More than Data Collectors: A Systematic Review of the Environmental Outcomes of Youth Inquiry Approaches in the United States

Heather Kennedy, Jonah DeChants, Kimberly Bender, and Yolanda Anyon

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Highlights

- Environmental outcomes reported in 36 US studies of youth inquiry approaches.
- Outcomes included changes to practitioners, policies, programs, research, and peer group norms.
- Long term, advocacy-oriented groups targeting decision-makers were more likely to report outcomes.

Abstract Over the last twenty years, research on the impact of engaging children and adolescents in the generation of new knowledge about their lives, schools, and communities, has grown tremendously. This systematic review summarizes the findings from empirical studies of youth inquiry approaches in the United States, with a focus on their environmental outcomes. Searches of four interdisciplinary databases retrieved a total of 3,724 relevant articles published between 1995 and 2015. Sixty-three distinct studies met the systematic review inclusion criteria, of which, 36 (57.1%) reported that the youth inquiry approach contributed to positive changes among adults, peers, organizations, and/or institutions. These environmental outcomes were qualitatively recorded, inductively categorized, and then organized into Bronfenbrenner's ecological framework. Youth inquiry approaches led to practitioner growth and changes in peer group norms at the micro-system level, program development or improvement and research benefits at the meso-system level, and school, city, and state level policy adoption at the exo-system level. Qualitative methods, especially case studies, were most commonly used to evaluate the impact of youth inquiry approaches on environmental outcomes. Studies of approaches that utilized advocacy to create change, targeted decision-makers as the audience for the youth's work and convened for a longer duration were more likely to report improved environmental outcomes. This systematic review suggests that youth inquiry approaches are a promising strategy for ecological systems change.

Keywords Youth inquiry · Systematic review · Environmental outcomes

✉ Heather Kennedy
  Heather.kennedy@ucdenver.edu

Graduate School of Social Work, University of Denver, Denver, CO, USA

Youth Inquiry Approaches

Although young people make up a significant portion of our population, they are kept mainly on the periphery of civic society and are often excluded from most meaningful roles in social and political life (Camino & Zeldin, 2002; McBride, 2008). The systematic subordination of youth is a social justice issue (Delgado & Staples, 2007) perpetuated by age-based policies regarding political participation that minimizes the power young people have to make decisions that impact their lives (DeJong & Love, 2015; Godwin, 2011). While youth and adolescence are a significant focus across the empirical literature, youth are often excluded from the research process (Langhout & Thomas, 2010). Dominant myths and attitudes that young people are lazy, materialistic, and uninterested seem to justify this exclusion (Gilliam & Bales, 2001; Margolin, 1978).

Youth participation has been offered as an antidote to the "youth as problems" paradigm and may be one way to disrupt the subordination of young people. Youth participation refers to children and adolescents' involvement in meaningful and sustained efforts to improve the settings, systems, and organizations that impact them (Ozer, Afifi, Gibbs, & Mathur, 2018). Several models of youth participation, such as youth organizing, student voice, and youth participatory action research (YPAR), engage young

people in conducting inquiry to generate new knowledge about their lives, schools, and communities. These youth inquiry approaches are characterized by young people investigating topics that are important to them by collecting, analyzing, and interpreting information, data, or evidence (Rodriguez & Brown, 2009).

Although youth inquiry approaches are embedded in different models of youth participation that reflect diverse epistemologies, levels of youth decision-making, and types of data collection methods, many aim to change or improve outcomes across multiple levels of the social ecology: among youth participants, adults, and communities.

For example, youth participatory action research (YPAR) is an epistemological perspective in which youth partner with adults to conceptualize an issue of social inequity, collect information about that topic, and advance specific change-oriented agendas that may include revising policies, building new institutions, improving service delivery, or disrupting structures of power (Cammarota & Fine, 2010; Schensul, 2014). Youth may engage in active resistance to the oppressive relationships, practices, and policies that have marginalized them. Engaging in YPAR challenges the traditional top-down narrative of knowledge construction and validity by employing methods that involve youth and adults in a "bottom-up" process of co-examining issues in their lives. Young people collect data about relevant topics, using diverse methods such as surveys, interviews, photography, and videography. By examining issues using research methods, PAR combines social action and reflection, the aim of which is participant growth as well as systemic change (Freire, 1998). Through participation in PAR, young people can foster an awareness of inequalities, systems, and worldviews (Carabello et al., 2017). Youths' research findings can also be used to agitate, disrupt, and correct social injustices with solutions developed for and by young people.

In contrast, the youth organizing model of youth participation combines the principles and strategies of community organizing and positive youth development. Youth identify contentious issues and mobilize to accumulate power to advance specific policy change agendas. Youth organizing models typically incorporate common elements: relationship development, popular education, participatory research and evaluation, and social action (Christens & Kirshner, 2011). While both youth organizing and YPAR consciously attend to issues of power, youth organizing often prioritizes an advocacy goal and may use inquiry to accomplish it. Outcomes of youth organizing include both youth and community development.

This study synthesized the literature regarding the environmental outcomes associated with a broad array of youth inquiry approaches. In addition, we considered whether characteristics of the study or youth inquiry approach were associated with reported environmental changes.

Youth Inquiry Approaches and Environmental Change

While there is growing body of literature about different models of youth participation that incorporate youth inquiry, there has been substantially more theoretical and empirical work on YPAR. In fact, research on YPAR has burgeoned over the last decade, expanding beyond its critical epistemological roots, particularly in public health, education, and community psychology. As a result, there are growing epistemological tensions in this field of study. Research on PAR with youth now reflects multiple ways of knowing, from experimental studies that aim to identify causal relationships (e.g., Berg, Coman, & Schensul, 2009) to qualitative research that focuses on thick and rich descriptions of the messiness of the process (e.g., Askins & Pain, 2011).

Only recently have scholars begun to synthesize findings of community-based participatory research and YPAR across this literature. Previous reviews have clarified the degree to which youth have been involved in various community-based participatory research projects (Jacquez, Vaughn, & Wagner, 2013) and the youth outcomes associated with participation in PAR (Shamrova & Cummings, 2017). To our knowledge, there has been only one review of organizational and community outcomes reported for PAR with youth. In their integrative review of 45 articles reporting having done PAR with youth across the globe, Shamrova and Cummings (2017) identified four primary outcomes for organizations and five outcomes for communities. Outcomes for organizations included: integration of inclusive and child-friendly practices into programming, changes to staff members' perceptions of their young clients, organizational advocacy related to the issues young people raised, and usage of data collected from PAR projects to apply for additional funding. Community-level outcomes reported in this review included: opportunities for intergenerational dialogues, new avenues for youth voice through boards and councils, advocacy that led to policy change, youth involvement in efforts to raise community awareness, and improvement of community infrastructure. While certainly an important contribution, the Shamrova and Cummings (2017) review stopped short of examining the methods used to study the impact of PAR with youth and whether any characteristics of the inquiry approach were associated with environmental outcomes. This work also confined environmental outcomes to two levels–organizations and communities–and did not examine other systems that could have been affected.

The present systematic review builds on past reviews by broadening the focus to a range of youth participation models that incorporate youth inquiry, including but not limited to YPAR. In short, our interest was to understand the environmental impact of youth inquiry approaches in which young people were more than just data collectors for adults or researchers. Guided by Bronfenbrenner (1977) ecology of human development, we sought to identify environmental outcomes across interdependent contexts at the micro, meso, and exo-system level that surrounds young people's inquiry and action. Micro-systems refer to the immediate environment of the developing person (e.g., family, friends, peers, and teachers). Meso-systems include community-based organizations, schools, or faith-based institutions and interactions between these institutions. Exo-systems include the larger cultural forces, not specifically immediate to the developing person, such as the distribution of goods and services and communication of norms (Bronfenbrenner, 1977). In applying an ecological analysis, we address a gap in previous work by exploring outcomes related to transforming researchers and traditional conceptions surrounding knowledge production. In addition, we compared whether environmental outcomes differ depending on the characteristics of the approach and study designs.

Specifically, our research questions were (a) What environmental outcomes are reported in studies of youth inquiry approaches?, (b) What terminology and methods have been used in studies of youth inquiry approaches that report environmental outcomes?, and (c) Did the reporting of environmental outcomes vary by the characteristics of the youth inquiry approach or the study? By synthesizing, describing, and analyzing environmental outcomes reported in the literature on youth inquiry approaches at multiple levels, we hope to inform those implementing and researching these efforts.

Method

Following the preferred reporting items for systematic reviews and meta-analyses (PRISMA) guidelines (Moher, Liberati, Tetzlaff, & Altman, 2009), our search and coding process was guided by transparent and replicable protocols. Systematic reviews are post-positivist in nature, aiming to categorize information into identifiable trends in the literature. In this review, we attempted to balance the aim for systematic investigation while still recognizing that youth inquiry approaches are nuanced and contextualized processes, which can be difficult to label and simplify. We, therefore, were judicious in our efforts to categorize and discern patterns–attempting to examine commonalities and divergences across the literature, while still honoring the highly contextualized nature of youth inquiry. As such, we began by building our process based on the PRISMA guidelines, but we made deliberate adaptations to these guidelines in an effort to be inclusive. In the initial development phases, we made changes to our protocol to reflect multiple ways of knowing.

Search and Sampling Strategy

Selected for relevance to approaches to youth inquiry, four databases were searched: PubMed, ERIC, Social Service Abstracts, and PsychInfo. The review period included articles published between 1995 and 2015. To identify records of interest, we entered search terms using Boolean operators AND/OR, using asterisks to truncate search terms. Our search criteria included: terms associated with study *population* (separated by OR): student, emerging adult, youth, high school, middle school, minor*, juvenile*, adolescent*, and teen* AND search terms associated with *intervention* (separated by OR): community involvement, youth voice, student voice, youth organizing, student organizing, youth activism, student activism, youth empower*, youth leader*, youth civic, youth advoc*, student advoc*, youth decision-making, student decision-making, social change, participatory action research, youth engage*, youth advisory board, youth advisory council, youth action board, youth action council, youth community development, youth involvement, youth led, youth council, youth coalition, youth outreach, student council, youth adult partner*, youth commission AND search terms associated with *study methods* (separated by OR): evidence-based, effective*, treatment*, intervention* |outcome*, experimental stud*, quasi-experiment*, case stud*, case–control stud*, cross-sectional, cohort stud*, observational, promising practice*, randomized control trial*, interview*, qualitative, survey, focus group, pre-experiment*, evaluation.

Eligibility Criteria

To comprehensively review the academic literature on the impact of youth inquiry approaches, eligibility criteria for this systematic review emphasized empirical articles that reported the outcomes of involving young people in data collection, analysis, and interpretation. Given the nascent state of this body of literature, and the multiple epistemologies reflected in studies of youth inquiry approaches, the review did not exclude papers based on design or methodology. Eligibility criteria focused on four key elements: (a) study characteristics (empirical research, published in peer-reviewed journals, conducted in the United States [so as to focus in one socio-political context of which we are familiar], published in English); (b) target

population (project participants were comprised of children or youth 25 years or younger; for youth ages 18-25, samples were excluded if they consisted only of undergraduate or graduate students, as this group appeared to represent young adults living independently); (c) inquiry-based process that involved youth in data collection, data analysis, data interpretation, or use of knowledge to improve lives); and (d) outcomes (study reported on the experiences, outcomes, or impact of youth inquiry on youth participants or their surrounding environment).

In this manuscript, we conceptualized youth inquiry approaches as a key component of several models for youth participation, such as YPAR and youth organizing, that may disrupt the narrative that young people cannot contribute. Because studies of the impact of youth inquiry approaches were diverse in epistemology, project approaches, and methodology, defining the inclusion criteria required intentionality. Youth inquiry approaches were defined as an element of organized groups where youth participants met regularly and had a common purpose (this excluded one-time workshops or youth conferences). Studies that report that youth participants were solely recipients of knowledge or instruction were excluded, as were service-learning programs which typically focused on learning through service to the community rather than youth inquiry intended for advocacy or creating change. Youth inquiry approaches that took place as school-wide interventions or in the context of after-school or community-based settings were included. We also aimed to be comprehensive and inclusive regarding study methodology. In light of previous reviews that identified few randomized or quasi-experimental designs (e.g., Morton & Montgomery, 2013), we included all empirical studies regardless of study design or methodology.

Study Selection and Data Extraction

The systematic search process included four phases led by a research team consisting of two doctoral students and two faculty members in the field of social work. All four team members were involved in establishing eligibility criteria, searching, screening, and coding studies. After conducting electronic searches using the databases and search terms described, Phase 1 involved preliminary screening of abstracts to determine whether they met initial screening criteria. First, the team each reviewed four abstracts to develop initial screening criteria. Then, each team member independently screened 20 additional articles and the screener was further revised. Next, the screener was applied to the remaining articles which were split among the team members; in the event of uncertainty of any of the screening items, the article was marked for further discussion and reviewed by the entire team. Any

article in which uncertainty remained after discussion was retained for further review in the next phase. As summarized in Fig. 1, our initial search resulted in 3,724 studies, 399 of which were duplicates. Two thousand eight hundred fifty-eight records were screened out due to being conducted outside the United States, not involving a youth project (or regular meeting of a group), or not written in English. In cases where insufficient information was provided in the abstract, articles were retained and moved forward to Phase 2.

In Phase 2, full-text articles were retrieved and further assessed for meeting these same initial screening criteria. To ensure screening consistency, criteria were thoroughly defined in a spreadsheet, and the entire team of four researchers used this spreadsheet to each screen a subsample of 50 articles. When discrepancies occurred, they were discussed, consensus was reached, and the screening criteria were further defined in the spreadsheet. Once the screening criteria were finalized, the remaining articles were screened by a single researcher. However, if a researcher was unsure whether a study met any criteria, the article and the issue was discussed by the research team until consensus was reached.

In Phase 3, articles that met the initial screening criteria were read to determine if they met additional eligibility criteria (included results about the effects of the approach on youth and/or their environment; evidence of youth inquiry). To increase the consistency of coding, this codebook was piloted with 40 articles, each article coded by all four independent coders. Discrepancies in codes were discussed, clarified, and the codebook was refined. To continue assessing reliability, Phase 4 involved double coding all remaining articles using the codebook; rotating pairs of research team members met weekly to reach consensus on any discrepant responses.

Data Items

Each included article was coded using the categories below. In most cases, coding options were not mutually exclusive, allowing coders to select more than one code per item as applicable.

Principles Associated with Youth Participatory Action Research

Coders noted whether the author of the study named their approach to inquiry as YPAR, PAR, action research, CBPR, or another variant. If an article was marked "other", the author's terminology was recorded. Coders also recorded the level to which each article demonstrated the three principles associated with youth participatory action research conceptualized by Rodriguez and Brown
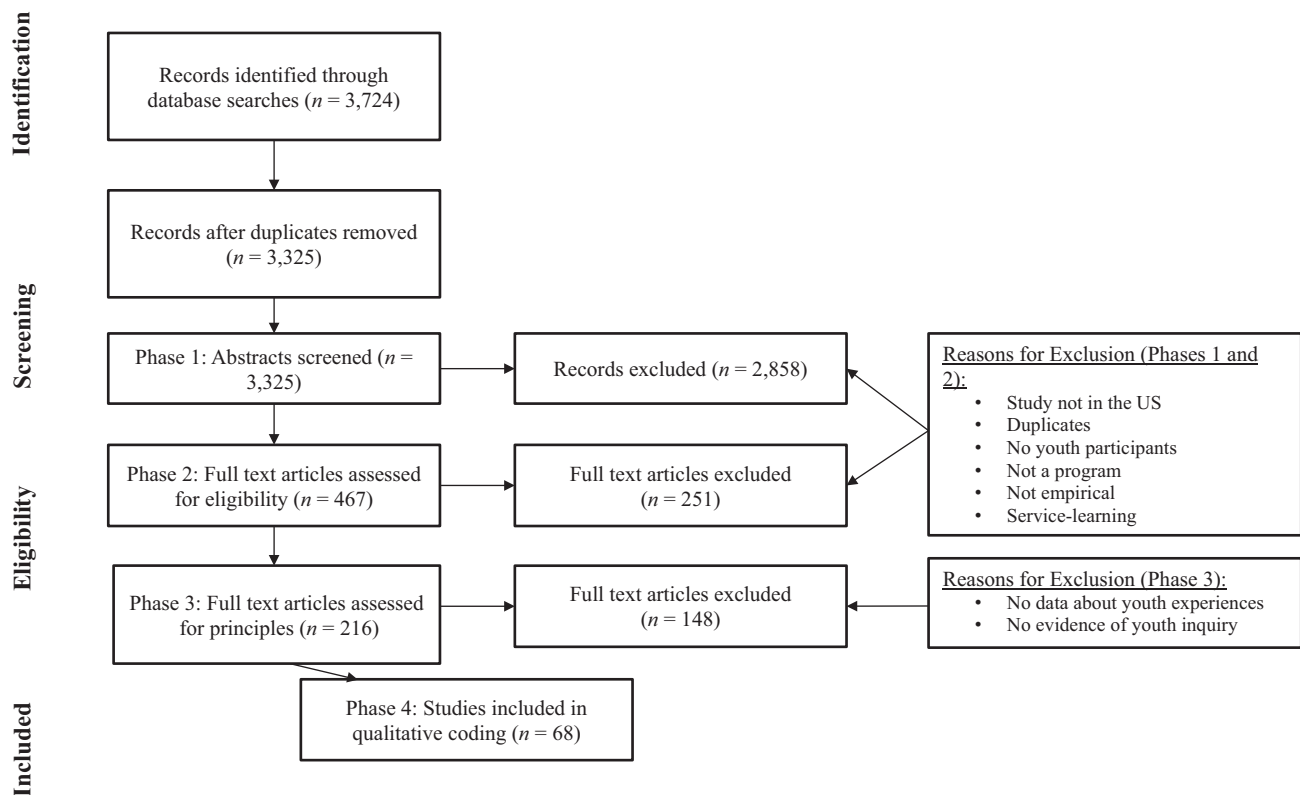
Fig. 1 Identification, screening, and eligibility of review sample

(2009): inquiry-based (youth investigated one or more topics by collecting information, data, and evidence), participatory (youth shared power with adults by making choices/decisions about the topic, methods or actions, project planning, results, dissemination, or social action), and transformative (the project resulted in a project, product, or policy or practice change, to improve lives of youth). The criteria for youth inquiry was two-fold: (a) youth had to use qualitative or quantitative methods to investigate an issue ground in their personal experience and (b) youth had to have been more than data collectors. In order to be included, an article had to have evidence to meet both of these inclusion criteria. The other two principles were assessed at three levels: (a) not present, (b) alluded to in the introduction, and (c) described with examples found in methods, results, or discussion sections.

Study Characteristics

Study author(s)' discipline and funding source(s) were recorded for each study as open-ended qualitative text. Study methods were coded as qualitative, quantitative, or mixed methods. We coded each study design as it was explicitly stated by the study's author(s); options included ethnography, grounded theory, phenomenology, randomized controlled trial, quasi-experimental, case

study, cross-sectional, pre/post, and/or longitudinal. Data type included: administrative, archival, interview, focus group, survey, observation, photos/video, and/or other. The youth inquiry study sample was coded based on whether it included: youth who conducted the inquiry, youth not directly involved in the inquiry project, community members, representatives from a partner agency, parents and caregivers, and/or others. If youth were included in the study sample, sample size was recorded, and demographics were coded including age, gender, race, sexuality, and socioeconomic status.

Characteristics of Youth Inquiry Approaches

The role of the adult facilitator was coded as researcher, teacher, and/or youth/community program employee. The topic investigated by the youth was recorded qualitatively and subsequently coded into six categories: health, education, inequities, violence and safety, resources for youth, and/or other. The type of data collected included: administrative, archival, interview, focus group, survey, observation, photos/video, and/or other. The setting in which the project was carried out was coded as school, church, youth/community center, university, or clinic. If the project included a discussion of the youths' method of social action, it was coded as: education/awareness building (i.e.,

talking with or disseminating a product to a community/ stakeholder group), advocacy (i.e., meeting with a decision-maker to ask for changes to a specific policy or practice), and/or organizing (i.e., mobilizing larger bodies to ask decision-makers for changes to a law or policy). The audience of the youths' social action was coded as: governmental agencies and other elected or appointed decision-making bodies, schools and organizations, social networks, the academy, and/or the general public. Project length (i.e., how many weeks the project spanned) and frequency (i.e., how many days per week project participants met) were recorded (without pre-designed categories) exactly how they were reported in each study; if not reported explicitly, these descriptors were coded as missing.

Outcomes Associated with Youth Inquiry

Outcomes were recorded if changes or improvements at the individual or environmental levels were reported in the study. This paper reports on environmental outcomes (at the micro, meso, or exo-system level); individual outcomes experienced by youth are reported in another manuscript (Anyon, Bender, Kennedy, & DeChants, 2018). Environmental outcomes reported in each study were qualitatively recorded and subsequently categorized into five inductively identified categories. These five categories were then organized post-hoc by three level of Bronfenbrenner's ecological framework. At the micro-system level we coded two categories: practitioner growth (i.e., adults changed their attitudes, perspectives, understanding and behaviors) and peer group norms (i.e., increase in knowledge or change in attitudes about health-related topics). At the meso-system level we coded two categories: program development or improvement (i.e., the creation of new programs, enrichment of services, spaces, or funding for services) and research benefits (i.e., improvements in recruitment, data quality, interpretation of results, or perspective gained). Finally, at the exo-system level, we coded policy adoption which included the passage of school, city, or state-level policies.

Synthesis of Results

The final data set was cleaned to remove errors from data entry and imported into the software program STATA 13. Most qualitatively coded items were then transformed into binary or dichotomous measures (yes/no). Articles were collapsed into unique studies, with the 68 papers included in this review, representing 63 distinct studies (several studies produced multiple papers). Descriptive statistics on all study variables were conducted. Fisher's exact test was used to compare differences in proportions, whereas t-tests were used to compare means. Specifically, studies of youth inquiry that reported change or improvement in environmental outcomes were compared to those that did not on a variety of project and study characteristics.

Authors' Epistemological Orientations and Experiences with Youth Inquiry

Our research team included individuals who consider themselves aligned with post-positivist, constructivist, and critical ways of knowing. These epistemologies raised many tensions in systematically reviewing this literature. For example, members of our team who held a critical orientation argued that all three principles of YPAR should be present in order for the study to be included in our sample. Other team members, who hold constructivist orientations, disagreed and felt that the exclusion criteria should include the principle of inquiry-based only, due to the lack of depth of information provided in published studies. In these discussions we aimed for balance and engaged in ongoing critical reflection regarding the ways that our epistemologies impacted our methodology and results.

All of the authors involved in this review have facilitated participatory action research (PAR) with youth in urban contexts. The lead author has served as a PAR facilitator with middle and high school aged students in after-school settings for 2 years. She has also conducted research on PAR with youth in after-school programs for 3 years. The second and third author have facilitated and studied PAR with young adults in a homeless shelter for 2 years. Finally, the last author has facilitated school-based PAR with youth for 5 years and has conducted research on PAR in community-based settings for 5 years.

Results

What Environmental Outcomes are Associated with Youth Inquiry Approaches?

Overall, 36 studies documented environmental outcomes, representing 57.1% of our total sample of 63 youth inquiry studies. Among the studies that reported environmental outcomes, the five inductive categories of these outcomes included (see Table 1): practitioner growth ($n = 12$; 33.3%), change in peer norms ($n = 6$; 16.7%), program development or enhancement ($n = 19$; 52.8%), research benefits ($n = 14$; 38.9%), and policy development ($n = 5$; 13.9%).

At the micro-system level, there were two categories of outcomes: practitioner growth and changes in peer group norms.

Table 1 Studies reporting environmental outcomes $N = 36$

Environmental outcome	n (%)
Policy development	5 (13.9)
Program/service development or improvement	19 (52.8)
Practitioner growth	12 (33.3)
Research benefits	14 (38.9)
Peer group norms	6 (16.7)

Practitioner Growth

Thirty percent of studies reported ways in which adults expanded their existing perceptions of the potential of young people in schools and communities. This category related to changing adults' values, beliefs, attitudes, or knowledge. Changes reported in this category were often precursors to formalized changes in programs or services. The expansion of adult perceptions was observed among adults who were included in the target audiences, who partnered with youth on a project, or who were peripherally involved (e.g., community members hearing youth's presentations). Specifically, adults learned to value youth as experts in their own lives and viewed them as important stakeholders in school and community-level decision-making (Kirshner, 2009; Otis & Loeffler, 2006; Reich, Kay, & Lin, 2015). Five articles reported that adults had an increased understanding of the experiences and needs of diverse youth because of the project (Brown, 2010; Galletta & Jones, 2010; McIntyre, Chatzopoulos, Politi, & Roz, 2007; Ozer & Wright, 2012; Sanchez, 2009). Specifically, adults were more willing to engage in diversity-related discussions with young people at school (Ozer & Wright, 2012); relationships between students and teachers were improved (Mitra, 2004; Voight, 2015); and adults described engaging in more reflexivity regarding power dynamics between youth and adults (Bertrand, 2014; McIntyre et al., 2007).

Change in Peer Norms

Youths' participation in inquiry also led to changes among their peer groups. Four of these studies reported that the project resulted in changes to peer groups' knowledge or behavior regarding either physical activity or nutrition (Dzewaltowski et al., 2009; Frerichs, Sjolie, Curtis, Peterson, & Huang, 2015; Yoshida, Craypo, & Samuels, 2011) or bullying (Voight, 2015). Similarly, Langhout, Collins, and Ellison (2014) reported that the youth had strengthened peer networks, linkages between home and school, and connections to intermediary community-based organizations.

At the meso-system level, there were two categories of outcomes: program development or improvement and research benefits.

Program Development or Improvement

Almost 54% of studies ($n = 19$) reported the addition or improvement of services offered in school, agency, and community contexts. This category related to formalized changes to programs or services. In some cases, more funding was made available for youth-related services such as after-school and job programs. Programs were created or enhanced to address physical and mental health-related topics such as bullying prevention, substance abuse, and healthy eating; these programs were created in both school and community settings (Christens & Kirshner, 2011; Frerichs et al., 2015; Kirshner, 2009; Voight, 2015). In Galletta and Jones (2010), PAR with youth was recognized as an important dual pedagogy, which was then integrated into a teacher training program. Several studies reported formalizing opportunities for youth voice into school and community settings (Brazg et al., 2011 Otis & Loeffler, 2006; Suleiman, Soleimanpour, & London, 2006). In Bertrand's (2014) study, a YPAR program led to the creation of a "Students Speak Out" group that involved regular opportunities for youth to meet with their principal. Similarly, Ozer and Wright (2012) described several expanded roles for students to be seen as experts, which included: meeting regularly with the principal, informing hiring decisions, providing feedback on teaching practices, and engaging youth of color in back-to-school nights. In some cases, new services were designed by youth to address an unmet need, such as language translating services between school professionals and parents, job search supports at the school, or a map of youth-friendly spaces in a community (Berg, Coman, & Schensul, 2009; Mitra, 2004; Walker & Saito, 2011). In several of these studies, youth were involved in the development of marketing campaigns, both in person (i.e., flyers) and online (i.e., through social media), to raise awareness about the changes to programming or to advertise new program offerings (e.g., Berg et al., 2009; Frerichs et al., 2015; Voight, 2015). Cammarota and Romero (2011) reported that, as a result of the poetry-based education campaign presented to school decision-makers, youth were allowed to display cultural symbols, such as flags from their countries of origin, at school.

Research Benefits

Fourteen studies reported that engaging youth in inquiry was associated with research-related benefits, which included a wide range of improvements to the process of doing research and the quality of the information uncovered. In eight of the 14 studies, a researcher associated with a university served as one of the adult facilitators. Several studies suggested that youth researchers improved

the recruitment and engagement of research participants (Gomez & Ryan, 2016; Kulbok et al., 2015; Walker & Saito, 2011). Youth knew where other youth spent their time, particularly youth who were hard to reach or were not involved in traditional programs; thus, researchers' gained access to populations typically underrepresented in empirical studies (Walker & Saito, 2011). Young people built rapport with their peers (Kulbok et al., 2015) and helped young people overcome hesitations to participate in research, as they were not viewed as authority figures (Gomez & Ryan, 2016).

Not only were young participants more willing to talk with youth, their involvement also led to better quality data. Authors reported that when youth were involved in the research process, it led to asking more effective and developmentally appropriate questions (Bautista, Bertrand, Morrell, Scorza, & Matthews, 2013; Brown, 2010). Youth served as key informants, providing perspectives of their communities (Brazg et al., 2011; Walker & Saito, 2011). When youth were the interviewers, their youth respondents provided greater depth in the information they shared (Gomez & Ryan, 2016).

Youth also aided in interpreting and disseminating research findings. Young people helped to interpret the words of youth participants authentically (Brown, 2010), expanded adults' understanding of the data (Kulbok et al., 2015), and, at times, uncovered new findings (Brazg et al., 2011). For example, Brazg et al., (2011) reported that young people explained that social media was an important risk factor for youth substance use, in a way that was previously unaddressed in the literature. Young people were also skilled at engaging community members at all levels by creatively sharing their research findings (Brazg et al., 2011). Whether through contributing digital interviews to a community history archive (Rogers, Morrell, & Enyedy, 2007), creating documentaries or rap videos, young people prioritized making research publicly available, going beyond traditional means of communicating findings in reports or peer-reviewed journal articles (Bautista et al., 2013).

Finally, studies reported research benefits in the form of opportunities to challenge dominant narratives. Young people challenged adults to view youth as serious and professional researchers (Arches, 2012; Sanchez, 2009), to recognize and suspend their own biases about the topics under study (Brown, 2010), and to appreciate the complexities of youths' views about the problems they experienced in real-world settings (Reich et al., 2015). Partnering with youth for research also challenged dominant research paradigms, integrating activism rather than only prioritizing objectivity (Rogers et al., 2007) and changing perspectives of research as something that is

done to youth to something that is done with them (Fox & Fine, 2013).

It is worth noting that, although many studies reported research benefits associated with youth participation, such collaboration with youth did not come without some challenges. Researchers said, that at times, youth were not taken seriously within adult-led systems; they also reported that successfully involving young people as co-researchers required a great investment of time by adult supporters (White, Shoffner, Johnson, Knowles, & Mills, 2012; Wilson et al., 2007).

Lastly, at the exo-system level, we coded one outcome: policy adoption.

Policy Adoption

Fourteen percent of studies reported that one or more policies had been adopted as a result of engaging with youth in inquiry. Three studies reported policy changes at the school district level, including passage of a wellness policy aimed at increasing access to healthy foods and more options for physical activity (Yoshida et al., 2011), broadening salad options within school cafeteria lunches (Mitra & Serriere, 2012), and allowing distribution of condoms at school-based health centers and other health-related events (Suleiman et al., 2006). Three studies reported city-level policy changes: a moratorium on drive-through fast food restaurants (Yoshida et al., 2011), an ordinance that restricted temporary advertising on storefronts, such as tobacco and alcohol product discount advertisements (Ross, 2011), and the addition of two bus routes to facilitate easy access to recreation facilities (Walker & Saito, 2011).

What are the Approaches and Methods that Have Been Used in Studies of Youth Inquiry That Reported Environmental Outcomes

The authors of the studies that included environmental outcomes used a variety of terminology to describe their approach to youth inquiry. The approaches, listed in order of frequency, included: participatory action research, youth participatory action research, youth-led research, community-based participatory research, youth organizing, youth leadership, student voice, action research, youth engagement, youth organizing, youth-adult partnership, self-directed group work, and participatory photo mapping. Participatory methodologies including participatory action research, youth participatory action research, and youth-led research were among the most commonly used terms (52.8%). Community-based participatory research was used in four studies (11.1%) by authors to describe their approach to youth inquiry. The remaining papers

36.1% of papers reported a range of other approaches and were grouped into the "other" category.

The subset of papers about youth inquiry approaches which reported environmental outcomes primarily used qualitative designs (64.7%, see Table 2), illustrating the importance of including all types of methods in this review. A smaller number of studies utilized mixed methods (29.4%), and only one used exclusively quantitative approaches (2.9%). In terms of study design, a majority were case studies (61.9%), with only a few randomized trials (9.5%) or quasi-experimental studies (4.8%). However, a research design was not explicitly stated in 15 of the included studies and was coded as missing. Most studies used multiple forms of data to triangulate findings, with observations (64.5%) and interviews (61.3%) being the most popular. Likewise, studies drew on several sources of data, such as information from youth working on the project (93.9%) and project adult staff (45.5%).

Does the Reporting of Environmental Outcomes Vary by Characteristics of the Study or Project?

We used Fisher's exact test of independence and t-tests of means to consider whether the studies reporting environmental outcomes differed from the studies that did not, based on the characteristics of the study or project. However, before presenting the results, it may be helpful to provide some background context by describing the general characteristics of all of the studies and projects included in this review (Table 3).

The vast majority of studies provided specific and concrete examples of what the principle of participatory (93.7%) and transformative (88.9%) looked like. In terms of topics that the projects addressed, the most common was education (50.0%), followed by social inequalities (40.0%), health (31.7%), violence and safety (25.0%), resources for youth (10.0%) or other issues (18.3%). Fifty-seven of the 63 studies provided details about the method of social action used by participants, 82.5% of which used an education and awareness approach, 43.9% used advocacy, and just 15.8% reported using organizing. The target audience for these social actions were schools and community organizations (58.6%), social networks (e.g. peers & family, 58.6%), followed by policy-makers (39.7%) and the academy (39.7%). Of the 38 studies that reported project meeting frequency, they met a mean of 1.6 times a week ($SD = 1.20$, Min 1, Max 5). Of the 42 studies that reported project length, they met a mean of 60.1 weeks, with a median and mode of 36 weeks ($SD = 50.0$, Min 5, Max 208). The most common setting for hosting projects was schools (58.9%), followed by community organizations (26.8%), and universities (14.3%).

Table 2 Approaches, methods, and designs subset of studies with environmental outcomes $N = 36$

	n (%)
Approach to inquiry ($N = 36$)	
PAR, YPAR, or variant	19 (52.8)
CBPR	4 (11.1)
Other	13 (36.1)
Methodology ($N = 34$, 2 missing)	
Qualitative	22 (64.7)
Quantitative	1 (2.9)
Mixed	10 (29.4)
Design ($N = 21$, 15 missing)	
Ethnography	4 (19.1)
Grounded Theory	4 (19.1)
Phenomenology	0 (0.0)
Randomized trial	2 (9.5)
Quasi-experimental	1 (4.8)
Pre- and post-test	0 (0.0)
Case study	13 (61.9)
Cross-sectional	0 (0)
Longitudinal	2 (9.5)
Data type ($N = 31$, 5 missing)	
Administrative	2 (6.45)
Survey	10 (32.3)
Archival/artifacts	15 (48.4)
Observations	20 (64.5)
Interviews	19 (61.3)
Focus group	19 (32.3)
Photos or video	3 (9.7)
Other (e.g. reflections, social network analysis)	3 (9.7)
Data source ($N = 33$, 3 missing)	
Youth involved in inquiry	31 (93.9)
Non-participant youth	10 (21.2)
Program staff	15 (45.5)
Community members	2 (6.1)
Partner	8 (24.2)
Parent or caregiver	0 (0)

When comparing studies that reported environmental outcomes to those that did not, differences were not statistically significant for the labeling of the projects as YPAR, the topic of the youth's inquiry, the project setting, study methodology, study design, or data type. However, the studies that provided concrete and specific examples of transformative social action were more likely to report environmental outcomes (64.3% compared to 0% of those that did not, $p < .01$). Similarly, the method of social action employed by participants was related to reporting environmental outcomes. Approaches that utilized advocacy (84.0%) or organizing (88.9%) were more likely to report an impact on the environment than those which used an education and awareness strategy only (61.7%, $p < .01$). The target audience for the inquiry's method of social action was also related to the likelihood that a study reported environmental outcomes. When policy-makers or representatives of schools/organizations were the target audience, studies were more likely to report environmental outcomes (82.6% and 73.5%,

Table 3 Environmental outcomes by study

Reference	Youth N	Type of youth inquiry	Methods	Design	Data type	Policy development	Program/ service development	Practitioner growth	Research benefit	Peer group norms
Arches (2012)	10	Self-directed groupwork	Qualitative	Case study	Missing	0	0	0	X	0
Bautista et al. (2013)		PAR	Qualitative	Ethnography	Archival/artifacts, Observations, Interview, Photos/videos	0	0	0	X	0
Berg et al. (2009)	316	Youth action research	Mixed	Quasi-experimental	Survey, Archival/artifacts, Observations, Interview, Focus group	0	X	0	0	0
Bertrand (2014)		YPAR	Qualitative	Ethnography	Observations, Interview	0	X	X	0	0
Borgida, Worth, Lippmann, Ergun, and Farr (2008)	1,456	Deliberation	Quantitative		Survey	0				0
Brazg, Bekemeier, Spigner, & Huebner (2011)	9	PAR	Qualitative		Archival/artifacts, Observations, Photos/videos	0	X	0	X	0
Brown (2010)	9	Action research	Qualitative	Ethnography	Archival/artifacts, Observations, Interview	0	0	X	X	0
Cammarota and Romero (2009)[1]		PAR	Mixed		Survey, Archival/artifacts, Observations, Interview					
Cammarota and Romero (2011)[2]		PAR	Mixed		Survey, Archival/artifacts, Observations, Interview	0	X	0	0	0
Christens & Dolan (2011)	20	Youth organizing	Qualitative	Case study	Archival/artifacts, Interview	0	X	X	0	0
Conner and Strobel (2007)	2	Youth leadership	Qualitative	Grounded theory, Case study	Observations, Interview, Focus group	0	X	X	0	0
De Jesús, Oviedo, and Feliz (2015)	12	Youth organizing	Qualitative		Interview	0	X	0	0	0
Dzewaltowski et al. (2009)	2,211	Youth-adult partnership	Quantitative	Random clinical trial, Longitudinal	Survey	0	0	0	0	X
Fox and Fine (2013)	40	PAR	Qualitative		Archival/artifacts, Observations, Interview	0	0	0	X	0
Frerichs et al. (2015)	74	Youth advocacy	Mixed		Administrative, Survey, Archival/artifacts, Observations	0	X	0	0	X
Galletta and Jones (2010)	33	PAR	Qualitative		Archival/artifacts, Observations, Interview, Focus group	0	X	X	0	0
Gant et al. (2009)	26	Civic engagement through photovoice	Quantitative	Pre and post, one group	Survey					

Table 3. Continued

Reference	Youth N	Type of youth inquiry	Methods	Design	Data type	Policy development	Program/service development	Practitioner growth	Research benefit	Peer group norms
Garcia, Mirra, Morrell, Martinez, and Scorza (2015)		YPAR	Qualitative	Ethnography, Grounded theory	Archival/artifacts, Observations, Interview, Photos/videos, Other					
Gomez and Ryan (2016)	10	YPAR	Qualitative		Interview	0	0	0	X	0
Hamilton and Flanagan (2007)	12	Youth activism	Qualitative		Survey, Observations, Interview, Focus group					
Harden et al. (2015)		PAR; Restorative practice	Mixed	Grounded theory, Pre and post, one group	Survey, Interview					
Hope, Skoog, and Jagers (2015)	8	YPAR	Qualitative		Interview					
Horn (2014)	8	Action research	Qualitative	Ethnography	Archival/artifacts, Observations, Interview, Focus group					
Irizarry (2011)	7	YPAR	Qualitative	Ethnography, Grounded theory, Phenomenology	Archival/artifacts, Observations, Interview					
Jones, Warnaar, Bench, and Stroup (2014)	781	Social action	Mixed		Survey, Observations, Interview					
Kirshner, Pozzoboni, & Jones (2011)	9	YPAR	Qualitative	Grounded theory	Archival/artifacts, Observations, Interview					
Kirshner (2009)	8	Youth organizing	Qualitative	Ethnography	Archival/artifacts, Observations, Interview	0	X	0	0	0
Kohfeldt and Langhout (2012)	16	YPAR	Qualitative	Ethnography	Observations					
Kroeger et al. (2004)	6	Action research	Qualitative		Archival/artifacts, Interview					
Kulbok et al. (2015)	2	CBPR	Qualitative		Interview		X	0	X	0
Langhout et al. (2014)	11	YPAR	Mixed		Interview, Other		0	0	0	X
McIntyre et al. (2007)		PAR	Qualitative	Grounded theory	Observations, Other		0	X	0	0
Hilfinger Messias, Jennings, Fore, McLoughlin, & Parra-Medina (2008)	32	PAR	Qualitative		Focus group, Photos/videos					

Table 3. Continued

Reference	Youth N	Type of youth inquiry	Methods	Design	Data type	Policy development	Program/service development	Practitioner growth	Research benefit	Peer group norms
Mitra (2004)[1]	43	Student voice	Mixed	Grounded theory, Case study	Administrative, Survey, Archival/artifacts, Observations, Interview	0	X	X	0	0
Mitra (2005)[2]	16	Student voice	Qualitative		Administrative, Archival/artifacts, Observations, Interview				0	0
Mitra and Serriere (2012)	6	Student voice	Qualitative	Case study, Longitudinal	Archival/artifacts, Observations, Interview, Focus group	X	0	0	0	0
Noonan (2015)	4	YPAR	Qualitative		Observations, Interview					
Otis and Loeffler (2006)		Youth leadership & social change	Mixed	Case study	Survey, Observations, Focus group	0	X	0	0	0
Ozer and Douglas (2013)[1]	398	Youth-led participatory research	Mixed	Random clinical trial	Survey, Observations, Interview, Focus group					
Ozer, Newlan, Douglas, and Hubbard (2013)[2]	78	Youth-led participatory research	Qualitative		Observations, Interview, Focus group					
Ozer, Ritterman, and Wanis (2010)	32	Youth-led participatory research	Qualitative	Case study	Observations, Interview, Focus group					
Ozer and Wright (2012)[3]	29	YPAR	Qualitative		Observations, Interview, Focus group	0	X	X	0	0
Phillips, Berg, Rodriguez, and Morgan (2010)	35	PAR	Qualitative	Case study	Archival/artifacts, Observations, Interview					
Pritzker, LaChapelle, and Tatum (2012)	30	CBPR	Mixed	Quasi-experimental	Survey, Focus group					
Reich et al. (2015)	14	CBPR	Mixed	Grounded theory, Case study	Survey, Archival/artifacts, Observations, Photos/videos	0	0	X	X	0
Rogers et al. (2007)	25	Community of practice	Mixed			0	0	0	X	0
Ross (2011)	20	CBPR	Qualitative	Case study	Archival/artifacts, Observations	X	0	0	0	0
Schaafsma, Tendero, & Tendero (1999)	14	Dialogue								
Scott, Pyne, and Means (2015)	13	YPAR	Qualitative	Grounded theory, Case study	Observations, Interview					
Smith, Bratini, and Appio (2012)	7	YPAR	Qualitative	Case study	Focus group					
Smith, Davis, and Bhowmik (2010)	9	YPAR	Qualitative		Focus group	0	X	0	0	0

Table 3. Continued

Reference	Youth N	Type of youth inquiry	Methods	Design	Data type	Policy development	Program/service development	Practitioner growth	Research benefit	Peer group norms
Suleiman et al. (2006)	26	Youth-led research	Mixed	Case study	Survey, Interview, Other	X	X	0	0	0
Taines (2012)	13	School activism	Qualitative		Observations, Interview	.	.	.	.	.
Teixeira (2015)	10	Participatory photo mapping	Qualitative		Observations	0	X	0	0	0
Torre (2009)	100	PAR	Qualitative	Case study	Observations	0	0	0	X	0
Turner, Hayes, and Way (2013)	2	PAR	Qualitative	Ethnography, Grounded theory	Archival/artifacts, Observations, Interview					
Voight (2015)	1165	YPAR	Mixed	Case study	Survey, Archival/artifacts, Observations, Interview	0	X	X	0	X
Wagaman (2015)	8	PAR	Qualitative		Archival/artifacts, Observations, Focus group					
Walker and Saito (2011)		Youth-led research and mapping	Qualitative	Case study	Archival/artifacts, Interview, Focus group	X	X	X	X	X
White et al. (2012)	10	Youth-led research				0	0	0	X	0
Wilson et al. (2007)[1]	122	CBPR	Qualitative			0	0	0	X	0
Wilson, Minkler, Dasho, Wallerstein, and Martin (2008)[2]	122	CBPR								
Wright and Mahiri (2012)	8	Youth-led participatory action research	Qualitative	Case study	Archival/artifacts, Observations, Interview, Focus group					
Zenkov et al. (2014)	90	YPAR	Qualitative		Survey, Archival/artifacts, Photos/videos, Other					
Zimmerman, Stewart, Morrel-Samuels, Franzen, and Reischl (2011)	60	Youth empowerment & community development	Mixed		Administrative, Survey, Archival/artifacts, Observations, Focus group					
Sanchez (2009)	3	PAR	Qualitative		Focus group	0	0	X	X	0
Yoshida et al. (2011)	36	Youth engagement	Qualitative		Focus group	X	0	0	0	X

Superscript indicates multiple records from the same study.

respectively) than if the target audience was the general public (60.0%), participants' social networks (58.8%), or researchers (65.2%). Finally, studies reporting environmental outcomes tended to have met for a greater number of weeks (70.8 weeks compared to 43.1, $p < .10$).

Discussion

This review's findings demonstrate how studies of youth inquiry approaches in the United States have reported positive, and in many cases, lasting changes in their environments, including their schools, neighborhoods, and communities. We conceptualized these outcomes within an ecological system theoretical framework including micro, meso, and exo-systems change. Despite the considerable structural barriers that young people face when advocating for themselves and their needs, many studies using youth inquiry approaches reported that youth were successful in transforming their larger communities.

At the micro-system level, a third of the studies in this review reported that adult facilitators gained a new appreciation and understanding of youths' skills and abilities. Adults, working side by side with youth to conduct research and engage in action, consistently reported that they were impressed and enriched by youths' abilities to participate in these projects as equal partners. Engaging in inquiry with youth, therefore, represents an opportunity to help adults challenge, extend, and transform their beliefs about the capacities of young people.

Projects were associated with changes to peer group norms and attitudes. Young people, beyond those who participated in the project, changed their perspectives on physical health, social connection, and awareness of resources. Engaging in inquiry with youth may, therefore, extend benefits to peers in schools and other host organizations. Thus, investment in programming for a smaller subgroup may permeate the larger community of peers.

At the meso-system level, groups that engaged in youth inquiry reported changes in programming for youth and challenged traditional conceptions of knowledge production. New programs were developed that addressed specific unmet needs of young people within organizations, diversifying the ways that organizations supported youth. The increased responsiveness to young people's needs that resulted from inquiry with youth echoes the results of Catalani and Minkler's (2010) synthesis of studies on photovoice, which found that such projects led to "improved understanding of community needs" (p. 443). Programs were also created or modified to incorporate greater youth voice by institutionalizing roles for youth in decision-making positions or in communicating with decision-makers in agencies. In this way, engaging youth in

inquiry may have led to improvements in both the quantity and quality of programs supporting young people. These organizational level findings are consistent with the recent integrative review by Shamrova and Cummings (2017) on PAR with youth which reported process-oriented environmental change, such as youth involvement in efforts to raise community awareness. Our findings extend this prior work by articulating outcomes to organizations, schools, and the research community associated with these processes.

This review is also unique in its scope, including not only studies which explicitly describe their approach as PAR, but also studies which use other language to describe the ways they engaged in youth inquiry. A majority (52.8%) of the studies described their methods as participatory action research, 11.1%, described their methods as community-based participatory research, and the remaining 36.1% used other language, (e.g., "student voice"). The sample, therefore, includes a broad snapshot of the scholarly literature on young people engaged in inquiry in the United States. The language used to describe the study methods was not associated with increased environmental outcomes, suggesting that youth inquiry approaches utilizing a diversity of methods and epistemological orientations can empower young people to make changes in their communities.

This review also extends Shamrova and Cummings' (2017) integrative review by capturing the myriad ways in which youth involvement enhances researchers' empirical understanding of their topics of inquiry. More than a quarter of the studies that reported environmental outcomes described how involving youth in research improved the depth, validity, and quality of the data. This finding runs parallel to that reported within Catalani and Minkler's (2010) review, which found that photovoice projects tended to involve hard-to-reach populations and led to improved relationships between researchers and community members. Researchers who are studying the implementation of youth inquiry also benefit from their involvement. These findings explicate the way that this form of research can itself be praxis. Inquiry with youth can have both catalytic (Lather, 1986) and impact (Massey & Barreras, 2013) validity in which the process changes those participating in the inquiry and findings are used as part of broader political advocacy and scientific discovery.

Finally, at the exo-system level, consistent with the action research model, several studies reported youth policy advocacy and adoption. Similar to findings from a systematic review of research on photovoice projects (Catalani & Minkler, 2010), this study documented that youth involved in inquiry advocated for policy changes such as healthier food options in their school cafeterias or

better transportation services in their neighborhoods and cities. Engaging in inquiry with youth appears to offer participants unique opportunities to learn about the policy-making processes of their communities and how to influence systems. Projects that targeted policy-makers or representatives of schools/organizations were more likely to report environmental outcomes, suggesting that communicating directly with decision-makers is a meaningful vehicle for policy change. Engaging in inquiry with youth, therefore, offers opportunities for youth to become skilled advocates for themselves, their peers, and their communities.

Limitations

There are several important limitations to this systematic review that require cautious interpretation of our study findings. Although we used a relatively broad set of search terms across four databases over twenty years, this study was limited to peer-reviewed studies and did not include any gray literature or book chapters, excluding potentially relevant work reported in non-peer reviewed sources, such as reports on agency websites. The exclusion of other dissemination mechanisms likely resulted in an underreporting of environmental outcomes associated with youth inquiry approaches. Importantly, youth inquiry approaches conducted in community or school settings without institutional support (e.g., funding or access to institutional review boards) may be uninterested in, or less likely to publish in empirical journals. Tensions related to data ownership may have further complicated the reporting of environmental outcomes. In obtaining institutional review board approval for youth participatory action research, for example, an academic researcher may have had to create distinctions between what is owned by the youth and what can be published. Importantly, academic researchers partnering with community-based organizations and schools are but one form of engaging in inquiry with youth.

Furthermore, to confine our study sample to those within the U.S. socio-political context, we did not include studies outside the U.S., even though participatory methods originate from Latin America. We recognize that the use of inquiry with youth as a method, program model, paradigm, and epistemology extend far beyond what was included in this review. We decided to limit our search to empirical studies published in academic journals to strengthen readers' confidence in the findings. As a result of this decision, our review may reflect publication bias in reporting of positive outcomes associated with inquiry with youth. This concern is tempered by our decision to include studies even if they did not describe concrete outcomes.

Similarly, we did not assess the risk of bias in the studies included in the review, primarily because we had difficulty finding rubrics applicable to the diverse methodologies included in our sample. More importantly, the goal of this systematic review was to comment on the state of the current literature, not to judge the rigor of the methodology of each study in the context of their results. Another limitation of our study is the preponderance of missing data. In many manuscripts, it was not possible to determine basic components of the study, like design and number of participants. Given the lack of detailed information about analytical approaches in many manuscripts, we were only able to group studies by research design and were therefore unable to draw more detailed conclusions or highlight some of the innovative approaches in the sample. This may have skewed our results, as studies that provided more systematic descriptions of their methods may have been different from those who do not in ways that we could not measure. In our study, we recorded the degree to which a study provided examples of the way that youth and adults shared power, but we were not able to assess the degree to which a youth inquiry approach engaged youth in each stage of the research process due to limited information regarding power-sharing.

Finally, with the purpose of synthesizing and identifying patterns across a broad literature, our systematic review required us to simplify information from studies into categories; this inadvertently required us to leave out detailed, complex information about youth inquiry processes and contexts. By beginning our systematic review process based on the PRISMA guidelines, our work was based, in part, on a post-positivist perspective. However, honoring the inherent messiness, contextualized, critical nature of youth inquiry work, we deliberately developed a coding framework that embraced a constructivist epistemology that did not privilege any one form of knowing and was deliberately inclusive. This mixing of epistemologies resulted in missed nuances of individual studies but allowed for a summary of trends across the youth inquiry literature broadly.

Conclusions and Implications

The findings of this review have methodological implications for how researchers measure the environmental impact of youth inquiry. Scholars intending to publish studies of inquiry with youth may want to consider how to measure impact, not simply on youth participants, but across the ecology of systems in which these projects are embedded. Additional tools are needed to effectively capture environmental outcomes at different levels of systems

(e.g., Foster-Fishman & Watson, 2012). Given the complex nature of environmental change, and the potential of youth inquiry approaches, more scholarship is needed. In terms of topics that future research might address, a particularly worthy area of study would be to assess whether recent innovations in youth inquiry approaches that involve the use of social media and social networking, also serve to enhance environmental impact (Kia-Keating, Santacrose, & Liu, 2017; Kornbluh, Neal, & Ozer, 2016).

The majority of the studies reviewed were conducted since 2009. With this increase in empirical work on inquiry with youth, there is an opportunity to begin utilizing common reporting language. Of note, many studies in this review did not report or fully describe key information about the adult's role, study design, and youth characteristics. Missing or vague information prevented us from understanding how these elements impacted environmental outcomes. There is a need for nuanced and "thick" descriptions (Ryle, 1971) in studies of youth inquiry approaches that captures the complexities of the process. It is paramount to explain how fundamental issues, such as power, are navigated and may influence outcomes (e.g., Fox, 2013; Stoudt, 2007). As Catalani and Minkler (2010) observed in their systematic review, more complete study reporting of samples, designs, and measurement would allow researchers to make comparisons across projects and draw conclusions about project impacts.

The findings in this review also offer potential insights on how to improve the effectiveness of inquiry with youth as a strategy for environmental change, with implications for project design and implementation. Our review found that groups that met for a longer period of time were more likely to report environmental outcomes. This finding aligns with the claims of other scholars, who have suggested that PAR programs should be extended beyond the academic year in order to ensure that youth meet their transformative goals (Kirshner & Pozzoboni, 2011). Giving youth more time to establish group cohesion, select a realistic goal, collect adequate information, and engage in action or advocacy, would likely allow youth to be more effective in constructing new realities. For some youth populations, particularly those with low resources, such as youth experiencing homelessness or transience, such prolonged engagement may create challenges. Future work should explore alternative ways to keep young people engaged over time by considering technology as a tool for continued contact (e.g., Buccieri & Molleson, 2015; Kornbluh et al., 2016).

In addition to projects with longer durations, studies, in this review, which targeted policy-makers were more likely to report environmental outcomes, suggesting that youth may benefit from more support in selecting strategic decision-makers and audiences for their advocacy efforts.

Similarly, youth inquiry projects that engaged young people in advocacy and organizing efforts as a method of social action were more likely than those using education and awareness to report environmental outcomes. This finding should encourage people engaging in inquiry with youth to extend their change efforts beyond awareness-building and education whenever possible. This is not to say that creating community awareness is not important, in its own right; however, it may be that awareness building and education approaches, particularly with community members who do not have decision-making power, are too diffuse to register an observable environmental impact. In contrast, advocacy and organizing methods often involve a specific target, with more easily captured changes than more subtle gains in awareness.

This systematic review suggests that youth inquiry is a promising approach to youth engagement and transformative, multi-level, community change being used across a wide array of academic disciplines. With an intentional focus on systems-level change, engaging in inquiry with youth can shift adults' thinking, increase relevance of youth programs, support new health-enhancing policies, amplify research, and create healthier norms among young people in communities.

This review stands as a historical snapshot of twenty years of published studies of youth inquiry. Findings reported here indicate that the investment of time and resources in conducting and studying youth inquiry approaches may be worthwhile. Such efforts are likely to bring youth from the margins to the center where they are recognized as legitimate change-makers in schools and communities.

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*Asterisk denotes a study that was included in the systematic review

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