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## Seeing “The Bigger Picture:” Impact of an Arts-Focused Type 2 Diabetes Education Program in High Schools

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### Abstract

Traditional health education efforts rarely align with youth social justice values. The Bigger Picture (TBP), a spoken word arts campaign, leverages a social justice approach to activate youth around the social determinants of type 2 diabetes (T2D). This quasi-experimental study examines the impact of embedding TBP in urban, low-income high schools (3 intervention schools received TBP; 3 comparison schools received a non-health related spoken word program) with respect to (1) health-related mind-sets and expectations; (2) sense of belonging; and (3) civic engagement among youth. Adults and youth who participated in programming at all 6 schools were interviewed, and a content analysis of students’ poems was performed. TBP was well-received by adults and students. While students in both TBP and comparison programs described multiple social determinants of T2D, intervention students more frequently articulated the connections between race/ethnicity and T2D as a social justice issue. Further, all comparison students explicitly mentioned individual dietary behavior as a T2D determinant while most, yet not all, intervention students did. Students in both programs reported a high sense of belonging at school and confidence in civic engagement. Content analysis of TBP students’ poems revealed youth’s detailed understanding of T2D determinants. Future studies might explore program scalability, and how the integration of civic engagement opportunities into TBP curriculum might impact students’ capacity to create positive social change.

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#### Disclosure Statement

Gabriel Cortez is an employee of Youth Speaks (the organization that delivered the intervention). Mr. Cortez was also interviewed for this study but was not part of the analysis or writing up of the interview results.

#### Supplementary Material

Supplemental data for this article can be accessed on the publisher’s website

Over the past few decades, the prevalence of type 2 diabetes (T2D) in youth has increased dramatically (Pinhas-Hamiel & Zeitler, 2005). Further, pronounced racial and ethnic disparities in T2D prevalence among youth are concerning; Black and Hispanic youth are 6 times and 4 times more likely to have T2D, respectively, than white youth (Pettitt et al., 2014).

Portraying T2D as a problem with a solution at the individual level dismisses the impact that social determinants have on health. Although individual factors like diet (Kolb & Martin, 2017), physical activity (Kolb & Martin, 2017), and family history (Scott et al., 2013) can contribute to T2D, the social and environmental conditions in which people live also shape health behaviors and impact T2D risk (Hill-Briggs et al., 2021).

Traditional preventive health efforts among youth largely focus on the importance of protecting health and changing health behaviors (Bryan et al., 2016). However, behavior change interventions have limited effects on obesity for adolescents (Stice, Shaw, & Marti, 2006). Bryan et al. hypothesizes this is likely because past interventions have falsely assumed that youth are already motivated by health concerns (Bryan et al., 2016). Incorporating youth values, such as social justice and defiance against authority, into health education efforts may make them more effective (Bryan et al., 2016; Schillinger et al., 2017). Another approach to effective teaching is ‘engaged pedagogy,’ wherein educational content is connected to personal experience (Hooks, 2014). Engaged pedagogical approaches may also promote students’ sense of classroom membership or belonging (Armstrong & McMahon, 2002). Further, using an engaged pedagogical approach in teaching students about health communication campaigns in particular is posited to enhance the learning experience, promote civic responsibility, and strengthen communities (Mattson, Haas, & Kosmoski, 2013; Mattson & Hall, 2011).

In line with this evidence, The Bigger Picture campaign (TBP, [www.thebiggerpictureproject.org](http://www.thebiggerpictureproject.org)) leverages social justice and critical pedagogical approaches to engage, educate and empower youth around the social and environmental drivers of T2D. Conceived as a public health literacy campaign, TBP focuses on shifting the dialogue around T2D from an individual problem to the social and environmental factors that increase disease risk (Rogers et al., 2014). This program is a partnership between the University of California, San Francisco’s Center for Vulnerable Populations and Youth Speaks (YS), a San Francisco, California-based youth arts organization, which has taken up the role of disseminating TBP curriculum to youth (Rogers et al., 2017). YS delivers spoken word education to challenged Bay Area youth to help them find, develop, present, and apply their voice, identity, power, and imagination toward societal change. In the case of TBP, low-income and youth of color are invited to learn about, and reflect on, the social determinants of T2D, along with the social, structural, and environmental forces that shape behavior and influence disease risk (Schillinger, Tran, & Fine, 2018).

YS has delivered TBP content in high schools in the San Francisco Bay Area for many years through school assemblies, with positive short-term effects on attitudes and beliefs (Rogers et al., 2017). However, examining whether more in-depth, longitudinal school-based TBP programming can have more comprehensive impacts has not been done. In addition, although

TBP has undergone various evaluations (Rogers et al., 2014, 2017; Schillinger & Huey, 2018; Schillinger et al., 2017), none has utilized a quasi-experimental design to enable a more rigorous examination of the impact of the program on key outcomes of interest.

This study utilizes an outcomes framework that both includes students' understanding of the root causes of T2D, as well as students' sense of community belonging and activation around civic engagement. These outcomes are grounded in the three domains of the Robert Wood Johnson Foundation's (RWJF) Culture of Health Framework, Section 1: "Making Health a Shared Value:" (1) health-related mind-sets and expectations; (2) sense of belonging; and (3) civic engagement (Making Health A Shared Value, n.d.). This study aims to determine to what extent TBP, when delivered in public high schools that serve a low income student body, can (1) shift mind-sets and expectations toward a socio-ecological understanding of T2D and its related disparities; (2) lead to a greater sense of community belonging and affiliation; and (3) generate more civic engagement related to health, justice, and other socio-environmental concerns among ethnically diverse students.

## Methods

Six high schools in San Francisco Unified School District participated in the study. Schools were stratified by size (i.e. 2 with <300 students, 2 with 300–500 students, and 2 with >500 students). Each stratum was randomized to receive either the traditional (non-health-related) YS curriculum (n = 3) or the TBP curriculum (n = 3) by YS. YS pedagogical approaches were identical in each arm, and intervention students received traditional non-health related content in addition to the TBP content. Table 1 describes the programs in detail. The programs were delivered over the course of 3 academic semesters (Spring 2019, Fall 2019, and Spring 2020). The Spring 2020 curriculum was cut short in March 2020 due to COVID-19-related school closures. YS delivered their programs through in-class residencies, voluntary "SLAM" (Student Led Arts Movement) Clubs, and assemblies at participating schools. Wellness Coordinators (school site staff responsible for coordinating the school wellness centers) and district wellness staff helped coordinate the program. Poet Mentors (YS staff members) delivered the program components and Partner Teachers (school site teachers) hosted Poet Mentors in their classrooms for the in-class residencies. This study was approved by the Committee for Protection of Human Subjects at University of California, Berkeley (# 2014–12–7010). The study was also approved by the participating school district's Research, Planning, and Assessment Department.

## Residencies

In-class residencies consisted of weekly workshops integrated into preexisting courses in the Partner Teacher's classrooms. In intervention schools, Poet Mentors (n = 4) delivered both traditional YS and TBP curriculum for up to 20 weeks/semester. Intervention schools had residency programs (range 1–3 classrooms/school) across all 3 study semesters, with modifications during Spring 2020. On average, there were 20 students in each residency class in Spring 2019 (total 80), 21 in Fall 2019 (total 103), and 22 in Spring 2020 (total 111). Classrooms spent approximately 4 sessions on the TBP curriculum each semester with the exception of Spring 2020 when 2 of the 3 intervention schools did not receive any TBP

curriculum due to pandemic-related closures. The remaining sessions focused on non-health related content. In comparison schools, poet mentors taught traditional YS programming for up to 20 weeks/semester. Comparison schools had residency programs (2 classrooms/school) across all 3 study semesters, with modifications during Spring 2020. On average, there were 17 students in each residency class in Spring 2019 (total 101), 21 (total 127) in Fall 2019 and Spring 2020 respectively (total 127). In Spring 2020, both intervention and comparison students were offered the opportunity to attend online workshops and work with Poet Mentors remotely after suspension of in-person school.

**SLAM Clubs**—In both intervention and comparison schools, SLAM Clubs were offered weekly, afterschool or during lunch, for up to 26 weeks each academic year by Poet Mentors. Students were recruited through the residencies, assemblies, school announcements and flyers. In intervention schools, students received traditional SLAM Club and TBP programming. An average of 9 students/intervention school attended SLAM Clubs in Spring 2019, 3 in Fall 2019, and 7 in Spring 2020. Students received approximately 4 TBP lessons (range 0–6) each term, except in Fall 2019 (1 school had 0 sessions) and Spring 2020 (1 school had 1 session). The remaining sessions focused on non-health related content. During Fall 2019 and Spring 2020, the school district provided a \$500 incentive, supported by San Francisco’s Soda Tax revenue allocated to the school district, for students in intervention schools to join SLAM Club and create TBP poems. All comparison schools, except one in Spring 2019, offered a SLAM Club each semester. An average of 6 students/comparison school attended SLAM Clubs in Spring 2019, 4 in Fall 2019, and 3 in Spring 2020. Comparison school students received non-health related content.

**Assemblies**—Every intervention school received one TBP-related assembly led by YS in Spring 2019 and one in either Fall 2019 or Spring 2020. Comparison schools received at least 1 assembly per academic year.

## Data Sources

Originally, we intended to compare school-level differences in changes in key outcomes from Spring 2019 (baseline) to Spring 2020 (follow up) through a school-wide survey. However, due to in-person school closures in March 2020 and limitations in student technology access during remote learning, we were unable to collect follow-up school-wide surveys. As such, we exclusively used qualitative methods to explore main outcomes.

**Youth Interviews**—Using purposive sampling (i.e. intentional selection of participants), all students in intervention and comparison schools participating in YS SLAM clubs during the 2020–2021 school year were invited to participate in semi-structured interviews during Summer 2020. Most of these students also participated in the residency program. Further, some students who only participated in residencies but were recommended by Poet Mentors due to their high level of participation were also invited to interview. SLAM Club students were prioritized because they had more exposure to TBP in Spring 2020 than the residency students and their contact information was available to Poet Mentors. Interviews were conducted by one researcher (SM). Participants and guardians gave informed assent/consent. All participants received a \$25 gift card. The interview protocol comprised topics such as

perceptions of YS programming, mind-sets and expectations toward health and T2D, sense of community, and civic engagement. The interviews, lasting approximately 30–45 minutes, were audio-recorded and transcribed verbatim. Dedoose (version 8.3.17, SocioCultural Research Consultants LLC) was used for data management and coding.

**Adult Interviews**—Using purposive sampling, we interviewed Wellness Coordinators (school counselors who helped with coordination of TBP), Partner Teachers, and Poet Mentors from all study schools in Spring 2019 and Spring 2020. District-level wellness staff who helped with program management were also interviewed in Spring 2020. All Wellness Coordinators, Partner Teachers, Poet Mentors, and district-level wellness staff involved in the project were invited to participate. Interviews were conducted by SM and 3 professional research assistants with prior interview experience. Participants gave informed consent and received a \$25 gift card. The semi-structured interview protocol focused broadly on the school environment as it related to health and TBP program outcomes. Interview topics were modified based on the participant’s knowledge and experience; for example, comparison school interviewees were not asked about diabetes-related outcomes. The interviews, lasting between 30 and 60 minutes each, were audio-recorded, except for one in which the interviewee declined recording; extensive notes were taken instead. The audio-recorded interviews were transcribed verbatim, and all interviews were uploaded to Dedoose for data management and coding.

**Youth Poetry**—Students in the residency program and SLAM clubs from all schools were invited by Poet Mentors to submit a poem to The Unified Anthology, a compilation of poems from youth aged 13–24 from the Bay Area, at the end of Spring 2020. Poems that represented the strongest writing, performance, and relevance were accepted, with considerations for equity amongst age, region, race, gender, sexuality, and ability. Students in intervention schools were specifically encouraged to submit a T2D-related poem.

## Analysis

**Theory**—Our analysis is grounded in the RWJF Culture of Health Framework, Section 1: Making Health a Shared Value (Making Health A Shared Value, n.d.). The three domains of this framework are (1) health-related mind-sets and expectations; (2) sense of community; and (3) civic engagement. For our study, we define health-related mind-sets and expectations as understanding of and experiences with T2D and its determinants. We define sense of community as belonging to and affiliation with a group. Finally, we define civic engagement as any activity where students speak about, initiate or contribute to change beyond the individual level.

**Youth and Adult Interviews**—An integrated approach (Bradley, Curry, & Devers, 2007) was employed in the coding and analysis of the data. We examined concepts present in the literature (i.e. deductive coding) while accommodating new themes that emerged from the data (i.e. inductive coding). Deductive codes were based on RWJF’s Making Health a Shared Value framework (Making Health A Shared Value, n.d.). Each transcript was coded independently by two researchers (SM and LA). The coding process was iterative; the researchers refined and consolidated codes and added sub-codes and emergent codes as

needed. Once the coding structure stabilized and saturation was reached (Urquhart, 2012), the researchers applied the final codes to all transcripts. For youth interviews, LA reviewed the coding, and for adult interviews, SM reviewed the coding to determine whether codes were applied with reasonable consistency. The research team then discussed codes and came to a consensus on salient themes.

**Poetry**—The research team employed thematic analysis to analyze and code all poems submitted to The United Anthology by students. The research team used an inductive coding approach by developing codes grounded in the data in a manner similar to prior work (Abbs et al., 2021). The codebook, developed iteratively through group coding sessions and discussions, covered topics such as the determinants of health and the methods used by poets to educate and activate audiences in envisioning change. Once the code structure stabilized, two researchers (SM and LA) coded each poem together. Coding disagreements were resolved through discussion. Codes were then grouped together to form themes. The inductive codes for visioning changes mapped onto the Making Health a Shared Value framework (Making Health A Shared Value, n.d.). Thus, the RWJF language is used.

## Results

School-level demographic characteristics, publicly available from the California Department of Education, appear in Table 2. On average across all schools, 63% of students were eligible for free/reduced price meals; 47% were Hispanic/Latino, 16% were African American, and 12% were Asian. No statistically significant differences in student enrollment, free or reduced-price meal eligibility, race/ethnicity, or gender were seen between intervention and comparison schools.

### Youth Interviews

A total of 46 youth in intervention and comparison schools were invited to participate in an interview; 15 (33%) agreed to participate. Interviews were conducted in Summer 2020. Of the participants, 10 attended intervention schools and 5 attended comparison schools; 12 identified as female, 2 identified as male, and 1 identified as non-binary; and 8 as Latinx, 2 as Black, 3 as White, and 2 as Multiple Races/Ethnicities. Illustrative quotes related to the themes are presented in Table 3

**Mind-Sets & Expectations**—Students in intervention schools reported being interested in the T2D content delivered during the TBP program. Students in both intervention and comparison schools listed factors like genetics, sugar consumption, diet, income, and neighborhood access as contributors to T2D. In more cases, however, students in intervention schools were able to draw connections between race and ethnicity (i.e., living in a minority community) to poor access to basic health-promoting resources (or high exposures to risky environments) as causes of T2D. Further, all students in comparison schools explicitly described individual dietary behaviors as a cause of T2D, while most, yet not all, students in intervention schools did. Finally, while both groups articulated a connection between poor access to healthy options and T2D, students in intervention schools generally provided more detailed descriptions of this connection. Two intervention students



called out the fact that limited resources in low-income communities of color are a result of intentional social policies or practices. Similarly, when asked about determinants of general community health, students in both groups described access to healthy options as contributors. No students in the comparison group mentioned race/ethnicity as a determinant of community health.

Additionally, students from both intervention and comparison schools believed that the sugar sweetened beverage (SSB) industry plays a role in T2D; they mentioned targeted advertisements and availability of cheap, high-sugar products as contributing to T2D. Students from intervention schools also brought up that sugar is addictive, described familial and cultural ties to SSBs, and believed the SSB industry to be complicit in the epidemic.

**Sense of Belonging**—Most students in both groups had an overwhelmingly positive experience with YS. Students emphasized they felt connected to Poet Mentors and students in the program. One intervention student talked about how safe YS felt to them. Similarly, a comparison school student stated that they felt more connected to other students in the program. Further, youth across schools emphasized that they were more motivated to attend school on days they participated in YS.

**Using Your Voice for Change (Civic Engagement)**—Many students in both intervention and comparison schools emphasized that YS helped them better use their voice around issues that were important to them, such as COVID-19 or social injustice. Examples of using their voice included talking to friends and family, posting on social media, or participating in protests. One student in an intervention school emphasized how the program increased their confidence in being able to engage civically and expressed an interest in learning more about how to talk with people who disagree with them. Similarly, a from a comparison school described how they were better able to converse with others who had different perspectives. Further, an intervention student described how they attended a protest as a result of participating in TBP. However, while many students in both groups gained confidence in using their voices to create change in their schools, they also reported that they were unsure how to create change in their communities.

Many students across schools emphasized that art is an effective way to engage youth around health and social justice issues. Some intervention students discussed how YS helped them use their voice around health-related issues like T2D; many intervention students reflected on the diabetes-related poems they wrote and spoke to what they hoped others would learn by hearing their poems. One intervention student discussed how they hoped that people would become more aware of the targeting practices of the alcohol and SSB industries as a result of their poem. Further, this student described reciting to their family one of their poems that touched on family eating habits and described how their poem helped bring their family together around making change.

## Adult Interviews

A total of 32 adult interviews with 27 unique participants were conducted over the 18-month study period (n = 15 in 2019; n = 17 in 2020). Most interviewees were involved in the project during one study year. All Wellness Coordinators and Poet Mentors participated in



interviews both years, though due to annual staffing changes, only 4 Wellness Coordinators and 1 Poet Mentor were the same staff both years, and thus interviewed twice. Wellness Coordinator interviews accounted for 34% of interviews (11 total interviews; 7 unique respondents). Poet Mentors interviews accounted for 28% of interviews (9 total interviews; 8 unique respondents). One Partner Teacher from each school participated in an interview each year (2-year response rate 63%), with the exception of 2 schools (1 intervention and 1 comparison) in 2019, when with no Partner Teacher interviews took place. Partner Teachers accounted for 31% of interviews (10 unique respondents). All district wellness staff participated in 2020. District-level wellness staff accounted for 6% of interviews (2 unique respondents). Illustrative quotes related to the themes can be found in Table 4.

**School-Level Outcomes**—There did not appear to be significant differences in school-wide discussions or understanding of T2D among the student body between groups. Adult respondents from both groups reported limited discussion and understanding of T2D on the part of their student body. Adult respondents from both groups reported a generally positive sense of student belonging at school. Further, both groups reported limited civic engagement opportunities for, and engagement by, students. These outcomes did not appear to change over the course of the intervention.

### TBP Program Outcomes

Adult respondents from intervention schools described learning outcomes related to the three RWJF outcomes as detailed below.

**Mind-Sets & Expectations**—TBP curriculum was well-received by respondents. Poet Mentors in intervention schools described TBP as connecting the dots between individual behavior and systems that influence behavior. Particularly in Year 2, Poet Mentors highlighted that T2D is not just an individual problem, but has environmental, political, and sociocultural roots. Many interviewees at TBP schools expressed the benefits of this approach, as traditional health messaging can be stigmatizing when focusing on individual behavior.

Particularly in Year 2, Poet Mentors emphasized that students in intervention schools came away with an understanding that T2D is a health problem that disproportionately affects low-income communities of color. Students were able to make the connection between determinants of T2D, such as income and neighborhood availability of healthy foods and parks, and corporate influences on food choices. Finally, Poet Mentors stated that intervention students discussed their own conflicts and ambivalence regarding the SSB industry, describing their outrage about targeted marketing campaigns while also acknowledging that SSBs are tasty.

**Sense of Belonging**—Across schools, adult respondents reported a high sense of belonging and community. While program-level questions related to RWJF outcomes were only asked of intervention schools, student engagement and belonging still came up in comparison interviews. Across schools, a sense of community was built and students felt comfortable sharing vulnerable information about themselves. The Poet Mentors reported

valuing students' voices and encouraging all types of students to engage. Many interviewees who watched the Poet Mentors interact with students reported that they made material relevant to students' lives and enabled student engagement and participation. Some Partner Teachers mentioned that even students struggling in school with either absenteeism or academic success were engaged in the program.

**Civic Engagement**—In intervention schools, interest in taking action to improve health was mixed. Poet Mentors emphasized that some students signaled an interest in changing things in their homes, schools, and/or within their personal lives, while others did not demonstrate interest in participating in activities to improve health in their communities.

Adult respondents were aware of a few students participating in systems change or large-scale change activities as a result of TBP. Although adults mentioned that youth respondents found TBP program content engaging, informative and even affirmational, they noted student challenges in finding ways to become civically engaged or powerlessness in creating change. Notably, one intervention school did have success in this area; students in the Black Student Union successfully advocated for healthier menu options at their annual banquet after learning about how food impacts T2D risk.

## Poems

Ten poems were submitted by TBP participants to the United Anthology that were related to T2D (nine specifically named T2D and one alluded to T2D). Two themes emerged from the poems: social and environmental determinants of health and envisioning change (Table 5; accepted poems can be viewed at [www.anthology.youthspeaks.org/](http://www.anthology.youthspeaks.org/)).

Poets identified multiple *Determinants of Health*, including systemic factors such as government and corporate influence (included in 90% of poems), sociocultural factors such as race/ethnicity, income/class, and social norms (80%), individual choices (70%) and poor access to healthy environments (50%). Many poem passages generated multiple codes, demonstrating students' recognition of the complexity of, and interconnectedness amongst, these factors.

Poets applied three different strategies to motivate readers around how to think about or advocate for *Envisioning Change* around the social and environmental determinants of T2D. The first strategy was "*Challenging Mindsets & Expectations*," designed to help readers/listeners understand why T2D disproportionately affects certain groups (included in 90% of poems). In this strategy, poets linked a particular behavior with an explanation, such as how getting food from a drive-through restaurant might be the only option for busy parents who work two jobs or cannot afford to feed their children healthier meals. Poets also challenged assumptions like the belief that healthy eating is an individual choice. They painted a more complex picture that calls out the multiple, multi-level factors at play that influence food choices. The second strategy was "*Civic Engagement*" (90%), wherein poets called out the injustice of inequitable access to resources needed to be healthy. Here, poets also envisioned what life should or could be like, or called for specific solutions, communicating that collective engagement and larger systems-level change are needed. With the third strategy, "*Sense of Belonging*" (50%), poets highlighted that people are not alone in their experience.

Their poems communicated that the experiences of the marginalized groups they write about mirror their own and their audience's lived experiences. They also communicated a personal and communal sense of responsibility for improving the lives of an entire group, not just their own lives.

## Discussion

This study is the first to employ a quasi-experimental design to examine the impact of an arts-based health program compared to an arts-based program which did not focus on health in the high school setting. We evaluated the effects of embedding TBP into the curriculum of high schools serving predominantly low-income youth of color on students' mind-sets and expectations toward T2D, sense of community, and civic engagement. TBP was well-received by school staff and students and viewed as a valuable program. Both the traditional YS and TBP programs appeared to have a positive influence on students' sense of belonging at school and on their confidence in using their voices around social justice issues. While students across schools were aware of multiple T2D-related social determinants, intervention students were more likely to articulate the connections between race/ethnicity, intentional social policies or practices, and T2D and less likely to explicitly attribute T2D to individual dietary behaviors. Interviews with intervention students and analysis of their submitted poems demonstrate a detailed understanding of these determinants and calls to action.

Based on interview findings, TBP appears to reflect engaged pedagogy, wherein connecting educational content to personal experience is central (Hooks, 2014). This approach recognizes that the personal is political and both are influenced by power relations (Danowitz & Tuitt, 2011). TBP focused on systems, helped students connect the material to their personal experiences, and offered a supportive and inclusive environment for learning and expression. This study offers additional evidence that engaged approaches are promising for teaching about health and for promoting health communication, particularly arts-based health communication.

Understanding of T2D determinants did not appear to be profoundly different between intervention and comparison schools. However, not all intervention students cited individual behavior as a determinant, illustrating their understanding of "the bigger picture" beyond individual behavior. Further, intervention students were more likely to cite race/ethnicity as a determinant of health. Race is an important social determinant of T2D. Research has repeatedly shown associations with racial discrimination (both individual and systemic) as a profound social determinant of both physical and emotional health, yet few studies explore the associations, and their respective biological pathways, between racial discrimination (and its consequences) and T2D outcomes (Paradies et al., 2015; Walker, Smalls, Campbell, Strom Williams, & Egede, 2014; Whitaker et al., 2017). The similarity in understanding between groups may be attributed to dose and contamination. Due to the pandemic, program dose was smaller than intended in Spring 2020. Further, some exposure to TBP content occurred in comparison schools; two comparison school students mentioned learning about TBP-related content in residencies or SLAM Clubs.

Students in all schools emphasized that YS positively influenced their sense of belonging in their residencies and/or SLAM Clubs. Sense of belonging at school is a predictor of academic achievement and self-efficacy (Korpershoek, Canrinus, Fokkens-Bruinsma, & Boer, 2020); identifying new strategies to improve sense of belonging is paramount. Further, youth in our study emphasized that YS may have improved their school attendance. In a recent meta-analysis, Korpershoek et al. (2020) found a negative correlation between belonging and absences. Future studies of YS and TBP might formally explore program impact on attendance.

Our findings demonstrate the need to better connect students who report interest in civic engagement with action-oriented opportunities through TBP. Adult interview findings suggest that partnering with local health organizations or other school clubs may provide avenues for students to become engaged in T2D-related initiatives. Prior studies of TBP have shown that the art generated from TBP can influence local policy change (Schillinger & Huey, 2018; Schillinger & Jacobson, 2016); therefore it is important to offer these opportunities for engagement. Further, students emphasized that art is a positive way to engage youth around social change. There likely is appetite from TBP students to use their poetry as a vehicle for civic engagement around T2D. We identified at least one school-wide instance of TBP-related social change, wherein students advocated for healthier options. This is a powerful demonstration of how the curriculum can create social impact in unexpected ways.

This study has several limitations. We were unable to include quantitative measures of TBP's impact at the school-level, as initially intended, as we were unable to deliver the follow-up questionnaire in Spring 2020 due to the pandemic. Fidelity of participation and intervention dose data likely varied across schools, as our community partner collected this information. Therefore, only averages are reported, and it is unknown how many students participated both in residencies and SLAM Clubs. Lack of participation among comparison students in the United Anthology precluded comparison of poetry content between groups. This difference may, in part, be attributed to students in intervention SLAM Clubs receiving a stipend. The stipend was paid for through soda tax revenues, and there was not a funding mechanism for comparison schools. Payment for program participation, along with interviewing students who self-selected into SLAM Club may also impact the generalizability of those findings. This self-selection may further explain why we did not observe large differences in understanding of health determinants between intervention and comparison schools.

TBP is an innovative health education program that utilizes art as a vehicle to connect with students about T2D, its determinants, and positive social change. We did observe some differences in mind-sets and expectations regarding T2D between TBP and comparison schools. In contrast, we did not observe significant differences between intervention and comparison schools in sense of belonging and civic engagement; this may be a result of all exposed students receiving a similar pedagogical approach. Study results highlight the positive reception of this educational approach by both school staff and students and shine a light on the unmet appetite of students to engage in activities to address social and health inequities. Some of this positive response can be attributed to the YS model and not solely

to TBP content. Future studies might explore scalability of TBP, as well as how the program could bolster civic engagement to better position students to harness their voices to make change.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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**Table 1.** Description of the bigger picture and traditional [author organization] curricula delivered in San Francisco unified school district high schools from spring 2019 – Spring 2020

	Traditional Curriculum (Comparison Schools; n = 3)			The Bigger Picture Curriculum (Intervention Schools; n = 3) <sup>1</sup>		
	Residency <sup>2</sup>	SLAM Club <sup>3</sup>	All-School Assembly	Residency <sup>2</sup>	SLAM Club <sup>3</sup>	School Assembly
<b>Learning Objectives</b>	To learn how to find, develop, present, and apply their voice through written and spoken word at the introductory level.	To learn how to find, develop, present, and apply their voice through written and spoken word at the intermediate level via preparation of a poem for an audience.	To demonstrate to students how to find, develop, present, and apply their voice through written and spoken word.	To learn how to find, develop, present, and apply their voice about Type II Diabetes through written and spoken word at the introductory level.	To learn how to find, develop, present, and apply their voice about Type II Diabetes through written and spoken word at the intermediate level via preparation of a poem for an audience.	To educate students about the environmental determinants of Type II Diabetes. To demonstrate to students how to find, develop, present, and apply their voice on Type II Diabetes through written and spoken word.
<b>Example Topics Covered</b>	Voice, Identity, Power, and Imagination as <i>applied to</i> : Non-health related topics identified by students	Voice, Identity, Power, and Imagination as <i>applied to</i> : Non-health related topics identified by students		Voice, Identity, Power, and Imagination as <i>applied to</i> : Type II Diabetes as an environmental issue, structural violence, and sugar-sweetened beverage marketing		
<b>Example Activities</b>	Free writes, word palettes, <sup>4</sup> check ins, and poem sharing	Free writes, word palettes, <sup>4</sup> check ins, and poem sharing, performance drills, poem revision, group poems	Poetry performance from Poet Mentors	Free writes, word palettes, <sup>4</sup> check ins, and poem sharing	Free writes, word palettes, <sup>4</sup> check ins, and poem sharing, performance drills, poem revision, group poems, audience consideration for Type II Diabetes poetry, incorporating statistics into Type II Diabetes poetry	Raising hands if student neighborhoods have grocery stores, parks, or liquor stores, Type II Diabetes writing prompt
<b>Example Products</b>	Individual poem notebook, in-class open mic	Polished poems to be shared with a poetry slam festival or written/ video anthology	Open mic	Individual poem notebook, in-class open mic	Polished Type II Diabetes-related poems to be shared with a poetry slam festival or written/video anthology	Open mic

A description of the Traditional and Bigger Picture curricula that students received. Both curricula allow for flexibility in responding to student needs and interests. Activities and products varied by classroom and semester.

<sup>1</sup> Intervention schools received both traditional (non-health related) and Bigger Picture content in residencies and Slam Clubs.  
<sup>2</sup> In-class residencies took place during school hours and were integrated into preexisting courses in partnership with a classroom teacher.  
<sup>3</sup> SLAM (Student Led Arts Movement) Clubs were voluntary spoken word clubs and took place during lunch or after school.  
<sup>4</sup> A collective brainstorm where participants expand on an initial idea, defining it or offering their perspective in their own words.



**Table 2.**

School-level demographic characteristics, baseline (School year 2018–19)

	Intervention Schools (N = 3)	Comparison Schools (N = 3)	P-Value <sup>a</sup>
Student enrollment, mean (SD)	602 (442)	583 (473)	0.96
Student eligibility for free or reduced-price lunch, mean % (SD)	69 (3)	58 (15)	0.28
Student race/ethnicity, mean % (SD)			
White	4 (2)	12 (9)	0.23
Hispanic or Latino	49 (17)	46 (9)	0.81
Asian	15 (17)	9 (7)	0.60
African American	15 (6)	18 (8)	0.59
Female students, mean % (SD)	47 (3)	43 (5)	0.44

<sup>a</sup>Calculated from t-tests.

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Themes from youth interviews

Table 3.

Theme	Example Quotes
<b>Mind-Sets &amp; Expectations</b>	<p>“[Youth Speaks] definitely like enlightened me on ... type II diabetes and how ... some people in different communities are more likely to get type II diabetes ... [My school makes] it so much fun to learn about these topics and make you excited to help out and figure out how you can help them ...” (Intervention school student)</p> <p>“I think my biggest takeaway [from The Bigger Picture program] is that ... like black and brown community have higher numbers of diabetes, like that’s not a mistake ... That’s something that has been implemented into our neighborhoods on purpose. And it’s honestly something that it’s stuck with me because ... these are things we learn about in school ... The government kind of puts us at the bottom of the list.” (Intervention school student)</p> <p>“A phrase that stuck out to me a lot was how companies make propaganda lying to people, hiding the fact that the things they create are not very healthy. For example Skittles, they’re saying to ‘taste the rainbow.’ And [in Youth Speaks] we change it to ‘taste the poison.’ So it made it kind of fun to be in the program ... I also wrote how ... I’d be going to the stores after school and buy chips and sugary drinks with my friends and having a good time, but not being aware of how that affects our health.” (Intervention school student)</p> <p>“In the Youth Speaks club, we learned how Hispanic people always grew up drinking Coca Cola and how Coke is never missing on the table because it’s a drink that we have learned to like a lot. And it’s part of a tradition now to have soda and yeah just grab a drink.” (Intervention school student)</p>
<b>Sense of Belonging</b>	<p>“I wasn’t judged, it felt like a safe space ... If I did need to be corrected about something like, I wouldn’t be corrected about it like in a bad way ... It would be sort of protected in a positive way. I mean, [the Poet Mentor] was very encouraging and supportive of anything ... If we ever needed help, we would just like ask him and he’d be down to help ... I feel like I got the sense where like everyone can say what they want to say. And we won’t be judged.” (Intervention school student)</p> <p>“I feel like we all were connected ... We do assignments, where we’ll write on a piece of paper and then pass the paper to the person next to us, and then we’ll all just write on each other’s paper and then we have a full poem ... Wall share out and then I feel like our bond was tight because like everybody could agree with each other ... And everybody was just like engaged. So then that just made us all closer.” (Comparison school student)</p> <p>“At the end of the day ... the [Slam] club made me more excited to go to school as well ... The club it made me very excited to learn about like- I was already so excited to learn about different cultures and everything cause ... I didn’t really get to learn much about that. And then the club it ... made me even more excited to learn about it because there’s so much stuff that I hadn’t learned yet.” (Intervention school student)</p> <p>“I think [my motivation to go to school] did change because, at first I didn’t really wanna go to school ... but [the Poet Mentor’s] club was like fun and he taught a lot, but not in a like a teacher to student way, more like friends.” (Intervention school student)</p>
<b>Using Your Voice (Civic Engagement)</b>	<p>“[Youth Speaks has] definitely given me more of a sense of confidence and everything to talk about the topics that everyone is talking about ... (Intervention school student)</p> <p>“[Another club member,] ... everything I would have said there ... he would have disagreed with it ... So we would like debate and talk about that. So I feel like that Youth Speaks definitely like it helped me express like my opinions, but it also helped me like debate other people’s opinions on those type of things ...” (Comparison school student)</p> <p>“I just feel like I wouldn’t be as involved because I wouldn’t like, speak up more about the Black Lives Matter movement. [The Poet Mentor] taught me to speak up more.” (Comparison school student)</p> <p>“No, [my confidence for creating change in my community did not change] because I don’t know how to do that unless like I go on social media or something like that.” (Intervention school student)</p> <p>“I think [poetry is] very convenient because us youth are very attracted to art and images ... At the same time ... art can be very informative in little words and with images ... I think it is very important to bring out to the youth ... that ... we are living in a world where ... some people are privileged more than others. And I feel like we need to acknowledge that, because once we acknowledge that, we’re gonna want to make a change. I mean, unless you don’t care. But you should ...” (Intervention school student)</p> <p>“... My poem kind of teaches the way that these industries are targeting us and I think ... these things that we’re so familiar with are actually a part of a bigger picture, you know ... I think in that way, my poem can make social change by teaching people to be more aware of, like, things that happen in a community. Like why is it that I’m more likely to see you know advertisements for alcohol or like sugary drinks ... I think my poem could create some change just by teaching people to be more aware.” (Intervention school student)</p> <p>“... I wrote a poem during one of our ... freestyle sessions ... and actually ended up reading it to my family. And it was a very beautiful morning because I was ... talking about them ... Youth Speaks gave me the opportunity to like bring my family together in that way ... That kind of like left an imprint on me.” (Intervention school student)</p>

Table 4.

Themes from adult interviews

Theme	Example Quotes
<b>Stigma to Systems Shift</b>	<p>“... If they still came away from the project feeling like, “yo this is an individual thing.” then I failed on my end, like (laughs) that’s, that’s not it ... Even if we’re increasing the awareness of Type II Diabetes, but they’re not seeing it as a systemic thing, then I didn’t do the thing.” (Participant 24, PM-1)</p> <p>“It’s nice to like have a way to talk about nutrition and ... focus on things other than individual choice ... I’d like move away from the shame and blame.” (Participant 17, WC-1<sup>2</sup>)</p> <p>“[Students] had internalized some stigmatization without even like realizing it.” (Participant 16, PT-1<sup>3</sup>)</p> <p>“We had conversations on ... shaming people, but we had to center it back to it’s not about the fact that you’re getting McDonald’s. You have to question why McDonald’s is what you can afford and why this is the stuff that you feel like, offhand, is the stuff that you should be eating, and why isn’t it second nature to eat a salad instead because these are the factors that affect that. So yeah. It’s a weird cycle of shame, but then understanding, but it was really, really good for them ... to learn.” (Participant 15, PM-1)</p> <p>“The themes, really hit home ... We have students that actually had type II diabetes and ... working in the black and brown community, that is a big issue in our ... communities. So that was like something that kids gravitated towards.” (Participant 25, PT-1)</p> <p>“I could tell that ... minds would be racing, pens would be moving and after we’re ... having ... a fruitful discussion, I feel like I have reason to think like okay, this is working, this is tight.” (Participant 30, PM-1)</p> <p>“[A student] said that ... both her grandma and her mom had diabetes ... but ... they don’t really talk about it and she kind of thanked me for helping her with this because ... it opened up ... a conversation with her mother that ... they ... just hadn’t really happened before then ... I thought was pretty powerful.” (Participant 30, PM-1)</p> <p>“We did the whole look to your left, look to your right, one in three, because one of y’all are going to get diabetes. And in black and brown communities it’s even smaller than that. And so it was a big thing of denial of, “It’s not going to be me. It’s not going to be me.” (Participant 15, PM-1)</p> <p>“... Maybe ... the Coca-Cola doesn’t need to be a daily thing or ... maybe my Hot Fries don’t need to be a daily thing.” (Participant 30, PM-1)</p>
<b>Systems Understanding</b>	<p>My little freshman ... didn’t even know there were two different types of diabetes.” (Participant 30, PM-1)</p> <p>“So, [the students] were definitely like connecting the dots ... when I would ask them like what their neighborhoods looked like and ... what in your neighborhood keeps you healthy and what in your neighborhood makes you sick ... So a lot of folks like, were connecting the dots right away of like yeah, liquor stores, fast food restaurants ... you know, these are things that like make us sick but ... like we’re eating it anyway ... I would see the aha moment if like a student would ... make a connection from the content of the class to their own lives, or ... in their own neighborhood ... So when we’re saying things like ... how would you make your neighborhood healthy ... and like responses sound like affordable ... produce, or ... an actual ... community center where we could go exercise ... that had good equipment ... There were several instances where somebody would refer back to like, “oh yeah ... like that day you had the [Bigger Picture] assembly when you was talking about the parks being all dirty and what not, that’s what the park in my neighborhood looks like.” And they knew ... we would get more exercise if there were actual nets in our basketball hoops or if ... our swings and slides weren’t rusty ...” (Participant 30, PM-1)</p> <p>“I hang out at a corner a store, and now I’m starting to see that the millions of dollars that corner stores are using to target me and have me become addicted to things.” (Participant 1, PM-1)</p> <p>“Just [the students’] initial reactions of being like, “That’s really messed up” ... knowing that [corporations are] not doing this to other populations and to other groups of young people ... [But] there were a lot of jokes that were like, “Well, I really like sugar.”” (Participant 8, PM-1)</p>
<b>Sense of Belonging</b>	<p>“... Even ... the quietest students were voicing, sharing poems, or answering questions. So [the Poet Mentor] made sure ... that everyone was involved one way or another.” (Participant 31, PT-1)</p> <p>“What I saw that was pretty consistent was real, strong, engaged pedagogy on the part of the youth mentors and Youth Speaks curriculum ... Looking at students’ asset-based, using student language, using ... appropriate cultural references, thinking about you know urban students of color and how students see the world. Like that was very prominent and evident in every class that I went to.” (Participant 19, DS<sup>4</sup>)</p> <p>“This community that’s forming ... I remember when a fight did break out ... I remember all the students went up to the windows ... just to see what’s happening. They’re like, “dang,” and then it was like ... “Cool, are we gonna continue this workshop?” (Participant 24, PM-1)</p> <p>“I had kids that sometimes wouldn’t even come to class, but they would come in on Wednesdays because they knew [the Poet Mentor] was there.” (Participant 25, PT-1)</p> <p>“I had kids who are failing every class who were like sharing every time and staying for the club, so that was really cool.” (Participant 16, PT-1)</p>
<b>Civic Engagement</b>	<p>“In their neighborhoods in their communities ... this is [another thing that’s wrong with my community]. So ... I didn’t really get as much of a sense of, “Oh, we’re going to act and change something.” Or “We want to campaign around this, or figure out how to get more people to talk about this.”” (Participant 8 PM-1)</p> <p>“I think they wanted to change it in ways that were more personal to them. Some of them ... I think felt more agency to speak up with their families.” (Participant 15, PM-1)</p> <p>“So a lot of my freshmen were in BSU, and I was starting the curriculum ... around Black History Month ... and they had this big banquet coming up ... Historical soul food is just</p>

Theme	Example Quotes
<b>Mind-Sets &amp; Expectations</b>	<p><i>like hella salt, hella fat ... and they had a conversation on that. And so they were bringing better options for their BSU banquet, which was a connotation they never had, but I think that was because of Bigger Picture ... So they had made the move to ask for healthier options ...</i> (Participant 15, PM-1)</p> <p><i>"They would make comments like, you know what [TBP content] would be good for us to learn about in our regular classes, or like why don't they teach us this in science. Like this is the type of sh*t that we should actually know about."</i> (Participant 30, PM-1)</p>

<sup>1</sup> Poet Mentor, Intervention School

<sup>2</sup> Wellness Coordinator, Intervention School

<sup>3</sup> Partner Teacher, Intervention School

<sup>4</sup> District-level Wellness Staff

**Table 5.**

Themes from student poems written about T2D (n = 10)

Theme	Example quote(s)	# (%) of poems theme appeared in
<b>Determinants of health</b>		
Systems	<i>"Symptoms of systemic inequality Jasmine starts to experience them"</i>	9 (90%)
Sociocultural factors	<i>"My classmates at school reject the school provided lunch and pull out fayo go and a loud bag of chips from their bag"</i>	8 (80%)
Individual behavior/choices	<i>"One day while we are in middle school our science teacher plays the movie Supersize. A movie where the man CHOOSES to eat fast food everyday for a month and we all flinch in disgust."</i>	7 (70%)
Access	<i>"Grocery stores out of reach. Liquor stores on every other block"</i>	5 (50%)
<b>Envisioning change around health determinants</b>		
Challenging Mind-Sets & Expectations <sup>1</sup>	<i>"The food we ate was comforting... What is not comforting is sugar running through our veins and clogging our arteries. But what do we know?"</i>	9 (90%)
Civic Engagement <sup>2</sup>	<i>"I'm still hungry hungry for healthiness but what is healthiness? i wouldn't know you never gave us a chance to taste it give us those healthy options that we deserve. how are you. no. how are WE going to make a change for OUR future generation and youth?"</i>	9 (90%)
Sense of Belonging <sup>3</sup>	<i>"They target kids like you and me. They target minorities and they target low income families. They know that we are desperate"</i>	5 (50%)

<sup>1</sup>Challenging Mind-Sets & Expectations is defined as a strategy that poets used to inform readers and reveal what may not be commonly known about disproportionate health outcomes. With this strategy, they may also challenge assumptions that are made about individual or community health.

<sup>2</sup>Civic engagement is defined as a strategy that poets used to call for collective engagement in response to injustices that perpetuate health disparities.

<sup>3</sup>Sense of Belonging is defined as a strategy that poets used to highlight the interconnectedness between themselves, the readers and the marginalized groups they write about.