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# "Working together as a team really gets them fired up": Afterschool program mentoring strategies to promote collaborative learning among adolescent participants

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**ABSTRACT**

Opportunities for collaborative learning reflect positive peer processes that have strong implications for adolescents' developmental experiences in afterschool programs (ASPs). However, collaborative learning, which involves considering multiple viewpoints and coordinating actions with peers to accomplish a shared goal, is often difficult for adolescents to navigate. Utilizing qualitative methods, the purpose of this study was to identify ASP mentoring strategies that promote collaborative learning among adolescent participants. Based on the experiences and perspectives of college student mentors who serve as frontline staff of a math enrichment ASP for Latino/a middle school students, we identified four mentoring strategies that promote collaborative learning: (1) nurturing personal connections with and among youth, (2) establishing positive group norms, (3) strategically splitting groups and work, and (4) modeling collaborative behaviors. These strategies reflect best practices that frontline staff can utilize to promote adolescents' collaborative learning, skill development, and engagement in ASPs. Practical implications and directions for future research are discussed.

Collaborative learning is an educational approach to teaching and learning that involves a group of learners working together to accomplish a shared goal (Laal & Ghodsi, 2012, p. 486). Collaborative learning supports active learning, critical thinking, and problem-solving skills (Johnson et al., 2014; Laal & Ghodsi, 2012; Wentzel & Watkins, 2002). The reciprocal exchange of ideas and learning of new perspectives through collaborative learning promotes adolescents' academic motivation, engagement, and achievement (Ryan, 2000). Socially, collaborative learning can equip adolescents with essential social-emotional competencies for navigating the "real world" including working cooperatively with peers, communicating effectively, and settling on agreements by finding common ground (Larson et al., 2005, 2011), which are consistently regarded as among the most critical twenty-first century skills (Partnership for 21st Century Skills, 2011).

Although the processes and benefits of collaborative learning in schools are well-documented (Johnson et al., 2014; Wentzel & Watkins, 2002), much less is known about youth's experiences in out-of-school contexts such as afterschool programs (ASPs). ASPs are enriching contexts for collaborative learning and provide a more conducive context for the development and practice of social-emotional skills, such as working together with peers, compared to more structured, formal school settings (e.g., Devaney & Moroney, 2018; Larson et al., 2006; Vandell et al., 2015). However, collaborative learning, which involves considering multiple viewpoints and coordinating actions with peers to accomplish a shared goal, is often difficult for youth to navigate (Larson et al., 2011; Smith et al., 2016). Though ASP frontline staff can help support collaborative learning among youth participants (Smith et al., 2016), frontline staff face many challenges, such as meeting the needs of individual youth and the peer group (Larson et al., 2016; Larson & Walker, 2010). Therefore, the purpose of this study was to identify and understand best practices with regards to the strategies that college student mentors, as frontline staff, used to promote collaborative learning in a math enrichment ASP for underprivileged Latino/a adolescents.

## Collaborative learning in ASPs

The importance of collaborative learning is based on a social constructivist perspective that development is

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relational, built around interactive, dynamic activities that suggests youth learn better when they learn together (Vygotsky, 1978). In this youth-centered view of development, learning is fundamentally relational and thus a collaborative process. Social interdependence theory (Deutsch, 1962) builds on the social constructivist perspective to say that specific elements of the task and individuals involved in the task are critical in promoting collaborative learning. These elements include positive interdependence (e.g., mutual goals), promotive interactions (e.g., encouragement), individual accountability (e.g., responsibility), social skills (e.g., teamwork), and group-level processing (e.g., reflection; Johnson & Johnson, 2009; Laal & Ghodsi, 2012). These elements allow youth to work together to maximize their own and each other's learning.

ASPs are ideal settings for collaborative learning in addition to promoting specific outcomes (e.g., academics). Indeed, while developing adolescents' skills to work together with peers has been described as part of the "hidden curriculum" of programs (Jarrett, 1998), ASPs have moved toward the explicit promotion of these skills (Devaney & Moroney, 2018; Hurd & Deutsch, 2017). When goals for collaborative learning are specified in the program curriculum, youth are more likely to exhibit collaborative behaviors. For example, the small-group, project-based, experiential learning nature of activities facilitates collaborative learning as youth work toward shared goals (Vandell et al., 2015). Although scholars have argued that positive peer processes, including collaborative learning, can be leveraged to promote positive youth development in ASPs, few have studied collaborative learning or many other peer processes within ASPs (e.g., Donlan et al., 2015; Fredricks & Simpkins, 2013). Given the importance of peers for collaborative learning and development more broadly, more work is needed to understand how ASPs support positive peer processes, in this case collaborative learning peer processes.

## Best practices for collaborative learning: The role of ASP frontline staff

The National Research Council's (NRC) Committee on Community-Level Programs for Youth identified certain features of programs that promote positive youth development in ASPs (Eccles & Gootman, 2002). This seminal work has guided research on ASPs and specific program quality features that not only reduces youth's problem behaviors but also promotes their psychosocial and academic competencies (Durlak et al., 2010; Vandell et al., 2015). Frontline staff practices are one important feature of program quality as they affect student outcomes directly and indirectly, such as by shaping peer processes (e.g., Hurd & Deutsch, 2017; Kuperminc et al., 2019).

Larson and Walker (2018) have argued that frontline staff play a critical role in promoting collaborative learning among youth. From their perspective, youth are active producers of their own learning and development. To help facilitate collaborative learning processes for youth, frontline staff cannot directly teach youth. Instead, frontline staff can use guided participation and scaffolding to help youth develop skills to productively work with and achieve shared goals with their peers. Importantly, to promote effective collaborative learning processes, frontline staff need to adapt and provide scaffolding in multiple ways that is responsive to youth's learning in a peer group environment and developmental needs (Larson & Walker, 2018).

According to self-determination theory, adolescents' learning and engagement in ASPs are driven by three developmental needs: autonomy, competence and relatedness (Deci & Ryan, 2012; Eccles & Gootman, 2002). The frontline staff of ASPs are well-positioned to promote collaborative learning and, in the process, engaging these developmental needs (Eccles & Gootman, 2002; Hurd & Deutsch, 2017). ASPs are often youth-centered such that adolescents actively participate and create their own experiences (Larson et al., 2016). Frontline staff play more of a supportive and facilitating role at youth's lead, thereby reinforcing adolescent autonomy. This youth-centered approach can facilitate adolescents' active and sustained collaboration with peers and initiative by fueling their sense of accountability and personal responsibility (Larson et al., 2005; Salusky et al., 2014). Such approach also enables adolescents to work with their peers, guided by frontline staff, while also developing and mastering competence-related skills (e.g., inquiry, critical thinking; Vance, 2018). Moreover, ASPs provide a powerful relational context for adolescents' developing prosocial identities (Deutsch, 2005), where frontline staff can minimize relational distance and promote active inclusion among adolescents to facilitate positive peer processes (Jones & Deutsch, 2011). When done effectively, frontline staff can create collaborative learning processes that lead to a program climate where adolescents feel respected, connected, accepted, and valued by individual members of a collective group (Deutsch, 2005; Griffith & Larson, 2016), thereby promoting a sense of relatedness. Taken together, there are *general* frontline staff best practices that can create conducive conditions

for collaborative learning among adolescent participants in ASPs. The effectiveness of these practices is based in part on their engagement of adolescents' developmental needs.

Preliminary research suggests *specific* frontline staff practices that can cultivate and facilitate collaborative learning among adolescent participants of ASPs. For example, Larson (2007) described cultivating an "ethos of helping" which involves frontline staff encouraging youth to see each other as sources of support and connection. Similarly, Salusky et al. (2014) described the importance of reinforcing youths' shared ownership and collective agency to promote collaborative learning. By fostering trust and a sense of solidarity among youth, frontline staff can cultivate a program climate in which youth feel physically and psychologically safe to engage in collaborative learning activities (Larson, 2007; Salusky et al., 2014). To facilitate collaborative learning activities, frontline staff can provide intermediate structures (e.g., realistic goals and timelines) and monitoring to keep youth on track to accomplish shared tasks as well as play an important role in modeling teamwork skills to enhance positive peer processes among youth (Larson, 2007; Smith et al., 2016).

Overall, despite the important role that frontline staff play in promoting collaborative learning, to date, very few studies have examined collaborative learning in ASPs and the specific role that frontline staff play to support the learning process. As a result, the specific practices that frontline staff use to promote collaborative learning is largely unknown. To identify concrete best practices, it is essential for researchers to see ASPs from the point of view of frontline staff and to consider the decision-making processes and challenges involved in the promotion of youth learning and engagement (Larson et al., 2015).

## Collaborative learning in academic enrichment ASPs

Researchers have studied collaboration at global levels and suggest that not all programs are equally effective in promoting collaborative learning (Larson et al., 2006). This variation can be partly explained by the nature and affordances of different types of programs (Larson et al., 2006). Academic enrichment ASPs serve as ideal sites for studying collaborative learning because of their increasing focus on *both* social-emotional learning and academic enrichment (Devaney & Moroney, 2018).

Among academic enrichment ASPs, many are increasingly emphasizing science, technology, engineering, and mathematics (STEM) learning in part due to the stark underperformance of U.S. youth in math and science and the importance of these domains as fundamental skills (Allen et al., 2019; National Research Council [NRC], 2015). Research is emerging concerning the effectiveness of such programs, although much more is needed to identify critical aspects of programming that works (Allen et al., 2019; Durlak et al., 2010; Krishnamurthi et al., 2014). To this end, research has shown that collaborative learning could be leveraged as a resource for learning in these settings (Chittum et al., 2017; Mun & Hertzog, 2018; Sahin et al., 2013).

In addition to being important contexts for collaborative learning, academic enrichment ASPs can be a powerful way to counter educational inequities that students from traditionally marginalized communities including Latinos/as face in STEM. In 2015, eighth grade Latino/a students in U.S. public schools ranked over 20 points below White students in math and science standardized test scores (Alvarez et al., 2016). To help combat these negative trends, there is an increasing number of STEM enrichment ASPs that serve Latino/a youth, particularly those in high-need communities (Krishnamurthi et al., 2014). Research has shown that ASPs are successful in engaging and retaining large numbers of students from these communities in STEM (Krishnamurthi et al., 2014; NRC, 2015). Through meaningful opportunities for collaborative learning, ASPs can reinforce Latino/a youth's cultural assets and real-world applications of STEM learning activities which in turn can help promote their STEM motivation and achievement (NRC, 2015; Sahin et al., 2013). Importantly, for Latino/a youth, the effectiveness of collaborative learning activities is based in part on their endorsement of communal goals and the value of interdependence (Kupersmidt et al., 2018). More research is needed to identify specific ways of leveraging collaborative learning opportunities to effectively engage Latino/a youth in ASPs. Toward this goal, in the current study, we focused on identifying collaborative learning strategies in the context of a math enrichment ASP for underprivileged Latino/a adolescents.

## Current study

Given the dearth of research on collaborative learning processes in ASPs, the current study utilized qualitative methods to provide foundational knowledge and context related to identification of strategies for promoting collaborative learning. Qualitative methods can inform more ecologically sensitive data collection

as well as allow for in-depth examination of interpersonal processes in context (Stein & Mankowski, 2004). Based on the experiences and perspectives of college student mentors who serve as frontline staff of a math enrichment ASP for underprivileged Latino/a middle school students, the purpose of this study was to identify and understand best practices with regards to strategies that promote collaborative learning among adolescent participants. More specifically, we identified strategies mentors utilized to create conditions for collaborative learning and further examined how they helped to facilitate adolescents' engagement within the group and larger program context.

## The ASP context

Founded in 2014, the study context is one of the largest National Association of Math Circles (https://mathcircles.org) affiliated programs in the United States that provides education enrichment and outreach to students in the form of engaging, collaborative math learning activities. The program is a university-based ASP that serves approximately 150 students each year from two target middle schools in Southern California. Approximately 98% of the students are Latino/a and over 90% are free/reduced school lunch recipients. Only 15% of the students at these schools meet or exceed the state math standards. With the help of teachers in the target schools, students are recruited and selected into the program based on an application process that takes into account who teachers believe need and can benefit most from the program. As a result, a large proportion of participants in the program include students who struggle with math.

In the program, approximately 80 college students are recruited as mentors to serve as front-line staff (herein referred to as "mentors") for middle school students each year across three academic quarters (fall, winter, spring). College students are intentionally referred to as "mentors" as opposed to "tutors" or "staff" in the program to emphasize their role as potential role models for youth. Mentors are expected to form positive relationships with students, encouraged to share their experiences as college students, and show an interest in students' lives. They play a key role in making the program curriculum more applicable and relevant to students and lead weekly math enrichment activities that involve students working collaboratively in groups (6–10 middle school students and 2–3 mentors) to accomplish a shared task. Prior to each weekly session, the program offers training sessions through a university course where mentors work as a reflective team to develop strategies for engaging students in the activities, while at the same time, getting mentorship from professors and experts on math pedagogy and effective youth practice. While most mentors voluntarily attend the training sessions, some take the course for university credits.

The program aims to promote middle school students' basic mathematical understanding through collaborative learning activities, while also allowing natural connections to more advanced mathematical concepts. One example activity involves magic squares where students work together to complete a series of square grids with a special arrangement of numbers in them. At the beginning of the session, students are introduced to the definition of a three by three magic square, which is a three by three grid of numbers in which each row, column, and diagonal sum to the same number. Before starting the activity, mentors have students explain the activity in their own words. Mentors help facilitate this process by building on and connecting students' responses to each other. As the activity progresses, mentors move students toward a stronger understanding by facilitating problem-solving discussions among students and providing opportunities for mental math and for connections to other mathematical ideas. Together, students explore modifications of a given magic square that lead to other magic squares, such as adding a constant to each entry or rotating the magic square 90 degrees. The activities are designed to be completed through collaborative learning, as they have multiple entry points and allow for multiple methods of solutions, which encourage sharing of ideas, and yet lead to more advanced mathematical questions.

## Method

### *Participants*

As part of a larger research study conducted in the 2018–2019 academic year, 20 undergraduate mentors completed in-depth interviews during Spring quarter. Prior to the interviews, mentors completed pre- and post-program surveys. Mentors were purposively selected based on (a) how long they have been in the program (at least two academic quarters) and (b) changes in their relational self-efficacy, followed by (c) a range of mentor demographics that reflected the larger program mentor population (i.e., gender, race/ethnicity, first-generation college status, income, and area of study in college). Because one of the goals of

the larger study was to inform ASP staff training and best practices, mentors' perceptions of their relational self-efficacy (i.e., being able to effectively work with youth) was used as a sampling criteria. Based on an adapted version of the Youth Work Relational Self-Efficacy Scale (Akiva et al., 2017), we stratified experienced mentors based on whether their relational self-efficacy increased, decreased, or remained stable. Of the 20 selected mentors, 10 increased into the middle and high level range of the scale, 5 decreased into the lower range of the scale, and 5 remained relatively stable in the middle range of the scale.

The sample of 20 mentors were diverse according to the various demographic selection criteria. Nine mentors identified as Latino/a (45%), six as Asian (30%), two as White (10%), and three as mixed-race (15%). Mentors' ages ranged from 18 to 23 ($M = 20.25$). Twelve participants (60%) identified as female and eight (40%) identified as male. Nine participants (45%) identified as first-generation college students and 13 (65%) reported receiving federal student aid. Across the 20 participants, college majors and minors represented included math (33%), education (33%), physical science (33%; e.g., physics), engineering (15%), and others (20%; e.g., social sciences). Participants were paid $5 for each program survey they completed and $10 for an interview. All names in this study are pseudonyms which were selected by participants.

### In-depth interviews

During in-depth semi-structured interviews, interviewers asked mentors to reflect on their experiences as mentors and the strategies they used to engage students during program activities. Interviews lasted approximately 60 minutes and were conducted in English. The interview consisted of five sections: general questions about them (mentors), general program experiences, youth-staff relationships, outcomes and skills they developed, and a section on culture and context. While the entire interview protocol was utilized for analysis, we paid special attention to the sections on program experiences and youth-staff relationships which consisted of questions including but not limited to: "What has been the best part of the program for you? Favorite activities?," "Describe your relationship with your students," "What are some of the ways you try to connect with and engage your students during activities?," "What has been the most challenging part of being a mentor for you?," "What do you hope your student(s) learned from you?," and "Do you feel like you've gained or improved any skills as a mentor?" These parts of the interview accounted for about half of the interview protocol and lasted approximately 30 minutes. Although the interview protocol did not include direct questions about collaborative learning, mentors answered questions in response to the context of the program activities, which as previously described, were all collaborative learning activities. With this context in mind, to answer the current research questions, interviewers keyed into the specific strategies that mentors utilized to promote learning and engagement among their students. Interviewers were instructed to ask follow-up questions in order to allow for mentors to elaborate on their responses and provide specific examples. The first author and six graduate students conducted the interviews. Prior to the interviews, graduate students participated in qualitative interviewing workshops and feedback sessions led by the first author. The majority of the interviewers were women (86%) and racially identified as Asian and Pacific Islander (57%) and Latino/a (43%). All interviews were audio-recorded and transcribed using an online transcription service. The data that support the findings of this study are available on request from the first author. The data are not publicly available because they contain information that could compromise the privacy of the research participants.

### Plan of analysis

Analysis of interview data included a process of thematic analysis (Braun & Clarke, 2012) involving multiple researchers. First, as part of the larger study, researchers read through all of the interview transcripts and individually developed initial codes that reoccurred and appeared interesting and meaningful, while also memoing to begin developing overarching themes within the data. This step yielded initial codes related to strategies mentors used to promote collaborative learning among youth. These initial codes included "forming personal connections," "helping kids to work together," "promoting group goals," "balancing varying levels of mastery," "making youth lead," and "modeling collaboration," to name a few. Based on these initial codes, researchers conducted a more targeted analysis of transcripts to identify patterns and themes across the initial codes and across the transcripts. During this iterative process, we drew from theory and prior literature to help us contextualize the significance of the initial codes and subsequent themes. For example, "establishing positive group norms" involved critical aspects of collaborative

learning discussed by Johnson and Johnson (2009) as "positive interdependence." Further, "nurturing personal connections with and among youth" encompassed similar concepts described by Larson (2007) as staff cultivating an "ethos of helping." Once themes were identified and finalized, transcripts were coded by two different researchers using consensual qualitative research methods (Hill et al., 2005). The two researchers discussed coding decisions and arrived at a consensus regarding themes and key examples (see Table 1). To audit this analytical process, we sought informant feedback by consulting with interviewers as well as the mentors and coordinators from the program to corroborate the themes and key examples. It is important to note that our analytical process presented here reflects the overall purpose of the study: to identify specific strategies mentors used to promote collaborative learning. To contextualize the significance of these strategies, we discuss the various ways in which these practices created conducive conditions for collaborative learning for adolescent participants in the findings section below.

## Findings

Four overarching themes emerged representing strategies mentors utilized to promote collaborative learning among adolescent participants (see Table 1). Below we present these strategies and discuss the ways in which each strategy created conditions for collaborative learning. Themes and subthemes are italicized.

### *Nurturing personal connections with and among youth*

The first theme involves mentors *nurturing personal connections with and among youth* as a way to promote collaborative learning. This strategy helped mentors create a safe and responsive space for adolescents to engage in collaborative learning. While this strategy occurred organically between mentors and adolescents, it required time to be effective. For example, in reflecting on how he promoted his student's collaborative engagement, Si said:

> We talked about his childhood and about playing similar games. Over time we started to talk more and more … he started to be more comfortable talking and working with [other students] because I started talking to him personally.

For mentors, *nurturing personal connections with youth* occurred through a series of small and positive interactions with adolescents over time. However, mentors approached nurturing personal connections differently depending on the adolescents they were working with. Si, for example, leveraged sharing similar interests with his student to facilitate a personal connection. Other mentors focused more on developing trust with adolescents, which was particularly beneficial for mentors who worked with adolescents who were much more reserved. For example, Naomi said:

> I had one student who was super quiet and didn't say a word. I realized that she was being singled out. I started to work with her more personally so she can trust me first before we did group activities … it helped.

Naomi's response was representative of mentors' intentional and responsive efforts to nurture personal connections by getting to know adolescents on a personal level, adapting to adolescents' comfort levels, and providing adolescents with individualized support; thereby developing trust before engaging adolescents in collaborative learning activities.

In addition to personally connecting with youth, mentors also worked to *nurture personal connections among youth*. This strategy was often preceded and strengthened by mentors' personal connections with youth. Billy described his efforts to facilitate this process for adolescents:

> One of the ways I tried to connect and engage students was to actively talk to them and just try to make sure that they're all a part of the conversation. I try to connect what they say individually to each other and so they have a common thread to build off of.

Personal connections served as an important foundation for adolescents to further develop social-emotional skills (e.g., communication skills) they needed to engage in collaborative learning, while at the same time, providing confidence to mentors as facilitators of the learning process. This was alluded to by Frank when he described the process of engaging and nurturing personal connections with his students:

> [Connecting with and engaging students] was hard at first … but then as time progressed, it became a lot easier for me. There was a student who was very quiet, especially in the beginning. But I noticed towards the end of the sessions, she started saying her answers and actually started helping others … it made me want to keep that going like make sure she got the most out of the program.

For mentors like Frank, seeing the benefits of personally connecting with their students promoted their motivation and belief in their ability to facilitate adolescents' collaborative engagement. By taking the time to nurture personal connections with and among

**Table 1.** Findings: mentoring strategies to promote collaborative learning.

| Themes/Strategies | Sub-themes | Key examples (participant names are pseudonyms) |
|---|---|---|
| **Strategy 1:** Nurturing personal connections with and among youth | **1a.** Nurturing personal connections with youth | Si: We talked about his childhood and about playing similar games. Over time we started to talk more and more … he started to be more comfortable talking and working with [other students] because I started talking to him personally.<br><br>Naomi: I had one student who was super quiet and didn't say a word. I realized that she was being singled out. I started to work with her more personally so she can trust me first before we did group activities … it helped. |
| | **1b.** Nurturing personal connections among youth | Billy: One of the ways I tried to connect and engage students was to actively talk to them and just try to make sure that they're all a part of the conversation. I try to connect what they say individually to each other and so they have a common thread to build off of.<br><br>Daniel: My goal for the two boys who were shy was to get them to talk to each other more … overtime they just blossomed, especially in the math and teamwork skills. They were able to work with each other and work with other mentors, work with other groups, build community. |
| **Strategy 2:** Establishing positive group norms | **2a.** Setting expectations about group work | Peter: We set expectations from the very beginning in terms of my role for them and their role in the group.<br><br>Al: I try not to treat any student differently so that they know what I expect from them during the group activities … I expect them to contribute as part of the group. They expect me to be there to help them. We all have a stake. |
| | **2b.** Promoting shared goals | Si: During [activities], I try to make them focus on each other. It's about teamwork. Everyone wants others to be happy and has the same goal. The whole team is working as a group.<br><br>Emily: It's fun to help and see them help each other and work together, especially when we're all on the same page. Working together as a team to solve the problems really gets them fired up. |
| **Strategy 3:** Strategically splitting the groups and the work | **3a.** Strategically splitting the groups | Allison: One strategy is splitting the students into even smaller groups which is a lot more helpful for students to work together.<br><br>Emily: If there were two of us, we tended to split the group into smaller groups. Each mentor would just have two or three students. When we come back together as a big group, we would have the students explain. They're more likely to participate and take less time. |
| | **3b.** Strategically splitting the work | Peter: I had a student who was able to solve the problem immediately. Because they were able to solve it immediately, I took the opportunity to have the student share with the other students what they did.<br><br>Sam: Because certain students get certain concepts faster than the other students do. I try to make them explain it to each other. That way they are still engaged and play a leadership role at the same time. |

(*Continued*)

**Table 1.** Continued.

| Themes/Strategies | Sub-themes | Key examples (participant names are pseudonyms) |
|---|---|---|
| **Strategy 4:** Modeling collaborative behaviors | **4a.** Asking for help | Marie: When I don't understand something or am having trouble getting the kids to work together, I ask [another mentor] for help. I think the kids see that and they appreciate it because I don't always know the answers.<br><br>Al: [During group activities], sometimes you gotta lay down that law but you don't want them to not like you … so I just call [another mentor] to help me. It's good because the kids see that we are a team. |
| | **4b.** Working together and backing each other up | Naomi: I love that multiple mentors help out a group of people. I love that we do that and work together. And I love our focus is community building and growing relationships. I feel like the kids see that and try to emulate that in the groups.<br><br>Anna: It also helped me work with others, like the other mentors. We would work on problems together. When we struggled, we would try to come up with [solutions] together. It helped the kids see that we were backing each other up as a group. |

youth, mentors were better able to leverage positive peer interactions to promote collaborative learning and a sense of belonging and community among adolescents. Adolescents were encouraged by mentors to engage with their peers and to consider the larger group context as a safe and responsive space for collaborative learning.

### *Establishing positive group norms*

The second theme involves mentors *establishing positive group norms* with adolescents including *setting expectations about group work* and *promoting shared goals* to facilitate collaborative learning. With regard to *setting expectations about group work*, mentors described establishing these norms early and often. However, expectations were also flexible and often incorporated adolescents' perspectives: "*We* set expectations from the very beginning in terms of my role for them and their role in the group" and "*We* create the group rules *together* and go back to it anytime it's needed" (emphasis added). Importantly, the personal connections nurtured by mentors helped to facilitate this process by creating a safe and responsive space for adolescent input. It also helped mentors personalize appropriate norms for their individual groups.

Setting expectations or "rules" about group work with adolescents helped to promote personal responsibility and accountability for both mentors and adolescents. This was described by Al who said, "I expect them to contribute as part of the group. They expect me to be there to help them. We all have a stake." Like Al, many mentors described leveraging adolescents' contributions and commitment to the group as a way to promote their engagement in the learning activity. Setting expectations about group work also helped mentors promote a more welcoming and respectful relational climate in the program. Paul, for example, had the goal of helping his students "consider and welcome different points of view" while Toni tried to help her students "be nicer and more respectful with another one." Importantly, mentors described being consistent in reminding adolescents of group expectations and providing structure, as needed, for its sustained and effective implementation (e.g., one speaker at a time, not disrupting other students when they are speaking, encouraging adolescents to build on others' inputs and ideas when sharing their own).

Another way that mentors established group norms was through the *promotion of shared goals* during group activities. These goals were relationally based and complemented the larger activity goals set by the program (i.e., time limits, activity tasks). It involved mentors helping adolescents develop mutually beneficial ways of working together to accomplish shared

tasks. When shared goals were promoted, adolescents were described as being much more engaged in collaborative learning activities. For example, Emily said:

> It's fun to help and see them help each other and work together, especially when we're all on the same page. Working together as a team really gets them fired up!

Overall, when mentors established positive group norms with adolescents, it promoted adolescents' meaningful participation in the group decision-making process. These norms contributed to a more structured, welcoming, and respectful relational climate in the program which helped to empower and sustain adolescents' engagement in collaborative learning activities.

### *Strategically splitting the groups and the work*

The third theme involved mentors *strategically splitting the groups and the work* in order to optimize opportunities for collaborative learning among adolescents. One aspect of this strategy involved *strategically splitting the groups* of 6–10 middle school students and 2–3 mentors into even smaller groups. This strategy was described by Emily who said:

> If there were two of us, we tended to split the group into smaller groups. Each mentor would just have two or three students. When we come back together as a big group, we would have the students explain. They're more likely to participate and take less time.

As indicated by Emily, splitting into smaller groups not only helped to promote adolescents' engagement but it also helped to address a common program/mentor challenge: activity time-limits. Navigating activity time-limits was a key reason for splitting adolescents into even smaller groups in order to create more ideal conditions for collaborative learning. Indeed, even within smaller groups, mentors ensured adolescents were still in a position to work collaboratively. They worked to find the optimal collaboration group size given the constraints of the activities and took into account adolescents' various characteristics (e.g., pairing students based on personalities) and levels of mastery.

Working with students who have varying levels of mastery, in particular, was a key challenge for mentors. In response, mentors described *strategically splitting the work* which involved providing key opportunities for adolescents to lead and share their ideas with others. This was described by Peter who said:

> I had a student who was able to solve the problem immediately. Because they were able to solve it immediately, I took the opportunity to have the student share with the other students what they did.

While students who were more knowledgeable about the curriculum were often tapped for these opportunities, mentors also provided other students a platform to share their ideas, particularly when it helped to move the group toward meaningful discussion and problem-solving. By providing these opportunities within smaller groups, mentors promoted adolescents' engagement by helping them practice and showcase their leadership, communication, and critical thinking skills. The mentors offered encouragement and made efforts to serve more as moderators of the learning process, intervening as needed to keep adolescents on track (e.g., when students got stuck on a certain problem/task or when students got distracted).

Overall, strategically splitting the groups and the work proved to be an effective way of promoting adolescents' collaborative learning and skills. It was also a way for mentors to address key challenges in the program. With the help of the adolescents, mentors were able to devote more attention to students who needed more help and keep track of the larger group as a whole with regards to activity time-limits and making sure all students were engaged and being supported.

### *Modeling collaborative behaviors*

While the previous strategies presented more direct ways of promoting collaborative learning, mentors also promoted the process indirectly through *modeling collaborative behaviors* with other mentors. They did so in a variety of ways including "*asking for help*" as described by Marie here:

> When I don't understand something or am having trouble getting the kids to work together, I ask the [another] mentor for help. I think the kids see that and they appreciate it because I don't always know the answers.

Mentors made efforts to present the action of "asking for help" a normal part of their interactions with other program mentors. Mentors understood that adolescents were observing their actions and so they made intentional efforts to model the types of collaborative behavior they wanted adolescents to emulate. Doing so created a space in which adolescents were encouraged to see and consider others as sources of support. Promoting "asking for help" seemed particularly beneficial in the context of the program which involved increasingly challenging activities and tasks.

Similar to the strategy of *strategically splitting the groups and work*, some mentors asked for help to

address common mentor challenges including not understanding the curriculum and addressing student misbehavior. Al alluded to asking for help with the latter challenge when he said, "sometimes you gotta lay down that law but you don't want them to not like you … so I just call [another mentor] to help me." Like Al, other mentors described *working together and backing each other up* as another way of modeling collaborative behavior. Anna described this specific interaction with a fellow mentor in her group:

> We would work on problems together. When we struggled, we would try to come up with [solutions] together. It helped the kids see that we were backing each other up as a group.

By asking for help, working together, and backing each other up, mentors modeled collaborative behaviors with the goal that adolescents would emulate the same behaviors in their interactions with others. Importantly, mentors described these supportive processes as a consequence of the larger program culture which had a strong emphasis on community building, and which provided key training opportunities for mentors to work together, in reflective practice, to address challenges and generate ideas for engaging adolescents in collaborative learning.

## Discussion

The purpose of this study was to identify and understand ASP strategies that promote collaborative learning among adolescent participants. Based on the experiences and perspectives of college student mentors who serve as frontline staff of a math enrichment ASP for underprivileged Latino/a middle school students, we identified four themes representing mentoring strategies to promote collaborative learning: (1) nurturing personal connections with and among youth, (2) establishing positive group norms, (3) strategically splitting the groups and the work, and (4) modeling collaborative behaviors. These strategies helped mentors create conducive conditions for collaborative learning including providing a safe, structured, supportive, and responsive space which helped adolescents develop and practice a variety of skills (e.g., communication, leadership, responsibility, critical thinking) to effectively work with others. These strategies helped to address mentoring challenges (e.g., activity time limits, working with students with varying levels of mastery) while at the same time, promoting adolescents' engagement and a strong sense of community among adolescents and mentors in the program.

Our findings make a unique contribution to the existing literature on ASPs by detailing strategies to support positive peer processes in the context of collaborative learning activities. The role of positive peer processes are often overlooked in the ASP literature, despite its significant role in influencing adolescents' experiences and outcomes in ASPs (Donlan et al., 2015; Fredricks & Simpkins, 2013). By identifying strategies from the point of view of frontline staff, our findings provide important insights into the decision-making processes and challenges (e.g., balancing youth autonomy and structure, navigating activity time-limits, and meeting the needs of individual adolescents) involved in frontline staff support of positive adolescent peer processes for collaborative learning in ASPs. Furthermore, while ASPs are beneficial to many youth, not all youth report positive experiences in these settings. In fact, research suggests that adolescents from racial and ethnic minoritized groups, including Latino/as, experience discrimination, exclusion, microaggressions and a lack of peer support in these settings (e.g., Gast et al., 2017; Gutiérrez et al., 2017; Lin et al., 2016). Given the potential for negative peer processes in ASPs, the strategies that we have identified, which involve frontline staff promoting and facilitating positive peer processes among Latino/a adolescents through collaborative learning, may help guard against these negative experiences.

What made these strategies effective at promoting adolescents' collaborative learning? One potential reason is that these strategies engage adolescents' well-documented developmental needs of relatedness, autonomy, and competence (Deci & Ryan, 2012). First, relatedness, which refers to the need to feel connected with others in meaningful ways, was evident in mentors' strategy of nurturing personal connections with and among youth. In line with previous research, this process took time and often involved the development of trust to be effective (Griffith & Larson, 2016). Mentors leveraged personal connections to promote adolescents' collaborative engagement and sense of belonging within their individual groups and the larger program space. Second, through establishing positive group norms *with* youth, mentors promoted adolescents' sense of autonomy by facilitating their meaningful participation in the group decision-making process. Similar to previous research, we found that providing a platform for autonomy in this way promoted adolescents' sense of accountability and personal responsibility (Salusky et al., 2014). Third, by strategically splitting the groups and the work, mentors provided adolescents with opportunities to

practice and showcase their competence in terms of critical thinking, leadership, and communication skills as they worked together to accomplish shared goals. Under the guidance of adult mentors, these skill-building opportunities can enhance youth's sense of competence and positive peer processes (Donlan et al., 2015; Grossman et al., 2007; Vance, 2018).

According to Larson (2007), youth develop the capacity for collaboration through a change process beginning with a general distrust of others, learning the benefits of reciprocity, and the gradual development of effective norms for working together to accomplish shared goals. Our findings suggest effective ways of facilitating this process for adolescents. For example, underlying the effectiveness of the strategies that mentors utilized to promote collaborative learning was a focus on promoting positive and trusting relationships with and among adolescents. Mentors did this in multiple ways including leveraging shared interests with adolescents and being responsive to their dispositions as individual members of a collective group. These findings extend previous research by highlighting the importance of not only nurturing personal connections among adolescents but also with individual adolescents in order to promote positive peer processes for collaborative learning. In line with previous research (e.g., Griffith & Larson, 2016; Jones & Deutsch, 2011), we argue that this foundation is critical in amplifying the benefits and effectiveness of collaborative learning. It also suggests the importance of establishing positive and flexible group norms to promote adolescents' meaningful participation in the group decision-making process (Johnson & Johnson, 2009; Smith et al., 2016). Extending previous research, we identified specific mentoring strategies to facilitate youth input for both program level (e.g., activity rules) and relational level (e.g., shared goals) norms.

The frontline staff of ASPs perform an intricate balancing act between promoting adolescent autonomy and exercising authority (Larson et al., 2016). In our study, this balancing act involved mentors' intentional efforts to model collaborative behaviors and to serve more as a moderator, rather than a "teacher" in their interactions with adolescents. Mentors welcomed adolescent autonomy while providing necessary structure (e.g., expectations, rules, respectful environment) in ways to better facilitate adolescents' collaborative learning and engagement. Extending previous research (e.g., Grossman et al., 2007), we found this youth-centered approach helped mentors promote constructive collaborative learning processes which led to adolescents' skill development and meaningful engagement in activities. In this way, our findings support the notion that adults cannot directly "teach" adolescents collaborative learning; the impetus and processes of learning and engagement must come from adolescents (Larson & Walker, 2018).

In order for ASP practices to be fully effective, they need to be intentional and focused; it is not enough for programs to merely promote "conducive" environments for social-emotional learning (Blyth, 2018; Durlak et al., 2010). When frontline staff engage in intentional practices, youth become not only more likely to engage in learning activities but also benefit from them (Durlak et al., 2010). The mentors in our study described engaging in such intentional practices. Mentors described using specific mentoring strategies with the goal of promoting adolescents' collaborative learning and engagement. They modeled effective collaboration skills (Smith et al., 2016) by normalizing "asking for help" and working through problems with fellow frontline staff. They provided adolescents with intentional opportunities to actively practice collaboration and devoted time to learning effective ways of doing so as part of the program's staff training opportunities.

Given that our study was based on a math enrichment ASP for predominantly underprivileged Latino/a adolescents, our findings have important implications for Latino/a students' learning experiences in ASPs and STEM pursuits. Research has shown that ASPs are successful in engaging and retaining large numbers of students from these communities in STEM (Krishnamurthi et al., 2014). Unfortunately, the specific ASP processes and practices that support these outcomes are less known. To this end, research has shown that collaborative learning could be greatly leveraged as a resource for learning in STEM enrichment ASPs (e.g., Mun & Hertzog, 2018), particularly ASPs serving underprivileged communities (Krishnamurthi et al., 2014). Providing collaborative learning opportunities reflect culturally responsive practices that may complement and leverage the cultural assets of Latino/a communities (Simpkins et al., 2017). Our findings provide insights into specific and responsive ways of engaging underprivileged Latino/as adolescents in collaborative learning activities which in turn, may help support their STEM pursuits.

### Implications for practice

In addition to identifying specific strategies to promote collaborative learning among adolescent participants, our findings have additional implications for

practice. First, as more ASPs move toward explicitly promoting social-emotional skills such as collaboration, we need to identify and understand feasible ways of effectively doing so. One significant way is to provide professional development to frontline staff that intentionally targets social-emotional skills including collaboration (Blyth, 2018; Hurd & Deutsch, 2017). The program in our study had the goal of promoting collaborative learning and provided professional development opportunities for mentors to learn and practice effective ways of promoting the process for adolescents. We argue that providing these opportunities are critical in helping mentors facilitate effective collaborative learning experiences among adolescents. Importantly, training should include time to address frontline staff challenges when it comes to engaging youth in these learning experiences and providing a space for collaborative and critical reflection (Hurd & Deutsch, 2017; Johnson & Johnson, 2009; Larson & Walker, 2010).

ASPs consist of a broad ecology of interactions at different levels. Although the goal is to promote collaborative learning among youth, different levels of the program ecology should be incorporated into such processes. Specifically, collaborative behaviors among youth will be greatly enhanced if similar interactions also occur during staff-student and staff-staff interactions (Hurd & Deutsch, 2017). As ASP coordinators and frontline staff design their programs and activities, it is critical to bear in mind that different aspects of the program ecology play a role in collaborative learning and that a collaborative culture at different levels of the program bear great salience in promoting collaborative learning among program participants.

While ASPs are structured learning settings, they are also unique in their flexible and youth-centered design. ASP coordinators and frontline staff can take advantage of this design by balancing structure with youth agency. It is important that adolescents are granted autonomy in learning activities where they can have key opportunities to showcase their strengths. However, as suggested by previous research (e.g., Durlak et al., 2010), adolescents should participate in a structured way. It is critical that frontline staff provide "intermediate structures" (e.g., helping youth identify realistic goals; helping youth stay on track; Larson, 2007) as they work toward accomplishing shared goals. This involves potentially providing adolescents with specific roles within learning groups to facilitate collaborative learning. Importantly, throughout this process, it is important to remain cognizant and responsive to youth's different and various learning needs.

### Strengths, limitations, and future directions

One strength of this study was our in-depth examination of mentoring processes in an under-studied context, namely an ASP that focused on math enrichment and attended by predominantly Latino/a adolescents. As stated previously, ASPs are an ideal setting for collaborative learning, but few studies have detailed this process. This study filled this gap in the literature by leveraging the relational and educational processes of an academic enrichment ASP context that emphasized collaborative learning as a key pedagogical method. Although practices can vary given a particular ASP context, in line with the perspective that core aspects of quality are applicable to all programs (Smith et al., 2014), we expect our identified strategies for collaborative learning relevant to a diverse array of ASP contexts. However, given our focus on one ASP context, the extent to which our findings can be generalized may be limited and should be tested. Nonetheless, both the Latino/a population and the number of STEM enrichment ASPs are rapidly increasing (Allen et al., 2019; Alvarez et al., 2016), so the strength (as opposed to generalization) of our implications could be substantial. STEM enrichment ASPs for underserved youth, including programs for underserved Latino/a youth, are on the rise but more research is needed to understand their impact (Krishnamurthi et al., 2014). In fact, there are over 200 educational enrichment and outreach programs affiliated with the National Association of Math Circles nationwide that specifically targets underserved youth including Latino/as (e.g., Kennedy & Smolinsky, 2016; Sheperd & Sakashita, 2009). Future research to determine the prevalence of practices in similar and different ASP contexts serving a diversity of youth populations is warranted.

Another strength of the current study is that we examined a specific program from within; that is, understanding how frontline staff/mentors promote youth collaboration through the voices of the mentors themselves. These voices from the ground are critical to identifying and understanding effective ways of promoting the impact and benefits of ASPs (Larson et al., 2015). However, this design also comes with limitations as it represents a specific perspective. Further, it is important to note that while the college student mentors interviewed for this study were experienced mentors in the program, they were relatively novice ASP practitioners. Although mentors' ASP experience may limit the current study's findings, their perspectives may also serve as a strength given the high staff turnover rates in ASPs (Moroney &

Devaney, 2017) and that previous studies have largely focused on the perspectives of experienced frontline staff (Larson et al., 2015). Future studies could triangulate more perspectives including youth and objective third-party observers to get a more complete picture of the processes and benefits of collaborative learning in ASPs. Additional areas of future research include examining whether the collaborative learning strategies identified in this study promotes adolescents' positive development over time and whether they foster competencies that can be transferable to other settings like schools and families (Durlak et al., 2010). This will provide further support for the significance of the strategies identified in this study and the need to promote collaborative learning and engagement in ASPs, during adolescence, and beyond.

## Conclusion

Opportunities for collaborative learning reflect positive peer processes that have strong implications for adolescents' developmental experiences in ASPs. Through practices that are responsive to the developmental needs and strengths of youth, ASP frontline staff can support the collaborative learning process in keyways. The current study identified such practices through mentoring strategies—including nurturing personal connections with and among youth, establishing positive group norms, strategically splitting the groups and the work, and modeling collaborative behaviors—that frontline staff can utilize to promote adolescents' collaborative learning, skill development, and engagement in ASPs.

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