

Methods for Co-researching With Youth: A Cross-Case Analysis of Centering Anti-Adultist Frameworks

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Abstract

This article provides a cross-case study of three studies that utilized anti-adultist approaches to collaborating with youth as co-researchers. Drawing on reflections from both adults and youth, we present an analysis of three case studies of adult and youth experiences in planning, implementing, and conducting research studies aimed at centering youth perspectives. Findings include what adults and youth learned about the co-researching process and highlight the need for careful consideration of how both adults and youth can disrupt adultist power dynamics. We argue that amplifying youth co-researcher perspectives in research can create a mutually meaningful and empowering research process for both adults and youth by promoting more equitable relationships and participatory practices.

Keywords

youth co-research, anti-adultism, participatory research, cross-case, analysis

Introduction

Social science research explores how educational experiences impact children and youth. Typically, adult researchers with advanced degrees implement studies from planning to publication. Less often, youth participate in shaping those studies to account for their experiences. This process perpetuates an “adult-centric bias” (Wong et al., 2010, p. 100) in educational research that promotes and fosters adultism. Adultism has been defined as attitudes, beliefs, and assumptions that marginalize youth due to their age and experience (Hall, 2020) and position youth as “recipients of knowledge and action” (Bettencourt, 2020, p. 154) and adults as “credible authorities” with the power to act.

Recognizing youth as capable of investigating issues relevant to their lives and producing usable knowledge (Tilley & Taylor, 2018) requires researchers to consider how to disrupt adultist approaches to educational research. Researchers aiming to conduct research *with* youth, rather than *on* youth (Torre & Fine, 2006) draw from a variety of anti-adultist approaches and frameworks that “empower youth by promoting equitable relationships and participatory practices”

that “have demonstrated promise in mitigating the harmful effects of adultism” (Hall, 2020, p. 1). Anti-adultist approaches span many fields (Anderson, 2020; Hall, 2020) and include participatory-based methodologies such as youth participatory action research (YPAR), youth organizing (YO), and youth-adult partnerships (Y-AP). These frameworks position youth as collaborators who bring critical expertise and knowledge about their own lives, as well as valuable skills for advancing social justice and civic engagement (Caraballo et al., 2017; McIntyre, 2000). Grounded in the foundational components of participatory action research, civic empowerment, and relationships between youth and adults (Freire, 1970; Morell, 2006), youth participatory frameworks

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encompass inclusion of youth in the research process, attention to the dynamics of sharing decision-making and authority across ages, and the legitimacy of youth knowledge generation.

This paper aims to contribute to the growing body of literature designed to support research and evaluation teams in the development and implementation of participatory projects with youth in educational settings. Specifically, our goal is to provide practical considerations for engaging youth in research. We address issues related to funding and time constraints, access to interested youth, and how to navigate building capacity for youth involvement when methodologies such as YPAR are not contextually possible. Despite the potential obstacles, we believe that the inclusion of youth in the research process is not only possible, but necessary. Hence, this paper provides a critical examination of the unique affordances and constraints of youth-adult collaborations in cultivating equitable engagement in the research process, with careful consideration of the role contexts “predicated on asymmetrical relationships between adults and youth” (Camino, 2005, p. 76) and adultist perceptions play in shaping research practice.

In this paper, we present findings from a cross-case analysis of three projects that incorporate youth as collaborative partners. Drawing on qualitative data, we identify what aspects of our participatory approaches supported or hindered the centering of youth voices, identities, and perspectives, and the role that adultism played in shaping both youth and adult perceptions of roles and expertise. The following research question guided our analysis: What aspects of anti-adultist practice were effective in creating mutually meaningful and empowering research processes for both youth and adults?

We begin with an overview of our three research studies, detailing our positionalities as adult and youth co-authors and a summary of each case with attention to how each study designed the research experience for and with youth. We then provide an overview of the theoretical frameworks that informed how we conceptualized practices and strategies of engagement in our projects. Next, we detail our analytic process for cross-case analysis and present our findings, arguing that amplifying youth co-researcher perspectives in research can create a mutually meaningful and empowering research process for both adults and youth in ways that disrupt adultist power dynamics. We conclude with insights and recommendations regarding what can be learned from our experiences planning, implementing, and conducting research studies that center youth perspectives.

Co-research, Co-Authorship, and Writing with Youth

The co-authors of this paper are youth and adult co-researchers. We use the terms *co-research* and *co-researcher* throughout this paper to highlight the collaborative process of researching *together* (Lyndon & Edwards, 2022). We refer to both youth and adults as co-researchers to place

emphasis on the process of including participants from our studies and programs *in* the research and evaluation process. We come to this work with varying levels of experience and expertise in teaching, learning, and research. The adult and youth co-researchers authoring this paper include women, men, girls, boys, and nonbinary people, and represent a range of abilities and (dis)abilities, as well as racial-ethnic identities. The adult co-researchers skew white, and all have degrees in higher education. The youth co-researchers are predominantly youth of color, spanning from middle school to graduate school education levels. As co-authors and co-researchers, we have done work to unpack how the adults’ power (racial, educational, and role-wise as employers of the youth co-researchers) played a role in our work together, while acknowledging that this work is ever in process.

A note on authorship: We draw on Gardner’s (2018) approach to co-authoring with youth, aiming to balance this paper so neither the adult nor youth perspective is more privileged, though we acknowledge that, as regular full-time staff, adult co-authors often had greater capacity to contribute to the writing. Mostly, our perspectives are incorporated throughout this text; when appropriate, we identify youth and adult voices to emphasize different perspectives.

Case Studies Overview

Case Selection & Working in Museum Contexts

This paper emerged from our collective interest in what we could learn from each other about the co-research process within the context of museum learning environments. We engaged in a collective case study approach (Stake, 1995), pre-selecting our cases specifically because we were curious what we could learn from each other; hence, our aim was not to determine what we could learn from one specific case, but what we could learn from across our cases that would enable us to identify what forms of engagement and what types of environments are necessary to support both youth and adults in the collaborative research process.

All our projects were implemented in science museums in large cities in the northeastern United States. Science museums can be valuable contexts for co-research with youth because many prioritize youth programming in their missions, have staff with youth development expertise, and maintain existing relationships with youth. Further, in recent years science museums have undergone fundamental shifts from simply engaging the public towards being community hubs of transformation and allyship (Pedretti & Iannini, 2020). In this section, we describe our three projects. (For more details see Appendix A) Each project was funded by the National Science Foundation (NSF) and aimed to uphold the standards of federally funded studies. Each case was selected to demonstrate different ways of engaging youth co-researchers: the projects worked with youth ranging from age 10–20 years old and the research questions and methods varied widely.

Individual Project Aims and Youth Co-Researcher Roles

Case Study #1. *Staying in Science* (SIS) is an NSF 10-year longitudinal study of 358 New York City youth and their pathways through college and into the workforce. Study participants conducted mentored science research while in high school at one of 28 programs that make up the New York City Science Research Mentoring Consortium (NYCSRMC), a consortium led by the American Museum of Natural History. Co-researchers have been critical in this longitudinal project, aimed at understanding the features of mentoring programs that support identity development and belonging in STEM (Chaffee et al., 2023; Hammerness et al., 2024), and identifying the resources youth draw on and the obstacles they face in their college and career pathways (Hammerness et al., in press; MacPherson et al., 2024). The co-researcher role is an opportunity to learn from experienced researchers while engaging in social science practices including qualitative and quantitative data collection and analysis, disseminating research findings, and networking with professional scientists and educators.

Case Study #2. *Exhibit appraisal and diverse populations: Pilot research about intersectional and science identities in science exhibits* (APPRAISE) was an NSF-funded pilot and feasibility study led by the Museum of Science, Boston, EdTogether, and Children's Museum of Pittsburgh. The project developed and tested research tools that help museums understand how youth conceptualize their identities and how exhibits can affirm those identities. Over 20 youth advisors were involved for short periods of time (1–2 hour sessions) throughout the project to provide ongoing input and feedback on the research tool, and two youth interns were fully embedded research team members over the course of the summer of 2021, participating in instrument development, data collection, analysis, and reporting.

Case Study #3. *Developing a Program Model for High School Science Research, Communication, and Education Experiences in Living Laboratory* (informally called the Teen Science Research and Communication Program, or TSRCP), was led by the Museum of Science, Boston, and Boston University. TSRCP was a year-long youth employment program during which teens conducted research with Boston University, engaged in science communication and education at the Museum, and participated in mentorship and community-building with STEM professionals. The project evaluation, which involved the youth as co-evaluators, studied the ways youth participants' science identities changed over time. Six youth participated in the program for one year, and all six participated as co-researchers in the program evaluation.

Summary of Project Logistics. Our three research studies had a variety of differences and similarities in youth recruitment, preparation, scope of work, and other attributes (see Table 1)

Recruitment. For SIS, all co-researchers were alumni recruited from the NYCSRMC and grew up and attended school in New York City. All co-researchers applied to participate in a co-researcher fellowship as part of the longitudinal study on youth pathways. Co-PIs interviewed and selected co-researchers based on their interests in participating in the study and learning about education research and their academic and career goals. In total, seven co-researchers were hired and reflected the demographic make-up of the larger NYCSRMC (which included 75% youth of color or a non-white ethno-racial identity, 67% female, 77% from immigrant families, and 52% multilingual youth). For APPRAISE, youth advisors were recruited through collaboration with two community partners—a local Boys and Girls Club and Our Space, an out-of-school program for students who are legally blind. Youth advisors ultimately included about 20 teens who reflected the demographics of youth in the final study (which included 68% youth of color, 16% youth with (dis)abilities, 43% girls, and 8% nonbinary youth). Teen interns applied and were interviewed through the Museum of Science's internship program and included two high school girls of color. Interns were selected based on their critical consciousness of how racism, ableism, and misogyny influence educational contexts—central topics for the research. Like APPRAISE, TSRCP youth were selected through the standard Museum of Science internship hiring practices. Youth with a range of interest in and experience with science were selected to support the development of curriculum materials that would be widely applicable. APPRAISE did not collect formal demographic data due to concerns about anonymity within the small cohort size. However, we know that the teens were a mix of high school sophomores and juniors. All youth voluntarily self-disclosed their genders, with five identifying as girls and one as a boy. Three youth voluntarily discussed race, with each of these identifying as a person of color.

Preparation. Participation was designed so no prior research knowledge was necessary. TSRCP supported youth through a structured curriculum co-developed by university researchers and museum educators; SIS and APPRAISE provided a more flexible introduction that sought youth perspectives of what they needed and/or wanted to participate in the research. All programs provided an overview of the objectives of their studies, how those studies were situated in a field-wide context (e.g. of college and career pathways), and the rationale for data collection methods. Additionally, programs provided discussion of ethics and human subjects research; most of the youth obtained human subjects certification as required for all researchers participating in federally funded research studies. All projects placed emphasis on determining ways protocols could feel more youth-friendly (e.g., adjusting survey and interview language) while meeting the research objectives, and paid deliberate attention to creating spaces where youth could reflect on their experiences, pose questions, and share suggestions.

Table 1. Case Study Overviews.

	SIS	APPRAISE		TSRCP
Logistical overview				
Study objective	Research project studying college and career pathways.	Pilot project designing a research protocol about youth identities and experiences with museum exhibits.		Evaluation study about the science identities of program participants.
Number of youth co-researchers	6	20+	2	12 (2 cohorts of 6)
Number of adult researchers	6	7		2
Youth ages	16–22	10–17	16–17	16–19
Recruitment approach	All NYCSRMC alumni were invited to apply; competitive hiring process	Coordinated with community partners; all interested youth could participate	Competitive hiring process through museum’s internship program	All program participants were invited to apply; all chose to participate
Commitment	100 hours over 16 months	4–10 hours total (time range varied)	112 hours over 7 weeks	5–24 hours per week (time range varied)
Youth compensation	\$22/hr	\$25/hr	\$13/hr	\$13-\$17/hr
Youth role				
Planned initial study	No	No	No	No
Developed instruments	Yes	Yes	Yes	Yes
Gathered data	Yes	No	Yes	No
Analyzed data	Yes	No	Yes	Yes
Disseminated findings	Yes	No	Yes	Yes
Authorship				
Adult Co-authors	Rachel Chaffee Preeti Gupta	KT Todd Sarah May		KT Todd
Youth Co-authors	Mahmoud Abouelkheir Lucie Lagodich	Xavier Lawrence	Jackie Wang	Cara Murphy

Scope of Work. The scope of work required of youth varied, and for two projects, changed over time. The scaffolding to more in-depth involvement and responsibility was a key feature of all youth co-researcher participation. In SIS, co-researcher participation initially involved instrument development, writing conceptual memos, and disseminating findings via social media. By year five, this scope was expanded to co-facilitating interviews, providing insight on how youth were perceiving COVID-related happenings, and contributing in more central ways to instrument development, analysis and interpretation. In TSRCP, youth were initially involved in member checking activities where they helped make meaning of evaluation data over time and informed changes to evaluation instruments. By year two, youth's role expanded to a co-evaluation model in which youth and adults collaborated to analyze and contextualize evaluation data and co-develop evaluation case studies. Youth advisors in APPRAISE were involved in providing feedback over three years, and youth interns were involved in all phases of one complete mini-study cycle over the course of a summer.

Finally, all projects included youth in dissemination, including conference and meeting presentations, visual reports, social media content, and writing papers (including this one!).

Youth & Adult Participation in a Research Community of Practice

The logistics of our projects did not necessarily define our experiences working as co-researchers. To reflect on youth involvement more meaningfully in each project, we utilize a situated learning perspective and community of practice (CoP) framework to guide our approach to understanding how youth and adults learn and engage together over time. Situated learning perspectives posit that knowledge is a relational process that is located among people in a *community of practice* (Lave & Wenger, 1991). A CoP is a space where a group of people “interact, learn together, build relationships, and in the process develop a sense of belonging and mutual commitment” to a shared goal (Wenger et al., 2022, p. 30). Research teams, as CoPs, cultivate shared beliefs, values,

ways of acting and interacting, and activities and tasks (Irving & Sayre, 2014) that support the design and implementation of research studies. This shared repertoire of resources enables CoP members to make meaning together and produce artifacts and processes that support research aims (Lave, 1988).

A community of practice lens provides a way of conceptualizing the integration of youth and adult experiences and contributions over time. As established members and newcomers within a CoP engage in collaborative practice, new forms of participation and identities emerge. Guided by established members (adult researchers and more experienced youth), youths' "trajectory of participation" (O'Connor, 2001, p. 228) gradually shifts from "legitimate peripheral participation" to full participation in the community (Lave & Wenger, 1991). The process of learning and becoming a participant in a community of practice is intricately linked to identity formation. To learn in a particular CoP means becoming a "different person with respect to the possibilities" enabled by the systems of relations within the community (Lave & Wenger, 1991, p. 53). Lave and Wenger use the phrase "identities-in-practice" to emphasize the ways that identities take shape in CoPs; as members (both established and newcomers) participate in the situated activities of a community, they change locations and perspectives, develop new identities, and are more able to contribute to the work of the community through their growing involvement. In our projects, identity is further conceptualized as "becoming" (Stetsenko, 2008). This idea of becoming occurs as we transform ourselves and contribute to the transforming of others through our voices, standpoints, and contributions, especially when we critically examine canonical practices. Adult co-researchers who may ordinarily be seen as experts

and at the center of the community of practice are equally "works in progress" and experiencing identity transformation.

To gain a more nuanced understanding of the forms of engagement and the role of power and agency in our co-research contexts, we utilize the TYPE (Typology of Youth Participation and Empowerment) Pyramid (see Figure 1) developed by Wong et al. (2010). The TYPE Pyramid conceptualizes participation on a trajectory of control and voice, with adults and youth moving towards a more pluralistic and shared level of collaborative participation. *Adult-driven* participation features forms of youth engagement that are designed by adults, positioning adults in teaching and supporting roles aimed at guiding youth towards obtaining skills necessary to participate in the project. A major critique of adult-driven participation is that it positions youth in *helping* relationships to adults; a relationship with *nutrient power* (Hogan, 2002; May, 1972) – where youth expertise, knowledge, and experiences support larger adultist goals.

Youth-driven participation positions youth as major contributors, including decision-making, ownership of goals and agendas, and opportunities to cultivate and utilize leadership skills. The youth-adult relationship shifts decision-making power towards youth, which requires adults to relinquish their agendas and goals (Camino, 2005); however, these youth-driven spaces can lack connections to adults and limit youth access to adult-held resources that enable youth to develop skills, expertise, and guidance. Wong et al., (2010) place *shared control* at the top of the TYPE Pyramid. The most pluralistic participation type, *shared control* shifts to a reciprocal relationship, where goal setting and decision-making is shared between youth and adults. Both youth and adults work together to support co-learning and growth, cultivating a

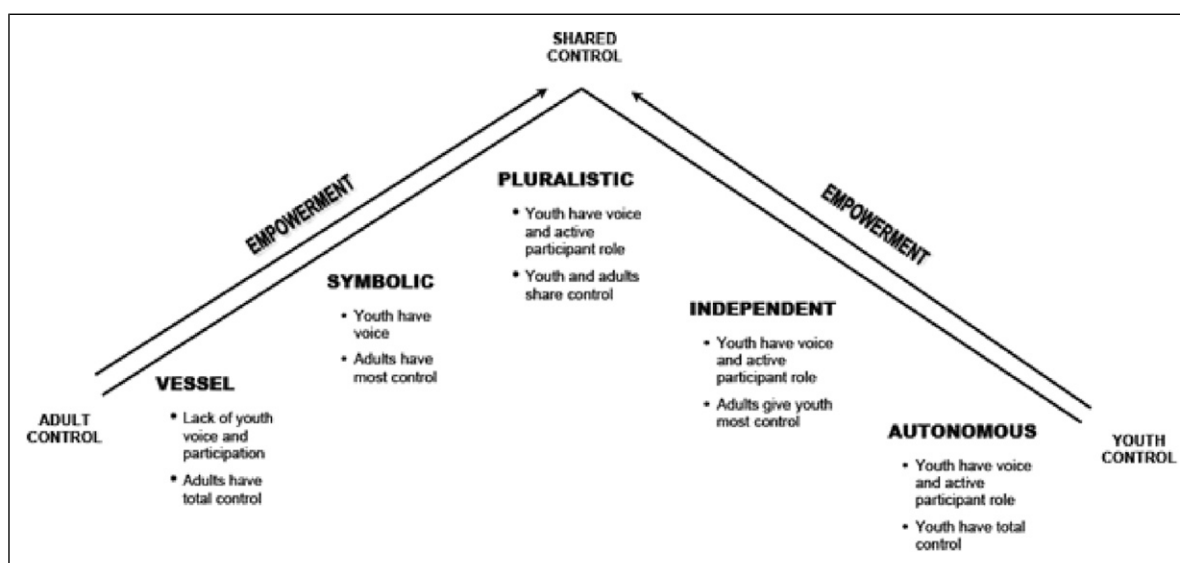


Figure 1. A Typology of youth participation and empowerment for child and adolescent health promotion.

learning environment where youth offer perspectives and adults bring expertise in planning, content knowledge, and best practices (Libby et al., 2005).

Wong et al., note that youth-adult arrangements may not be easily categorized within one type; rather, youth and adults may opt to utilize different approaches to achieve specific outcomes at different stages. In reflecting on each of our projects, we utilized this heuristic to interrogate power (im)balances in our youth-adult partnerships, utilizing the following research question: What aspects of anti-adultist practice were effective in creating mutually meaningful and empowering research processes for both youth and adults?

Methods

In writing this paper *with* youth co-researchers, we aimed to preserve “multiple realities” (Stake, 1995, p. 12) of our process, including the sometimes-contradictory experiences and understandings adults and youth had of the same practice or process and our own personal experiences (Stake, 2010). Utilizing Glaser and Strauss’s (1967) approach to developing cases, we used a grounded theory approach to explore our own experiences from various vantage points and perspectives of both adult and youth co-researchers. We began by identifying our dataset of existing data sources, including: original proposal documentation of our three studies that detailed the goals and scope of the youth co-researcher role as originally defined by adult co-researchers; detailed project descriptions of each program; timelines of youth co-researcher participation; and a detailed list of research materials produced and/or informed by youth co-researcher participation (e.g. surveys, member-check memos, data collection protocols, reports) from each study. We then generated additional data, including meeting notes and recordings detailing our discussions of the existing data sources that enabled us to collectively identify key aspects of each of our co-research experiences. To ensure that both youth and adult perspectives were present, *and* that youth had opportunities to identify where potential adultist perspectives emerged during their co-researcher experiences, nine of the co-authors worked together to draft a set of interview questions (see Appendix B). Co-authors participated in interviews in ways that worked for them: four adult and two youth co-authors wrote individual reflective responses to the interview questions; three youth co-authors were interviewed (or interviewed each other) with the same set of questions and their responses recorded. Youth and adult co-researchers within each research team reviewed and responded to each other’s reflections, probing for additional detail. We then utilized these nine interviews as our primary dataset for analysis of our co-researcher experiences.

To analyze the interviews, we engaged in the process of “theming the data,” (Saldana, 2021), by generating a phrase or sentence that identified what a specific unit of data was about. Six of the co-authors (four adults, two youth) analyzed both youth and adult co-researcher interviews, generating a list of

major patterns within each case and then across all three cases. This process enabled us to identify categories that emerged from the data (Ezzy, 2002) and cluster similar themes together, with careful attention to forms of engagement, types of interactions, and the individual and context-driven constraints both youth and adults felt during the co-research process.

We engaged in the following activities to address issues of triangulation (Denzin, 2009; Denzin & Lincoln, 2011). First, we drew on multiple sources of data to determine if observations from the interviews in one case were similar and/or different under the circumstances of the other cases (Stake, 1995). Secondly, we engaged in investigator triangulation by ensuring that two or more skilled researchers examined the data. Specifically, we ensured that all traditionally trained adult co-researchers who were PIs or Co-PIs *and* youth who learned how to analyze data participated in analysis; hence, six co-researchers with differing disciplinary expertise, ages and backgrounds, and prominent roles in each study analyzed the same data (Kimchi et al., 1991). Finally, member checking is an embedded component of our approach: youth who participated in the analytic process were also checking the accuracy of all co-researcher observations and interpretations. Additionally, as co-authors, they were able to guide what should or should not be included in the paper and provide their own writing and interpretations in the final written text. Overall, this process enhanced the trustworthiness, reliability, and relevance of research, deepening our understandings of objectivity, validity, and generalizability (Fine, 2008; Jardine & James, 2012).

The considerations for practice represent the major themes of this reflective analysis. Below, we provide a synthesis of our experiences and recommendations for engagement in adult/youth research. All quoted materials in the findings below are taken directly from the co-researcher reflections and interviews described above.

Cross-Case Synthesis: Considerations for Practice

Conceptualizing Roles

Understanding how adults and youth conceptualized and enacted each other’s roles was an important first step in contextualizing our work and foundational to our perceptions of whether adult and youth collaboration was balanced. Our analysis revealed that both adult and youth conceptualizations of co-researcher roles were shaped with adult-driven expectations for youth regarding forms of learning and participation that supported skills development and the integration of youth perspectives. While adults desired to share control, communication and expectations regarding roles were not always clear, which dampened the potential for truly balanced work.

Across our projects, adult researchers defined *youth* roles in two ways: 1. To directly participate *as a team member* in the ongoing research process through specific tasks and practices

that contributed to the study, and 2. To contribute their unique perspectives as youth. Youth engagement in research activities was aimed at providing and/or infusing the process with youth feedback and guidance based on their own experiences and opinions. Sarah articulated that engagement in these practices defined youth participation, and therefore youth roles, as both a “learning role” as much as a “practice-oriented role,” where youth were taught how to engage in the practices of social science research while ensuring that youth voices and perspectives were integrated into the design and implementation of each project.

Adults also conceptualized *adult* roles at two levels: 1. as providing structure to youth through project work, including time and effort preparing materials and planning for youth engagement in research activities, and 2. as listeners to youth voices and perspectives in service of the project work, but also to build community, trust, and relationships. Adults detailed their roles as “leads” or “go-to” people. KT explained their role as one focused on “capacity-building and inclusion of teens,” and “putting myself in a position to truly listen and learn from teens.”

Youth’s articulation of their roles varied across the projects; however, *all* youth described their roles as roles of support. For instance, Cara felt that her role on TSRCP was like an “assistant,” stating that while she didn’t want to use that word which implied “lower level” work, her internship role meant she was doing “the simpler tasks for a larger project, but that’s because we’re still new. Not in a negative way.” Cara’s perspective of her role stands in some contrast to the ways Mahmoud and Lucie conceptualized their roles, which were more focused on providing unique perspectives and input to the larger study. Lucie reflected that her role included finding “ways to examine results that senior researchers may not see,” and providing “connection and empathy to study participants” because she shared many of their lived experiences. Further still, Xavier’s conceptualization of his role was directly linked to wanting to be himself and provide his perspectives in a professional manner: “Sometimes you have to let your real self come out; you should be you; you should be who you are and be it in a professional way.” For Xavier, communicating feedback in a professional context as a younger researcher included the desire to “be polite” and “submissive.”

The contrast between youth and adult conceptualizations of their roles highlights how adultist framing in professional contexts permeates youths’ collaborations with adults. Xavier’s perception that he needed to first and foremost be polite and “submissive” in offering his feedback highlights how typical power differentials can permeate adult-youth relationships without explicit work to upend traditional roles. Lucie’s perspective that her role was to “help” adults see what they may not see otherwise positions her role in a *support of*. Cara’s point of view was that she did not want all the project’s work shared equally because she did not yet have the expertise of other team members who had been participating longer; the more equitable thing was for her to take on the tasks she felt equipped to do.

We posit that across our three projects, adult-driven conceptualizations of youth roles and how those were enacted by youth arose because of the speed and momentum of collaborative processes within the scope of larger ongoing projects and the needs to balance the goals of integrating youth voices within the confines of limited time. Youth researchers sometimes felt less involved than they would have liked. Mahmoud revealed, “I did not feel like I was always in the loop with what was going on and where the work was headed. Especially in the earlier years, it felt as if I was only completing reflective memos without knowing how or in what ways the work would be used to further the study.” Adult researchers agreed that they struggled to know how much work is appropriate when wanting to be inclusive without over-asking. Moreover, while adults better understood their roles in relation to the youth within the projects, tensions emerged when those roles were operationalized in practice, and in some cases led to ambiguity in how much additional support was needed to prepare youth for the involvement. Preeti shared that she always struggled “to know how much work is *too much work* considering they are not actually full-time employees.”

Preparation and Establishing Supports for Collaboration

We identified multiple themes regarding how we prepared ourselves and established team norms that supported collaborative engagement. We found that adult co-researchers have a responsibility to prepare and support youth co-researchers, and adults’ own level of preparation for this task is critical to consider. Many adult researchers felt prepared to support youth in a collaborative research process because of prior experiences in teaching and learning and experiences working with research partners. Rachel wrote about how working on a prior research study that involved co-researchers from high school and college helped her “think about participatory research in ways I had not before - mainly, that when you have relationships with the youth you are studying, the dynamics are different - often more personal.” Adults also referred to the collaborative process with other adult researchers as supporting their ability to engage in this work with youth. Sarah discussed working with her adult team members and relying on them to give her feedback on her plans. Sarah’s program, which included working with youth with a range of dis/abilities, was “designed to be adaptive,” so engaging in reflective sessions with other adult researchers enabled necessary design flexibility.

Our reflections on preparation highlighted the ways that particular skill-building practices strengthened youth identity as being part of “the team.” Preparing to participate in anti-adultist research work requires that both youth and adults share some common foundational skills and language. Jackie reflected on the ability to learn and contribute to multiple stages of the research process and having a lot of choice in

what aspects she joined as central to feeling that she was “part of the research team” where “senior researchers were listening to our advice and input and actually making changes to the procedure.” However, due to how quickly she became part of the research process she struggled to learn “what the project was and *why* we were doing it,” writing that “I sometimes felt unprepared, but not unsupported.” These experiences highlight that youth, as newcomers to a research community, did not always feel prepared but did feel supported in learning the skills necessary to participate.

We found the importance of shared physical, social, and virtual spaces can aid in supporting and preparing youth. KT reflected on the importance of shared space and its effects on youth’s sense of belonging over time, writing that during the first year of the TSRCP program,

“The space where teens spent most of their time was small, enclosed, and dark, with no natural light. The teens didn’t get to know many other Museum staff and they talked about how this negatively impacted their feelings of belonging. For the second year, teens were in a different office space with an open floor plan and floor-to-ceiling windows. They got to know a lot more people and this really seemed to impact their sense that they were truly Museum employees.”

KT noted that things like “decorating a desk with art and pictures (or in a virtual space, encouraging personalization of profile pictures) can make a difference.”

Virtual resources also served to support collaboration. For SIS, a research team that worked over 90% of their time virtually (i.e. via Zoom video calls), adult researchers leveraged the G Suite of collaboration resources, a readily accessible platform for all shared material, to make it easy for the youth to stay current even if they could not participate in all aspects of the project. Regular communications with the team involved email, in which meeting agendas, tasks, and recaps were clearly outlined. Consistency of meetings was crucial, even if not everyone could attend: the agenda carried on, meetings were recorded, and detailed notes were taken. Co-researchers who were unable to attend the meetings were expected to watch the recording and submit reflective memos to the team, from which they could contribute their ideas and catch up on the work asynchronously.

In hindsight, we felt that one area that we did not spend enough time on was getting to know each other’s assets and strengths as related to contributing to the work early on, though these opportunities did emerge. The TSRCP project made a point of encouraging youth to try some of everything before choosing to specialize. SIS youth were invited to explore theories and topics related to the larger study to present to the larger research team. Many youth were surprised to find that they enjoyed (or disliked!) something more than they anticipated. We find that when offered space and resources to support youth in engaging with different types of work, teams can capitalize on youth interests and expand on

existing skill sets that they bring to the collaboration. Having conversations about personal interests and professional goals early in the relationship can also contribute to creating trust and safe spaces.

Creating Spaces that Foster Belonging

We identified several practices that helped us navigate these ongoing power differentials, including strategies to develop trust and build relationships between youth and adults, and creating space for youth to connect with peers and subsequently build their own autonomy and power within the projects. Across our projects, we found that developing trust and building relationships through a range of formal and informal activities can set teams up for more authentic collaboration. As one example, Cara reflected on the importance of receiving nine months of online preparation where “youth learned research skills and bonded with their mentor, which built trust before the research process even began.” While not all projects can include such long training and relationship-building activities, shorter periods of relationship-building can include trust-building activities with time for learning about each other’s lives, asking about upcoming activities, and developing an atmosphere where there is laughter and chit-chat. Semi-structured agendas can leave room for co-constructing what to focus on with each other. For example, Mahmoud recalls that the adults would structure activities that would include reviewing preliminary quantitative data from surveys collectively followed by a discussion of what stood out to youth. This activity advanced the goals of the work and allowed youth to share feedback to guide data analysis and interpretation while simultaneously providing youth space to speak from their lived experiences, which requires vulnerability and some trust.

It was not only youth who were encouraged to share about themselves. Adults acknowledged when they did not know an answer, were puzzled over an issue, or did or did not have lived experiences like the youth. KT reflected on their identity with respect to race and age, writing: “I’m white, and a lot older than the youth. That was very salient to me. I think I connected pretty well, but there was still a distancing.” Being honest, vulnerable, and humble demonstrated to youth that their involvement was authentic and necessary because we were tackling problems of practice together.

Creating opportunities for youth to connect with each other apart from adults during meetings helped build community and a stronger sense of how youth understand their contributions. Youth-youth collaboration also served to level power dynamics, as it provided greater comfort and a more supportive experience to navigate the process of learning together. For the TSRCP project, one successful strategy was using chat features where youth could share resources, offer support, and socialize without the adult gaze. This provided a valuable space for youth to talk about the research and foster team building. Cara expressed that having youth researchers work in groups is important for youth to feel more comfortable and can foster bonds.

Incidences of lack of youth-youth collaboration further exemplify our finding that peer interaction can critically support youth co-researcher experiences. Lucie reflected on her experiences working in virtual spaces where there was limited opportunity for youth to get to know each other without adults present. She stated that the times she was paired with another youth co-researcher “facilitated the *in-between space*” where youth could “chat informally and bond without an adult co-researcher present,” which served to make her feel more comfortable working in a predominantly virtual environment.

Impacts of Leveling Power in Co-Researcher Relationships

Our prior reflections on co-researcher roles, norms towards supporting authentic collaboration, and practices related to navigating power dynamics all help describe the work research teams might go through to effectively involve youth as co-researchers on project teams. How does involving youth in research actually impact team members and the project itself, and how do we make sure those impacts are beneficial? Mahmoud articulated the ways he felt his voice was incorporated to reduce power differentials and effect change over time:

“Overall, I feel comfortable sharing my opinions and thoughts with the “senior” researchers/ PIs. Looking back on my time working with the team, I definitely was more hesitant to speak out/ voice my concerns or questions in the beginning. As I got to know the team better and more personally, as well as gain confidence in my contributions, I felt much more comfortable voicing my thoughts.”

Mahmoud acknowledges the slow buildup of trust. He grew to realize, “Don’t be afraid to speak up and share your ideas, thoughts, and concerns. The perspective you provide from your lived experience contributes meaningfully to the study in a unique and important way.” Similarly, Xavier felt well-positioned to give critical feedback:

“As a youth advisor, I attended meetings once a month to discuss certain aspects of the Museum of Science and describe my take and my perspective on them. In short, I was just getting paid to talk. I would describe it as really relaxing, really liberating. I felt like if I didn’t give feedback, I wouldn’t be doing my job. The senior researchers showed that you’re okay with having feedback and constructive criticism, so I thought, “Okay, I can trust these people to handle what I have to say, and I can say what I need to say.”

Xavier described feeling it was his job to give feedback. However, our analysis revealed that adults and youth struggled when youth feedback was not taken up. KT described the challenges of addressing such situations:

“Setting the scope of youth involvement can be really hard. We sought and hired youth who had strong critical consciousness, which

was a great asset. And it was sometimes difficult. At one point, we hoped to get feedback about a survey, so we had youth fill out the survey about an example exhibit. We didn’t do a good job directing our questions and the youth critiqued the exhibit instead of the survey. We shared the critiques with our exhibits team, but as researchers, we didn’t have the authority to make immediate changes to the exhibits, like we did our surveys. That led to frustration when youth came to the Museum and felt their feedback hadn’t been taken seriously. It overshadowed the fact that we’d substantially restructured our research approach with the youth.”

Based on this experience, Xavier describes concern that creating space for youth is not enough if it does not involve action. He shares, “I felt like my contribution was only valued a little bit. I don’t remember seeing what I gave feedback about when I visited. It kind of felt like my feedback was just something that was being processed and not acted on.” This sense that feedback is not acted upon could be particularly harmful for young people, especially when suggestions present ways to disrupt systems of oppression. For youth who see their roles as advocating for justice within educational systems, a failure of adults to address these concerns can seem highly problematic. Project teams need to be prepared to act on youth input and, if not possible, be transparent about why some feedback might not be incorporated.

Incorporating youth feedback in research also carries challenges with maintaining research rigor with validated methods. One notable example of this occurred during the development of a social network survey for SIS. To engage co-researchers in piloting and testing the survey, Rachel conducted cognitive interviews with two co-researchers (including Mahmoud) to obtain in-the-moment responses to survey questions and flow, and six youth co-researchers were given the survey draft and asked to provide feedback. Rachel then summarized this feedback, requesting specific changes to the instrument, including the revision of multiple scales and input on sections youth said they felt were “confusing, unrelated” or “not the vibe” of how youth communicate. This feedback was presented to the lead researchers with disciplinary expertise in social network analysis and while the senior researchers were careful listeners to the youths’ concerns, they defended the original wording as reflecting widely-used constructs in social network research and felt that they should maintain the accepted (validated) standard. In these situations, it is important to provide clear justifications for the decisions made, while still acknowledging and validating the contributions of youth co-researchers and potentially offering space for experimentation and new approaches when possible.

Discussion

This cross-case analysis explored the ways in which adult-driven and youth-driven forms of participation were evident across our three cases. The themes that emerged suggest that adult-driven forms of participation shaped how and in what

ways youth participated; however, specific practices and forms of engagement enabled the youth-adult collaboration to shift towards a more pluralistic form of shared control.

We found that adult and youth conceptualizations of roles are what drive both adult and youth perceptions of whether work on a project is balanced. While adults tended to want to share control with youth, communication about youth roles was not always clear, which dampened the potential for truly balanced work. Using the [Wong et al., \(2010\)](#)'s TYPE Pyramid enables us to see that adult-driven definitions and enactments of roles were often more symbolic than pluralistic, providing opportunities for youth to voice their perspectives, pose solutions to problems, and be acknowledged by adults as key contributors to the research process but not always place youth in decision-making positions. Our findings suggest that movement towards shared control participation types shifts and adjusts in activity and over time ([Cargo et al., 2004](#)). Not every decision or activity requires both youth and adults to participate; determining goals, tasks, activities, and forms of participation is a joint process that utilizes the strengths individuals bring to the work. What this analysis enables us to understand is that adultism can be difficult to disrupt. In practice, as youth move to more central forms of participation in the community, adults must make actionable moves to get to the goal of pluralistic partnership with youth.

Youth research literature provides a plethora of perspectives on how research utilizing participatory frameworks (i.e. YPAR, youth development, youth action research) challenges how adult researchers approach and conduct research with youth, raising important concerns regarding the quality and scope of youth involvement ([Liebenberg et al., 2020](#); [Tilley & Taylor, 2018](#)). Equitable participation in research requires choice, the possibility of choice, and a sense of ownership ([Cornwall & Jewkes, 1995](#)). In conducting analysis and writing this article as a team of youth and adults, we sought to cultivate a "culture of joint decision-making" ([Gardner, 2018](#), p. 215), where youth became "joint knowledge constructors" (p. 216) in ways that, we believe, disrupted the divide between the adultist categories of adult co-researchers as holders of academic expertise, specifically in the domain of academic writing.

While engaging youth in a co-research process that emphasizes their participation in the analytic process is a key component of co-researching with youth that has the potential to disrupt adultist approaches to research (see [Clark et al., 2022](#)), education research that includes youth as actual co-authors in publications is limited. Youth voice is often limited to data sources and/or member checking - a practice we also included in the writing process. However, embedding youth as core participants in the writing process enabled us to put into practice additional anti-adultist practices that allowed for youth to move towards more central forms of participation in our community of practice with shared control over what gets produced and shared with academic audiences. Echoing Gardner and her adult and youth co-authors ([Gardner et al., 2016](#)) publication on their process of writing for publication together on a five-year study,

we argue that this group endeavor contributed to a shared sense of feeling like authentic research partners and provided an opportunity to "foster transformation within the academic community" ([Gardner, 2018](#), p. 211), with youth and adults co-creating rather than adults writing on behalf of the group.

Our findings point to three important aspects of moving towards shared control, including relationship building, shared understandings of skills, and opportunities for youth to drive the making of shared norms. We found that relationship building is a necessary foundation of shared control. Getting to know each other's strengths and building trust was effective at moving towards a pluralistic partnership. Our findings also reiterated that participation in research necessitated that all team members had shared understandings of language and basic research skills. This included identifying different learning styles and highlighted the adultist tendencies in educational practices youth are used to. Finally, we found that the norms of shared space (physical space, digital space, etc.) had a big influence on the sense of control. Involving multiple youth at once and giving youth space away from the adult gaze was important for youth to develop shared power amongst each other, including opportunities for youth-youth-only conversations and youth-driven forms of participation (e.g. youth sharing verbal rather than written feedback).

Youth learning tends to come with an adultist lens in many contexts (e.g. school) where younger people learn the skills and practices from people older than them. Adultist cultural biases prime youth to consider themselves learners from adults older than them, including mentors and employers. This dynamic is embedded in research teams, where there is an established schema and practice that has been taught and perpetuated through the academy, with senior researchers in decision-making positions and students positioned as learners who may or may not directly contribute to the research. We discovered that youth did indeed learn research skills from adults, but they also learned from one another and through the process of conducting research. Adults not only supported youth learning but also gained tremendous insight, perspective, and contributions from youth. The dominant adultist narrative in research emphasizes skills development as more useful than what the adult co-researchers gained. As we continue to shape existing and new projects, we reject this notion and strive to address this imbalance of value and perspective.

Limitations

Working towards a community of practice that aims to foster spaces where youth and adults share control ([Wong et al., 2010](#)) over research processes is time and resource-intensive and requires all parties to be interested in and willing to engage in the reflexivity necessary to challenge adultism ([Bettencourt, 2020](#)). The three cases discussed here took place in museum contexts with funded studies that enabled adults to train and pay youth to participate. This hiring and payment structure provided an inherent power dynamic that contributes to

potential bias and (un)willingness to share, analyze, and write honestly about the role of adultism in our work. However, we collectively believe that providing youth financial incentive is necessary for equitable contributions to take place.

We also recognize that informal learning spaces like museums had a key impact on our abilities to be reflexive and adaptive to supporting youth to engage in and enact roles that supported their trajectories from novice researchers to co-authors of this paper. Efforts to disrupt adultism can be met with resistance from funders, journal editors, organizational leaders, and logistical norms about how research is done (Teixeira et al., 2021). Researchers interested in integrating participatory methods with youth may be operating within institutional contexts that hinder youth participation and adult abilities to create the necessary time to train youth in research and cultivate relationships. This is especially true for researchers working with youth on research projects that could require youth co-researchers to handle sensitive data, including their own and each other's. Just as is required of adult researchers, we ensured that youth co-researchers obtained certification for working with human subjects and understood the process of ongoing consent was a necessary component of our work and a requirement of our institutional review boards. Researchers will need to determine their own institutional requirements for ethics and consent, and plan to train youth in these processes as part of their process.

Recommendations

Below, we provide these recommendations in the voices of the youth and adult authors of these cases.

Youth to Youth Interested in Co-Research Opportunities

Highlight the relevance and importance of your voice. Don't be afraid to speak up and to share your ideas, thoughts, and concerns. The perspective you provide from your lived experiences contributes something meaningful to the study in a unique and important way. Find ways to give constructive feedback and take it. Pay attention to details. Take seriously the large responsibility of the time commitment.

Youth to Adults Leading Co-Researcher Studies

Begin with the end in mind: Be purposeful in keeping youth aware of the larger aims and goals; this will support youth in seeing how they connect to the larger purpose but also support them in feeling connected to the larger team. *Expect a range of starting points for adults as well as youth:* Include a range of "ways in" to working with youth; engaging in this process may require adults to maintain a flexible approach to thinking about the multiple ways that youth can be involved to determine how to be flexible given larger project goals. Consider

the time and effort required to train youth to be researchers alongside adults. *Keep communication with youth transparent and frequent.* Be prepared to accept criticism and feedback from youth that may be hard to take. Youth need youth to make their participation a comfortable and supportive experience.

Adults to Youth Interested in Co-Research Opportunities

Consider your own interests and the role that your interests play in your commitment to a project; ask adults to identify what types of tasks and skills are required to engage in the work and whether learning those skills is of potential interest to you. Find something you are interested in about the work and ask questions about it. Research usually requires many different types of tasks. We're all not good at or interested in every task; get comfortable learning about different activities involved so you can have a better sense of the type of work you'll enjoy doing. *Young people often have keen awareness of inequities that adults who may be years removed from youth experience may miss.* You can share this gift and advance equity by paying attention to power differentials you see playing out between youth and adults, raising questions about why things function the way they do, and suggesting alternative paths forward.

Adults to Adults Interested in Working with Youth as Co-Researchers

Consider aims and goals for engaging youth. Be intentional and strategic in designing and implementing a youth co-researcher component to your work so that it is sustainable. Consider how collaborating with youth researchers helps the outcomes of the project. *Map out what you're (not) willing to give up and why.* Articulate that clearly with youth and get their feedback about it. Inviting youth into this metacognitive process can be powerful. Acknowledge that the academic and education research system is persistently oppressive; as researchers, we are actively trying to resist that system yet also trying to get work done within the system. Set clear expectations and goals for youth roles, your roles, and the collaborative work. Put it in writing. *Decide what is fair and manageable with youth, not for youth.* The more that process is collaborative and transparent the more trust you build together. Preparedness is key; recognize when you as a leader may not be prepared to support the work and discuss that with them. *Community building among the team is critical for communication.* Youth need to know each other and others to develop connection and care about each other. Find protocols for those times where we need to have all the voices heard. Be open to try very new approaches to your work. Pay attention to tensions that arise when youth share an idea that you feel you don't have time for, or that doesn't fit with familiar ways of doing research.

Conclusion

The three projects in this paper generated insight that was generalizable at a national scale and met the competitive standards of federal funding. By involving youth, these projects intentionally challenged the notions of who can contribute to high-quality research about youth.

We contend that youth involvement in research about youth is as essential as having team members with advanced research skills. Each study involved youth in distinct ways, illustrating a range of examples from which other researchers can draw if they want to disrupt adultist dominance in research practices by including youth as partners in their work. Co-authors reflected on the importance of investing time to build trust and facilitate clear communication between youth and adult team members. Workplace structures, resources, and tools can also prepare - or prevent - team success. Finally, co-authors reflected on the crucial need to navigate power dynamics in youth-adult co-researcher relationships. While power differentials cannot be avoided, certain practices can mitigate the potential for harm and promote empowering situations for young people. In the projects described, co-authors reiterated the importance of building trust through structures that invited youth collaboration and input, consistent communication and clarity about a project's goals and progress, and transparency in co-researcher roles and staffing models.

From a perspective of equity and representation, youth-focused research does a disservice when youth are not part of the research team because most likely - the project team consists of adults who do not share the lived experiences of the young people who are the focus of the research. We posit that research on youth should involve youth as it provides a crucial perspective that is often overlooked and untold. Working with youth co-researchers is time-intensive and requires patience and planning but it is increasingly becoming a non-negotiable aspect of work. Preeti shares, "It can be a struggle to constantly remind the adult project team that this is not a 'nice thing to do' and that it is not about teaching youth to do social research. We need to be intentional and proactive in designing this element of collaborating with youth researchers because it actually helps the outcomes of the project." At all stages of a project—from planning to instrument design to data collection, analysis, and dissemination—youth-focused research is more ethical and valid when it is conducted "with", as opposed to "on" youth.

Appendix A

Case Study #1: *Staying in Science*

Study Context. *Staying in Science* is a National Science Foundation 10-year longitudinal study of 358 New York City youth and their pathways through college and into the workforce (DRL 1561637, 2033515 & 2100155). These youth conducted mentored science research while in high school in one of the institutions that are part of the New York City Science Research

Mentoring Consortium (NYCSRMC), a consortium of 28 science research mentoring programs across New York City led by the American Museum of Natural History. The study explores alumni experiences—including factors that support participation in mentored research programs in high school—and traces their pathways as they enter college and the workforce. Adult and youth co-researchers focused on several research questions, including: What features of the high school program are most important in identity development as one who can do science and belong in STEM careers? What resources exist for youth as they enter college and the workforce as related to their persistence in STEM? What obstacles do they face and how do they navigate the bumpy terrain of college and into the workforce when faced with obstacles? Co-researchers have been a critical aspect of the project. In the first four years, we had eight co-researchers, in the 5th year (during the COVID-19 pandemic), we had two (a subset of the eight) and as of 2023, we maintain those two co-researchers and four additional alumni have joined for a total of six.

Co-researcher Scope and Commitment. In the first four years of the study, the aim of having youth co-researchers was to draw on participants' perspectives to support the trustworthiness and credibility of instruments and interpretation of results. The co-researchers read relevant research literature, provided feedback on survey and interview instruments, learned to analyze quantitative and qualitative data, wrote conceptual memos about data, and reflected on their experience of doing science research with a scientist. Youth co-researchers disseminated findings by co-presenting at conferences and contributing to social media posts. In the fifth year of the study (during the COVID-19 pandemic), the two alumni who continued as co-researchers added to their scope of work by co-facilitating interviews. They were especially valuable in considering how youth were perceiving COVID-related events and political happenings. Co-researchers shared insights that informed the tone and timing of the survey and interpretation of results. In years 6–10 of the study, the six co-researchers are collaborators in a more central way. In addition to prior tasks (e.g. instrument development, conceptual memos, co-conducting interviews, dissemination), youth are discussing obstacles and resources that impact participants' sense of belonging, othering, and experiences with microaggressions, and they are critically examining ways to illuminate youth experiences with non-traditional methods. They also co-create workshops for current program alumni based on study findings and co-author blog posts and journal manuscripts.

Recruitment. We solicited co-researcher applications from NYCSRMC program alumni who were also participants in our longitudinal study. The co-researcher fellowship role was framed as an opportunity to learn from experienced researchers while engaging in social science practices including developing expertise in qualitative and quantitative data collection and analysis, improving skills in disseminating research findings, and networking with professional scientists

and educators. We interviewed and selected co-researchers based on their interests in the research, their academic and career goals, and their rich social and cultural capital. Our co-researcher cohort brought racial and gender diversity to the research team and had the experience of growing up and attending school in New York City (in contrast to the adult researchers, only one of whom grew up in New York City).

Preparation. To prepare the co-researchers, the adults first introduced a high-level overview of college and career pathways research so that the youth co-researchers could understand the field-wide context of the research study. We discussed ethics in human subject research and co-researchers completed a human subjects certification course. Adult researchers intentionally scaffolded research skills, including the process of analysis by modeling and providing directions on how to analyze survey data and write conceptual memos. Discussions about youth experiences of the program then informed the methods for *Staying in Science*, including how, when, and why we collected data.

Logistics of Working with Youth Co-Researchers. All youth co-researchers were attending school during their involvement in the study. In the first two years, some were still in high school; currently, all have completed undergraduate degrees and are working and/or enrolled in graduate school. We often met once a month as a team in person or virtually, although much of the individual task-based work was completed asynchronously. Currently, we are meeting twice a month for 1.5 hours. Co-researchers signed a 16-month contract and will work 100 hours within that time, although we re-assess interest in continuation every six months. The co-researchers receive a stipend approximately three times a year at a rate of \$22 an hour, a rate that was set by the project leaders at the start of the grant.

Case Study #2: Exhibit Appraisal and Diverse Populations: Pilot Research About Intersectional and Science Identities in Science Exhibits (APPRAISE)

Study Context. APPRAISE was an NSF-funded pilot and feasibility study led by the Museum of Science, Boston, EdTogether, and Children's Museum of Pittsburgh (DRL-1906688). The project developed and tested a suite of research tools that help museums better understand how youth conceptualize their identities and how exhibits can be designed to affirm those identities, with research questions addressing: the extent to which the research measures were valid for youth audiences; how well the tools measured identity, exhibit engagement, and outcomes; and whether there were meaningful relationships between these constructs that could help exhibit teams identify ways to improve exhibit design. Four mini-studies were conducted with youth participants using iteratively more youth-friendly versions of the research tools, which were also co-designed with youth co-researchers. There were two mechanisms through which the

project involved youth co-researchers: Over 20 youth advisors were involved for short periods of time (1–2 hour sessions) throughout the project, and two youth interns were involved more intensely over the course of the summer of 2021.

Co-researcher Scope and Commitment. The aim of having *youth advisors* was to invite feedback from youth about specific aspects of the APPRAISE research tools (e.g., survey item development), based on their personal experiences and their direct engagement with draft activities. Youth advisors engaged in a series of interactive advisory sessions that included trust-building activities and opportunities to review materials and provide feedback to inform the iterative development of the research protocol. The project engaged youth advisors when youth input was especially crucial, predominantly at the beginning of the project when the instruments and research approach were in early phases of development. The aim of involving *youth interns* was to create a longer-term opportunity for youth to conduct research using the protocol, from data collection to analysis and reporting, to reflecting on subsequent changes to the protocol overall. Later in the project, youth advisors and interns also contributed to dissemination products by presenting at conferences and writing papers (including this one!).

Whereas youth advisors worked on bounded *tasks*, youth interns were fully embedded members of the research team over the course of a summer. The APPRAISE project revolved around four iterative “mini-studies,” through which the team refined its protocol. The youth interns were involved in one complete mini-study cycle. This involved reviewing and revising the proposed research protocol; gathering data through observational, survey, and interview methods; conducting both qualitative and quantitative data analysis; and working collaboratively to develop a report that summarized the results of the mini-study and suggested improvements. During the internship, the youth advisors were working as many or more hours on the project than any of the PIs. They attended all project meetings and were involved in all decision making during their tenure.

Recruitment. Youth advisors were recruited through collaboration with two community partners—a local Boys and Girls Club and Our Space, Our Place, an out-of-school program for students who are legally blind. Boys and Girls Club staff members selected groups of youth to participate as part of their existing program. All youth from Our Space, Our Place were invited to serve as youth advisors, and two chose to be advisors. Teen interns applied through the Museum of Science's typical internship hiring mechanisms and went through an interview process. Interns were selected based on their lived experiences with and critical consciousness of race, gender, and ability in education—central topics for the research.

Preparation. Youth advisor sessions were designed so no prior knowledge was necessary. Project PIs designed activities that invited advisors to try out portions of the research protocol,

reflect on their experiences, and share feedback (this aspect was particularly important for Boys & Girls Clubs groups, whose staff wanted opportunities for youth to practice public speaking). The emphasis was on brainstorming ways future iterations of the protocol could feel more youth-friendly (e.g., adjusting survey language, considering more interactive data collection activities) while meeting the research objectives. For the youth interns, there were some traditional training elements—including a human subjects course—but most preparation involved job shadowing, mentorship, and scaffolded but authentic research tasks. Youth also had ample opportunities to pose questions and share suggestions with the project team.

Logistics of Working with Youth Co-Researchers. The youth advisor activities with Boys & Girls Club involved substantial coordination and the PIs met with Boys & Girls Club staff prior to the sessions to co-plan youth advisor meetings. The project paid the Boys & Girls Club a lump sum for the youth's participation, which amounted to \$25 per hour per youth as well as an adult advisor stipend of \$75 per hour for the staff involvement in the planning process (rates set by the project PIs). Each youth participated for four or 8 hours. With Our Space, Our Place, the PIs coordinated with youth directly and paid them \$25 per hour. Two youth were involved, with one participating for about ten cumulative hours and the other youth about four cumulative hours. Interns worked on the project two days per week for seven weeks, for a total of about 170 hours. Youth were paid the Massachusetts minimum wage, \$13 per hour, as per Museum of Science policy for youth interns.

Case Study 3: Teen Science Research and Communication Program (TSRCP)

Study Context. *Developing a Program Model for High School Science Research, Communication, and Education Experiences in Living Laboratory* (commonly called the Teen Science Research and Communication Program, or TSRCP), was a project led by the Museum of Science, Boston, and Boston University, funded by the National Science Foundation (DRL-1811276). TSRCP was a year-long youth employment program during which teens conducted research in collaboration with Boston University, engaged in science communication activities at the Museum of Science, and immersed themselves in Museum of Science education while receiving mentorship and community-building with STEM professionals. The program built on the successful Living Laboratory(R) model, which connects museums and university researchers to integrate research and practice.

The evaluation study for the TSRCP project, led by the Museum of Science's research team, studied the ways youth participants' science identities changed over time. Initially, the evaluation plan took a fairly traditional approach where adult evaluators designed the study and gathered, analyzed, and reported on data. In doing the analysis, however, the evaluators felt

that their interpretations lacked vital youth input. Recognizing that science identity is highly personal, the evaluation team sought to involve the youth as co-evaluators who would tell their own stories of their identity development over the course of the year. Although the broader project involved youth both in co-research with Boston University and co-evaluation with the Museum of Science, the remainder of this case description focuses on the co-evaluation, illustrating how this work can develop over time in the context of program evaluation.

Co-researcher Scope and Commitment. The focus of TSRCP was to provide opportunities for youth to practice social science research and the co-evaluation component evolved over the course of the program. In the first year, the evaluators met individually with each youth participant, shared the data they had provided over the course of the year, and the youth and evaluators discussed the meaning of the data together as a type of member-checking. This was highly valuable for the adult evaluators—who felt more confident in the findings—and the youth, who stated that it was a useful reflection tool to make meaning of their experience. Youth also reflected on the evaluation instruments and informed changes for year two. In the second year, the evaluators expanded from a model of member-checking to a youth co-evaluation approach. Youth and evaluators had collaborative interpretation meetings four times in year two. During these meetings, evaluators shared quotations and graphs of the youth's data over time and asked the youth to analyze and contextualize the data. Evaluators used these meetings to develop case studies for each youth, which the youth reviewed and edited. Youth also contributed to dissemination products including conference presentations and a final written report. Ultimately, this approach to co-evaluation aligned with the project's goals around supporting the development of science identities by involving youth in *doing* science rather than just learning about it (as is a common pedagogical approach in high school). Youth took ownership of their own stories, practiced evaluation skills, and ultimately enhanced the validity and cultural appropriateness of the study.

Recruitment. Six youth participated in the program for each of two years. They were selected through the standard Museum of Science internship hiring practices, including applying through the Human Resource portal and participating in interviews. Youth were selected to represent a range of interest and experience with science to support the development of curriculum materials that would be widely applicable for a broad range of youth. All selected youth were invited to serve as co-evaluators and everyone chose to take on this responsibility.

Preparation. As part of the project, youth went through an intensive research program, for which many activities supported both the program objectives and the co-evaluation needs. Youth completed human subjects training and worked sequentially through a structured curriculum, co-developed with university

researchers and museum educators, that scaffolded skills of reading research articles, introduced the R programming language for data analysis, engaged youth in considering research ethics, supported research design skills, and more. Supporting the curriculum, youth practiced data collection, analysis, and reporting in authentic, ongoing research studies led by Boston University and the Museum of Science's Research & Evaluation Department. Due to this comprehensive experience, there was minimal additional preparation needed for the co-evaluation component of the project.

Logistics of Working with Youth Co-Researchers. The grant covered two, year-long cohorts of the program. In the summer, youth worked three days per week; during the school year, youth all gathered synchronously on Saturdays (either in person or virtually when pandemic constraints demanded), they also worked asynchronously for 5 hours in the afternoons and on the weekends, and they were invited to participate in the Boston University researchers' lab-wide meetings. Adult mentors from Boston University and the Museum of Science were present whenever youth were on-site at the Museum of Science. Youth were paid the Massachusetts minimum wage at the outset of the program (\$13 per hour), and the pay rate has since increased to \$17 per hour in 2023.

Appendix B

Reflective questions for Youth Co-Researchers

- (1) How would you describe your role as a youth researcher on this project?
- (2) What did you do as a youth researcher?
 - (a) What aspects of your work were "given" or pre-planned by the project team?
 - (b) What aspects felt more driven by your own interests and choices?
- (3) In what ways did you feel prepared/supported to engage in the work you did?
 - (a) In what ways/are there examples of ways that you did not feel prepared or supported to be successful in your role/work?
 - (b) If so, how did you usually respond in those situations? How did you communicate about that/do about it?
- (4) We're interested in hearing more about how different ways of communicating worked - or didn't work - during your participation.
 - (a) What were the most effective ways of communicating with us that worked best for you? What were the least effective ways of communicating?
 - (b) Were there ways in which we communicated with you that supported you in feeling a part of the research team? Were there ways we communicated that were not supportive of you feeling a part of the team/of your work?

- (c) Did you feel confident sharing your ideas with senior researchers? Did you feel like your ideas were valuable and valued?
 - (d) Did you feel like you had something significant to contribute in communicating with the senior researchers/research team?
- (5) What was the most challenging component/aspect of your work as a youth researcher?
- (6) Where did you feel most successful in your role as a youth researcher?
 - (a) Are there specific aspects of the project that you think you were the most successful in contributing to?
- (7) Looking back - would you change any part of your experience? Why or why not?
 - (a) What do you wish was different/what work would you want to see happen in the project that hasn't yet? Is there anything you've anticipated doing that we haven't, but you wished we had/wanted to?
- (8) Reflect on your development, from before having this opportunity and after: What are things you learned about yourself as a youth researcher? How did this inform what you learned about what you like or don't like doing (research-related, or otherwise)?
 - (a) How do you feel this work has impacted/affected other aspects of their lives? (Studying something very differently than what you've been doing in your everyday life - how has this process and project impacted how you perceive/understand yourself, your own research/professional work, your multiple intersecting identities, and other aspects of your lives?)
- (9) What advice do you have for researchers who want to work with youth researchers on their projects?
- (10) What advice do you have for youth who are interested in working as researchers on projects like ours?
- (11) Why should research involve youth, or not? What's the importance of doing youth research to you?
- (12) Any particular memories or events that stand out to you that you want to share not captured in the questions above?

Reflective Questions for Adult Co-Researchers

- (1) How would you describe the co-researcher role on this project?
- (2) How would you describe your role in leading the co-researcher component of this project?
- (3) What did you do to teach/support/guide co-researchers?
- (4) In what ways did you feel prepared/supported to engage in the work you did leading the co-researcher component of this project?

- (a) In what ways/are there examples of ways that you did not feel prepared or supported to be successful in your role/work?
- (b) If so, how did you usually respond in those situations? How did you communicate about that/do about it?
- (5) We're interested in hearing more about how different ways of communicating worked - or didn't work - during your participation.
 - (a) What were the most effective ways of communicating with co-researchers that worked best for you? What were the least effective ways of communicating?
 - (b) Were there ways in which we communicated with co-researchers that you believe supported them in feeling a part of the research team? Were there ways we communicated that were not supportive of them feeling a part of the team/of your work?
 - (c) How did you support co-researchers in building confidence in sharing their ideas with each other and adult researchers? How did you try to support them/create opportunities for them to feel that their ideas were valuable and valued?
 - (d) Did you feel like the co-researchers had something significant to contribute in communicating with the senior researchers/research team?
- (6) What was the most challenging component/aspect of your work as an adult researcher leading this component of the work?
- (7) Where did you feel most successful in your role as an adult researcher leading this component of the work?
- (8) Are there specific aspects of the project that you think co-researchers were the most successful in contributing to?
- (9) Looking back - would you change any part of the co-researcher experience? Why or why not?
 - (a) What do you wish was different/what work would you want to see happen in the project that hasn't yet? Is there anything you've anticipated doing that we haven't but you wished we had/wanted to?
- (10) Reflect on your development, from before having this opportunity and after: What are things you learned about yourself as a researcher engaged in this collaborative process? How did this inform what you learned about what you like or don't like doing (research-related, or otherwise)?
 - (a) How do you feel this work has impacted/affected other aspects of their lives? How has this process and project impacted how you perceive/understand yourself, your own research/professional work, your multiple intersecting identities, and other aspects of your lives?
- (11) What advice do you have for researchers who want to work with youth researchers on their projects?

- (12) What advice do you have for youth who are interested in working as researchers on projects like ours?
- (13) Why should research involve youth, or not? What's the importance of doing youth research to you?
- (14) Any particular memories or events that stand out to you that you want to share not captured in the questions above?

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Ethical Statement

Ethical Approval

Ethical approval to report this case series was obtained from the Institutional Review Board, American Museum of Natural History, FWA00006768 and the Institutional Review Board, The Museum of Science, FWA #00010051.

Informed Consent

Informed consent to participate in the research and evaluation studies outlined in this manuscript was written.

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Data Availability Statement

The data presented and analyzed in this manuscript are qualitative and identifiable in nature and cannot be shared externally due to the IRB requirements of our respective institutions.

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