multiracial; Black; other identity; White; missing	--	Cis girl; cis boy; trans girl	
583	52.5	92.0	Black/African American; other identity	--	NB+; quest/other; missing	Ace
222	43.2	75.8	Asian	--	NB+; quest/other; missing	
268	36.9	64.8	Asian	--	Cis girl; cis boy; trans girl	

[a]Percentage of the sample average.

Ace: asexual; Bi: bisexual; Cis: cisgender; LG: lesbian or gay; Native: American Indian, Alaska Native, Native Hawaiian Pacific Islander; NB+: nonbinary, gender nonconforming, gender queer, or gender fluid; Quest/other: questioning or other identity for gender identity and questioning or other (including straight) for sexual orientation; Trans: transgender.

Table 3. Terminal Nodes for Anxiety Symptoms Among Sexual and Gender Diverse Adolescents (Past 2 Weeks; Overall Sample Average = 63.4%; *N* = 10,747)

Node sample size	*Prevalence (%)*	*Index (%)*[a]	*Race*	*Ethnicity*	*Gender identity*	*Sexual orientation*
2089	71.2	112.3			Trans boy	
4542	68.2	107.6			NB+; quest/other	
2095	61.4	96.9		Non-Hispanic/Latinx; missing	Cis girl; trans girl	
340	54.1	85.4		Hispanic/Latinx	Cis girl; trans girl	
1681	45.0	71.0			Cis boy; missing	

[a]Percentage of the sample average.

Cis: cisgender; NB+: nonbinary, gender nonconforming, gender queer, or gender fluid; Quest/other: questioning or other identity for gender identity and questioning or other (including straight) for sexual orientation; Trans: transgender.

highest prevalence in-person victimization nodes (Table 2). For example, 68.4% of Native American participants who identified as transgender girls, cisgender girls, or cisgender boys reported having been bullied by peers in the past 30 days (regardless of their sexual orientation)—a rate 20% higher than the sample average rate (index score = 120.0%).

The second highest prevalence in-person victimization node comprised transgender boys regardless of sexual orientation or ethnic/racial identity. Most (64.3%) transgender boys reported having been bullied in the past 30 days. By comparison, Asian youth across most gender identities were part of the lowest prevalence victimization nodes. For instance, 36.9% of Asian youth who identified as transgender girls, cisgender girls, and cisgender boys reported having been victimized in person—a rate about 35% lower than the sample average rate, and nearly 50% lower than their Native American counterparts with the same gender identities.

Intersecting social positions associated with mental health concerns

Several patterns emerged with respect to SGDY with the highest and lowest prevalence of anxiety and depressive symptoms (Tables 3 and 4). Notably, gender identity was the primary correlate of mental health; race did not emerge in any terminal anxiety and depressive symptoms nodes, and ethnicity emerged in only two. Specifically, transgender boys were in the highest prevalence nodes for anxiety and depressive symptoms. For instance, 71.2% of transgender boys across all other social positions reported anxiety symptoms—a rate about 12% higher than the sample average rate.

Similarly, 67.7% of transgender boys who identified as gay, pansexual, some other sexual orientation, or who were questioning their sexual orientation, reported depressive symptoms—a rate about one-and-a-quarter times the sample average rate. In contrast, cisgender boys and girls across sexual orientations were part of the lowest prevalence anxiety and depressive symptoms nodes. For example, less than half (45.0%) of cisgender boys and adolescents who were missing for gender identity reported anxiety symptoms—a rate 29% lower than the sample average rate.

Discussion

Limited research has explored health experiences at intersections of racial, ethnic, sexual, and gender identity among SGDY. Using a large national sample of SGDY, this study described differences in health-relevant outcomes at the intersection of ethnic/racial, sexual, and gender identities. Transgender boys across most ethnic/racial identities and sexual orientations were among the highest nodes of the depression, anxiety, and in-person victimization analyses. Native American youth who identified as a transgender/cisgender girl or cisgender boy also had the highest prevalence of victimization.

We found that the highest prevalence node for anxiety symptoms was defined by transgender boys; transgender boys across most sexual orientations were in the highest nodes for depression symptoms, corroborating research that has found that transgender boys report compromised mental health outcomes.[35,36] This may result from significantly lower family connectedness and/or poorer quality student–teacher relationships reported by transgender youth assigned female at birth.[37] Transgender boys and other youth assigned female at birth reported greater discrimination than their SGD peers.[13,36] An additional explanation for this finding

Table 4. Terminal Nodes for Depressive Symptoms Among Sexual and Gender Diverse Adolescents (Past 2 Weeks; Overall Sample Average = 54.8%; *N* = 10,745)

Node sample size	*Prevalence (%)*	*Index (%)*[a]	*Race*	*Ethnicity*	*Gender identity*	*Sexual orientation*
1076	67.7	123.4			Trans boy	LG; pansexual; quest/other
735	63.3	115.4			Trans boy	Ace; bi
5388	58.2	106.1			NB+; quest/other; trans girl	
278	55.4	101.0			Trans boy	Queer
1605	46.2	84.3			Cis boy; cis girl; missing	Bi; pansexual; quest/other
1663	40.1	73.1			Cis boy; cis girl; missing	Ace; LG; queer

[a]Percentage of the sample average.

Ace: asexual; Bi: bisexual; Cis: cisgender; LG: lesbian or gay; NB+: nonbinary, gender nonconforming, gender queer, or gender fluid; Quest/other: questioning or other identity for gender identity and questioning or other (including straight) for sexual orientation.

may be that compared with transfeminine youth, transmasculine youth perceive more negative parental reactions to their gender identity both at the time of coming out and several years later, which could in turn influence mental health outcomes.[38]

Of note, we found Asian SGD adolescents shared a lower burden of in-person victimization. Although this is consistent with past findings that have shown that Asian youth report lower levels of victimization,[39] more recent findings[26] indicate Asian youth who also identified as transgender reported higher amounts of victimization compared with their White SGDY peers. One way to explain the mixed findings may be from an intersectional perspective: Asian SGDY may face multiple forms of victimization (e.g., gender, sexuality, racially motivated, and online/offline) alongside more general forms of harassment.[20] Under-reporting of victimization may also explain some of the mixed findings—some studies have found inconsistencies in reporting victimization across ethnic minority youth and scholars have called for a need to use culturally adapted measures to accurately assess their experiences with victimization.[40]

A review of the literature on sexual minority youth of color found mixed evidence regarding ethnic/racial differences in mental health outcomes, such that it is not clear which ethnic/racial populations with sexual minority identities have the highest prevalence of poor mental health outcomes.[15] Relatedly, the CHAID analysis revealed no racial differences in anxiety or depression and few ethnic differences in anxiety, which can be situated in the mixed extant literature. The lack of racial/ethnic difference reported here corroborates other studies that have found no ethnic/racial differences in mental health-related outcomes, such as psychological distress among SGDY and young adults,[41] and suicidality among SGDY who were assigned female at birth.[42]

However, other studies have documented fewer symptoms of depression among Black individuals who held sexual minority or bisexual identities compared with their White counterparts with similar sexual identities,[43–45] and specific social position-related experiences in nonsuicidal self-injury were found at the intersection of sexual orientation and race (i.e., for bisexual participants of color).[46] These findings should also be considered in light of power limitations as certain subgroups may have been too small to detect differences when more than two identities at a time were considered.

The findings suggest notable variability in depression and anxiety symptoms based on sexual orientation and gender identity among SGDY. Future research should seek to identify the ways in which ethnic/racial minority SGDY cope with minority stressors that may increase resilience. Future research should consider multiple domains of social and behavioral outcomes (e.g., biological, social, and psychological) and social positions (e.g., weight and ability status). Given the need to selectively include only the survey items that could address the research questions for this study and ensure adequate cell sizes at the intersection of multiple identities, it was not possible to examine other health-relevant experiences that may differ based on intersections of social positions.

Limitations

Despite several important contributions, several limitations should be noted. First, given the cross-sectional nature of these data, measures capture participant identities at one point in time. Given that SGDY report changes in their identity labels and attraction over time,[47] future research should examine how changes in identity labels are associated with health. Another limitation is that the study utilized a nonprobability sample and recruited participants through SGDY community organizations and social media platforms.

Although the lack of racial/ethnic differences in anxiety or depressive symptoms seem to corroborate prior research,[41] it is important to note that this CHAID analysis was constrained by sample size. Despite the large sample, subgroups became increasingly small with the addition of intersecting identities. This was especially apparent in the context of youth of color and transgender/gender diverse youth (e.g., $n = 15$ for Black transgender boys who identified as pansexual), and may have prevented the decision tree from presenting findings beyond two intersecting identities.

Conclusion

SGDY constitute a growing and diverse population, yet little is known about distinct health experiences at the intersection of multiple social positions. The findings presented here build upon existing research that investigates differences in health experiences of SGDY in relation to one (or sometimes two) social identities at a time, and can inform future research that aims to study the mechanisms that drive the differences documented in this study. Furthermore, given the ever-changing policy and social landscape for SGDY, these findings provide timely information about the SGDY who are most burdened by poor mental health and in-person victimization experiences—and who might benefit most from research, policy, and programmatic efforts.

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Disclaimer

The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

Authors' Contributions

R.J.W. drafted a substantial portion of the article, conceptualized overall study data collection, article research questions, and led the author team in the development of the article; S.E.L. conducted the analyses, drafted portions of the article, and provided feedback throughout the writing process; M.E.E., C.W.W., S.T.R., and L.A.E. helped to frame the overall structure of the article, edited portions of the article, and provided feedback on the writing process; A.E.C., P.S.M., and B.M.R. drafted portions of the article in addition to providing feedback throughout the writing process; R.J.W., M.E.E., and S.T.R. acquired funding for this study. All authors read and approved the final article.

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Supplementary Material

Supplementary Figure S1
Supplementary Figure S2
Supplementary Figure S3

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