




## Full Length Article

# Experiential features of volunteering predict changes in college students' social, emotional, and behavioral skills

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## ABSTRACT

Using an exploratory quasi-experimental design, the present research investigated SEB skills as an antecedent and consequence of volunteering in a sample of college students who were either actively volunteering ( $N = 169$ ) or not ( $N = 286$ ). Results indicated that more skilled students participated in volunteering, but volunteering, in general, did not predict positive SEB skill change. However, participants who reported interacting with others while volunteering experienced growth in socially relevant skills. Participants who reported positive subjective evaluations of volunteering also experienced growth in several SEB skills. These findings suggest that domain relevant actions, as well as subjective experiences of engaging in those actions, may be critical for positive SEB skill development.

## 1. Introduction

Significant research has explored the contextual and individual correlates of civic engagement during emerging adulthood (Carlo et al., 2005; Mahatmya & Lohman, 2012; Obradović & Masten, 2007; Oosterhoff et al., 2021; Yazdani et al., 2022). Much of the work on individual correlates utilizes constructs that can be categorized as personality traits—a person's *typical* behavior in a domain. However, social, emotional, and behavioral (SEB) skills—a person's *capacity* for a behavior (Soto et al., 2021)—may also predict their civic engagement. In turn, civic engagement can also provide emerging adults opportunities to practice and get better at certain tasks, changing SEB skill levels. In this way, civic engagement may serve as an important context for SEB skill development. This study explores these possibilities and is guided by three aims. The first is to understand whether initial SEB skill levels are associated with engaging in service-learning, a course-bound form of experiential education in which students engage in activities that meet communities' needs and critically reflect on the experience, and extra-curricular volunteering, in which students engage in activities that meet community needs during their free time. The second is to investigate whether service-learning and volunteering is associated with change in

SEB skills over the course of a semester. The third is to explore whether change in SEB skills depends on what participants did during their community activities, how they generally felt about the experience, and their descriptions of learning from the experience.

### 1.1. Social, emotional, and behavioral (SEB) skills

While personality traits capture how someone tends to behave across situations, social, emotional, and behavioral (SEB) skills capture how someone *can* behave when needed (Soto et al., 2021). For example, an introverted student who typically follows the lead of other people at work or in school projects (i.e., low trait extraversion) can still be capable of leading effectively when they are addressing a cause in the community that is particularly important to them (i.e., high social engagement skill). This example illustrates how both traits and skills share common social, emotional, and behavioral referents but are conceptually distinct. A growing body of theoretical and empirical literature has similarly found that the structure and organization of SEB skills mirrors that of the Big Five—one of the most utilized frameworks for studying personality traits (Abrahams et al., 2019; Napolitano et al., 2021; OECD, 2015, 2021; Soto et al., 2021; Walton et al., 2023). The Big

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Five organizes personality traits into five broad domains: Conscientiousness, extraversion, agreeableness, negative emotionality, and openness to experience. In recent taxometric work on the Behavioral, Emotional, and Social Skills Inventory (BESSI; Soto et al., 2022), results indicated that SEB skills could be similarly organized across five broad domains: Self-management skills (e.g., task management, rule-following skill), social engagement skills (e.g., leadership skill, persuasive skill), cooperation skills (e.g., perspective-taking skill, capacity for trust), emotional resilience skills (e.g., stress regulation, confidence regulation), and innovation skills (e.g., creative skill, abstract thinking skill).

Though SEB skills and personality traits can both be organized in similar five-domain frameworks, empirical evidence suggests that skills and traits are not identical. Exploration of SEB skills' nomological network has indicated that convergent correlations between traits and skills range from moderate to strong (e.g., Lechner et al., 2022; Soto et al., 2022), but both personality traits and SEB skills contribute unique explained variance when predicting adolescents' self-reported academic, social, occupational, well-being, and civic outcomes (Soto et al., 2024). SEB skills also provide incremental validity over personality traits when predicting school-reported grades, standardized test scores, and self-rated performance in social role-playing exercises (Breil et al., 2022; Soto et al., 2023, 2024; Yoon et al., 2024). Finally, emerging research suggests that having higher skill levels than trait levels is predictive of better outcomes, whereas the same is not true of having higher trait levels than skill levels (Ringwald et al., 2025). Taken together, these findings indicate that how someone is *capable* of behaving matters for their success and thriving.

While this research is promising for both researchers and practitioners interested in promoting youths' positive development, it is critical to understand whether SEB skills are malleable. One longitudinal study found that, on average, US high school students' SEB skills do not demonstrate mean-level change over the course of an academic year (Napolitano et al., 2025). However, analyses of individual differences in change indicated that some adolescents did experience change and that positive SEB skill change was associated with positive changes in several developmentally relevant outcomes. A next step in exploring the malleability of SEB skills is to investigate whether certain life experiences engender change. In this study, we focus specifically on engaging in service-learning and volunteering while in college—a widely available but not universally utilized experience—that aims to enrich students' academic and personal development.

### 1.2. Service-learning and extracurricular volunteering as a context for SEB skill development

Civic exploration is critical during emerging adulthood, the period between 18 and 29 years old, because this is a key time when individuals are reflecting on questions such as who they are and what kind of world they'd want to live in (Flanagan & Levine, 2010; Núñez & Flanagan, 2014). This exploration is key in forming a civic identity, which is foundational for future civic participation (Finlay et al., 2010). Thus, scholars have argued that there should be meaningful opportunities to become civically engaged on college campuses—an important context of emerging adulthood (Finlay et al., 2010; Núñez & Flanagan, 2014). Many institutions of higher education share this ethos and explicitly list preparing students for civic life in their mission statements (Bringle & Hatcher, 1996). Opportunities to engage in service-learning and extracurricular volunteering are means through which colleges and universities foster civic development among their students.

Service-learning is a form of experiential education in which students engage in critical reflection and activities that address community needs (Núñez & Flanagan, 2014). Encouragingly, a meta-analysis has indicated that K-12 and college students who engage in service-learning are more civically engaged and have higher levels of academic achievement than those who did not engage in service-learning (Celio et al., 2011). This meta-analysis also suggests that service-learning is an important context

for personal development: Students who engaged in service-learning had higher levels of social skills, such as leadership, cultural competence, and social problem-solving skills, after their involvement compared to students who did not (Celio et al., 2011). A systematic review of service-learning in higher education similarly concluded that service-learning may help college students develop leadership, cultural competence, communication, and interpersonal skills (Salam et al., 2019). A recent meta-analysis also suggests that service-learning has small but significant impacts on college students' empathy (Gordon et al., 2022).

In contrast to service-learning, extracurricular volunteering is not bound to course requirements and is pursued during leisure time. Similar to service-learning research, there is some qualitative evidence that suggests extracurricular volunteering can also help emerging adults hone their social skills (Khasanzyanova, 2017). These findings suggest that campus-based volunteering—whether through service-learning or extracurricular experiences—can lead to personal development, particularly in the social engagement and cooperation skill domains.

In addition, whether college students take advantage of opportunities to engage in service-learning or extracurricular volunteering on their campuses may depend on their SEB skills (Celio et al., 2011). For example, more socially skilled students may seek out specific courses and student organizations that help them connect with others, and students who have high levels of self-management skills may better be able to balance extracurricular volunteering, schoolwork, and other obligations. In a short-term longitudinal study, strength in particular SEB skills—including perspective-taking skills, abstract thinking skills, and stress regulation—were a potent predictor of the number of hours that college students volunteered during the COVID-19 pandemic (Sewell et al., 2023). If there is an endogeneity effect with SEB skills, such that students with high skill levels are primarily the ones who are taking advantage of these civic opportunities, then low skill students may miss out on a critical civic, academic, and personal development context.

The present study builds on this literature in two ways. First, we measured “skills” rather than traits. Historically the distinction between traits and skills have been conceptually and operationally obscured, with “skill” measures assessing tendencies or attributes (Soto et al., 2021). Second, this research builds on prior literature methodologically by assessing baseline levels of skills prior to any volunteering, and then explicitly assessing changes in skills, using latent change score models (LCSMs; Ferrer & McArdle, 2010). The LCSM approach specifies that all of the variance in a construct at time 2 can be completely explained by time 1 levels of the construct and change between time 1 and time 2. The LCSM approach also models change as a latent variable rather than simply the difference in observed scores across time. LCSM is preferable to other approaches such as cross-lagged panel models because it isolates change in latent “true scores” while accounting for stability in the construct across time and measurement error.

### 1.3. Experiential features of volunteering and SEB skill change

Whether or not SEB skills change after engaging in service-learning and volunteering may depend on specific aspects of the volunteering experience. For instance, students' subjective perceptions of their volunteering experience may help explain SEB skill change. One student may view the service-learning component of their course as a burden and, thus, their descriptions of the experience may have a negative emotional valence. In contrast, another student may think the experience was the best part of the course and their descriptions of the experience may have a positive emotional valence. Recent research suggests that subjective evaluations of life events are important for understanding how these events affect personality change (Dugan et al., 2024; Schwaba et al., 2023).

In addition, actively engaging with others while volunteering may be necessary to produce change in SEB skills, especially social engagement

and cooperation skills. In a volitional personality change intervention, performing specific behaviors, rather than simply wanting to change, was necessary for growth (Hudson et al., 2019). Hudson and colleagues (2019) also found that, in general, performing domain-relevant behaviors specifically predicted growth in the relevant trait (e.g., engaging in more conscientious behaviors predicted growth in conscientiousness) and not growth in all of the Big Five traits indiscriminately. Furthermore, in a meta-synthesis of qualitative studies, Gordon and colleagues (2022) highlighted those direct interactions with community members during service-learning were frequently linked to the development of empathy.

Finally, whether or not students learned something new—about themselves or about their community—may be important for understanding how volunteering is related to SEB skill change. For instance, a student who typically communicates with others their own age may realize they are also capable of successfully communicating with diverse groups of people through their experience tutoring elementary school students or visiting with isolated seniors in an assisted care facility. Similarly, a student who learns more about the issues facing their community and actively partners with local organizations to address these issues may in turn develop skills related to abstract and creative thinking. Taken together, subjective perceptions, social interaction, and learning may be important ingredients of volunteering that produce skill change.

#### 1.4. Present study

In sum, previous research has shown that social, emotional, and behavioral (SEB) skills are essential for success and thriving and that service-learning and extracurricular volunteering are an important context for academic, civic, and personal development. However, it remains unclear whether youth with particular skillsets “select” into these opportunities. Therefore, the present research investigates whether social, emotional, and behavioral (SEB) skills predict participating in service-learning and campus-based extracurricular volunteering.

Furthermore, prior research suggests that youth demonstrate individual differences in SEB skill change across an academic year, but we do not know whether certain life experiences predict individual differences in change. Thus, the present research also examines whether engaging in service over the course of a semester predicts changes in SEB skills after accounting for normative developmental change, as well as whether SEB skill change depends on the participants’ subjective perceptions, descriptions of social interaction, and descriptions of learning in their reflections about their volunteering experience. To investigate these questions, we utilized a quasi-experimental design with data collection at the beginning and end of a 10-week service-learning program.

Based on the extant literature described above, we speculated that college students engaged in service-learning and extracurricular volunteering would differ in terms of their SEB skills compared to students who were not engaged. We also speculated that social engagement and cooperation skills would positively change after engaging in service learning and extracurricular volunteering. Because this is the first quasi-experimental study to explore SEB skills as an antecedent and consequence of civic engagement, as well as the role of experiential volunteering features (subjective perceptions, social interaction, and learning from the experience), these speculations were exploratory and not preregistered.

## 2. Method

### 2.1. Participants

Two waves of data were collected from two groups of university students: 1) students who were participating in a volunteering recognition program (hereby known as the “the volunteers”,  $N = 169$ ) and 2)

a comparison group of students who were not currently volunteering or taking service-learning courses ( $N = 286$ ) at a large university in the midwestern United States. The total sample consisted of 455 participants at the first wave of data collection, and 284 participants at the second wave of data collection (62.4 % retention). Participants were included in the analytic sample if they were between the ages of 18 and 29 and completed most questions (60 %).

At the first wave of data collection, a slight majority of participants identified as female (59.8 %), averaged 20.9 years old ( $SD = 2.3$ ), and were undergraduate students (81.2 %). The sample was diverse with regards to racial and ethnic background: 49.4 % of participants identified as White, 21.4 % as East Asian, 17.2 % as South Asian, 15.9 % as Latinx or Hispanic, 6.2 % as Black, 2.3 % as Middle Eastern or North African, 1.2 % as Native American, 2.5 % indicated another racial or ethnic group, and 4.1 % preferred not to answer. In total, 3.4 % of participants indicated multiple racial/ethnic categories. In terms of family income, 20.8 % had household incomes of less than 35,000, 36.6 % had incomes between 35,000 and 100,000, and 42.6 % had household incomes over 100,000. Over a quarter of the participants (28.8 %) were first generation college students. The comparison sample was slightly older ( $M = 21.1$ ,  $SD = 2.0$ ) than the volunteers ( $M = 20.5$ ,  $SD = 2.7$ ;  $F(1, 453) = 5.83$ ,  $p = 0.016$ ). The comparison sample also included more white students (41.3 %) than the volunteers (25.6 %;  $\chi^2(1, 443) = 7.1$ ,  $p = 0.008$ ). Finally, the comparison sample had a higher average family income ( $M = 4.84$ ,  $SD = 2.1$ ) than the volunteers ( $M = 4.39$ ,  $SD = 2.3$ ;  $F(1, 372) = 5.83$ ,  $p = 0.048$ ). There were no other differences in terms of demographic characteristics.

Attrition analyses indicate that group membership predicted attrition ( $\chi^2(1, 454) = 10.3$ ,  $p = 0.001$ ), with participants in the comparison sample having lower rates of attrition (31.8 %) relative to the volunteers (47.3 %). In addition, Asian participants had lower rates of attrition (26.8 %) than participants who were not Asian (47.3 %), and Latinx participants had higher levels of attrition (50.0 %) than participants who were not Latinx (34.6 %). No other factors predicted attrition, and there were no other significant differences in sample demographics across the data collection waves.

### 2.2. Procedure

The volunteers were recruited via two methods. The first recruitment method was through a university-wide open call for student volunteers ( $N = 27$ ; 16 % of the volunteers), and the second recruitment method was through service-learning university courses ( $N = 142$ ; 84 % of the volunteers). Volunteers enrolled in service-learning courses were asked to participate in a voluntary research study via e-mail announcements. Volunteers could participate in service and fulfill their course requirements without participating in this research. Both groups of volunteers created accounts on *Givepulse*— an online platform where they could register for volunteering projects and log their service. Upon creating their account, volunteers completed the time 1 (T1) survey. All volunteers then self-selected their volunteer projects on *Givepulse* from over 80 opportunities. The Appendix presents examples of these opportunities. Projects included in-person activities, remote activities, or hybrid in-person and remote activities due to public health concerns surrounding COVID-19. Opportunities also varied in terms of how many volunteers could join them. For example, one community organization requested technical support during virtual meetings, which required only 1 to 2 students, while another project involved writing letters to isolated seniors and could involve dozens of students.

In between the T1 and T2 surveys, volunteers could log their service and write reflections about their experiences on *Givepulse*. Logging their service hours and writing reflections was not required, thus only a subset of volunteers wrote reflections (48.5 %). On average, volunteers logged 4.37 h of service ( $SD = 3.11$ ). Volunteers who logged their service hours and wrote reflections tended to be younger ( $r = -0.57$ ,  $p < 0.001$ ) and have lower levels of cooperation skills at T1 ( $r = -0.17$ ,  $p = 0.033$ ). There

were no other significant differences in the study variables between volunteers who logged hours and wrote reflections and those who did not.

The comparison group of university students who were not actively volunteering or enrolled in a service-learning course were recruited via multiple methods including 1) virtual visits to large lecture courses, 2) e-mail announcements, 3) physical flyers and social media posts, and 4) word of mouth. Before potential participants completed the informed consent, interested students were linked to an inclusion criteria question, which asked about current volunteering and service-learning enrollment, hosted on the Qualtrics platform. Most students (86.0 %) who answered the inclusion criteria question were eligible to participate in the study and were linked to the informed consent form and T1 survey.

All participants in both groups received an email approximately 10 weeks after the T1 survey asking them to participate in the T2 survey. At the study's conclusion, all participants received one raffle entry for each survey they completed. The raffle prizes consisted of one of thirty \$50 gift cards or one of two iPads. The 32 winners of the lottery were randomly selected, and the likelihood of winning one item from the lottery was approximately 4.6 %. The procedures and data collection for this study were approved by the [redacted] Institutional Review Board (#20915).

### 2.3. Measures

#### 2.3.1. SEB skills

Social, emotional, and behavioral (SEB) skills were indexed by a version of the 45-item Behavioral, Emotional, and Social Skills Inventory (BESSI-45; Sewell et al., 2025). The BESSI-45 measures five broad SEB skill domains: Self-management skills, social engagement skills, cooperation skills, emotional resilience skills, and innovation skills. Each SEB skill domain was measured by nine items. Participants indicated how well they could perform each item, reflecting their level of expertise. An example item for the cooperation skills domain was "Understand how other people feel," (1 = Not at all well [Beginner level]; 2 = Not very well [Advanced beginner level]; 3 = Pretty well [Intermediate level]; 4 = Very well [Advanced level]; 5 = Extremely well [Expert level]). Participants completed the BESSI-45 at both waves of data collection, and each skill domain demonstrated adequate reliability at both waves ( $\omega_{average,t1} = 0.76$ ,  $\omega_{average,t2} = 0.78$ ).

#### 2.3.2. Experiential features of volunteering

The first author and a research assistant first independently read through volunteer reflections and took notes on general themes. From these themes, they developed a simple system to code for 1) subjective perceptions (emotional valence as positive, neutral, negative, ambivalent), 2) social interaction while volunteering (present = yes, not present = no), and 3) learning from the volunteering experience (present = yes, not present = no). Once the scheme was established, the coders reread and coded the data independently. Cohen's Kappa between the raters was 0.85 for subjective perception, 0.80 for social interaction, and 0.72 for learning. Discrepancies were addressed via discussion until a final decision for the code was reached.

For subjective perceptions, 57.3 % of reflections had a positive emotional valence, 30.5 % had a neutral emotional valence, 11.0 % had an ambivalent emotional valence, and 1.2 % had a negative emotional valence. Because most reflections had a positive emotional valence, subjective perceptions was treated as a binary variable representing a positive emotional valence or not in subsequent analyses. Table 1 presents frequency and exemplars for these reflection codes.

### 2.4. Analytic strategy

We first assessed bivariate correlations among all study variables. Then, we tested whether the two groups of participants—the volunteers

**Table 1**  
Frequency and Exemplars for Volunteering Reflection Codes.

Code	%	Exemplar
Positive Subjective Perception		
Yes = 1	57.3 %	"The yard work helped ease my mind and I took pleasure in beautifying the different... locations. Additionally, I really enjoyed being able to spend some quality time outside, away from the stress of school and social life."
No = 0	42.7 %	"Attended meetings to discuss our book drive, came up with ideas for advertising the book drive, hung up flyers, worked on thank you notes for those that helped us with the book drive."
Social Interaction		
Yes = 1	57.3 %	"My job was to hang out with people coming into the center in order to create a sense of community. I played card games, talked, and did a puzzle with people"
No = 0	42.7 %	"Assisted in sorting donations such as clothing, books, and shoes. Helped tidy up the store and organize displays"
Learning		
Yes = 1	34.1 %	"I went to a local event and interviewed people about it... then wrote an article about the fundraising event... [the opportunity] allowed me to learn about what goes on in our community."
No = 0	65.9 %	"I volunteered to help organise the... event. I interacted with children and parents and facilitated the station games"

and the comparison—differed in terms of their SEB skills via simple ANOVAs. These analyses indicate whether there are certain SEB skills that may prime individuals to engage in service learning and volunteering when the opportunity is available. Next, we utilized four steps of latent variable analyses to assess whether skills changed after engaging in service-learning and volunteering, as well as whether skill changes were associated with experiential features.

In the first step, we tested for measurement invariance across time. Establishing measurement invariance ensures that apparent changes are due to actual change in the construct of interest and not changes in how participants interpreted items (Putnick & Bornstein, 2016). Investigating measurement invariance entails testing a series of confirmatory factor analysis models with differing levels of equality constraints and examining changes in model fit. The baseline, or configural measurement model, had no equality constraints and provided a basis for comparison to the metric measurement model. Establishing configural invariance indicates that factor structures are equivalent across time in terms of the number of factors. The metric measurement model constrained item loadings to equality between groups and provided a basis for comparison to the scalar measurement model. Metric invariance indicates that each item contributes to the latent construct to a similar degree across time. Finally, the scalar measurement model constrains item intercepts to be equal across time. Establishing scalar invariance indicates that mean differences in the latent SEB skill domains capture all mean differences in the shared variance of the items.

Each SEB skill domain was modeled separately. To reduce model complexity, we parceled indicators with similar conceptual content (e.g., items from the same lower-order skill facets in the BESSI; Soto et al., 2022). Models also included parameters correlating item residuals across measurement occasions. Root mean square error of approximation (RMSEA), standardized root mean square residual (SRMR), the Comparative Fit Index (CFI), and the Tucker-Lewis Index (TLI) were used to evaluate model fit (Kline, 2016). Acceptable fit was determined by CFI and TLI values  $\geq 0.90$ , and RMSEA and SRMR values  $\leq 0.08$  (Hu & Bentler, 1999; Kline 2016). A nonsignificant  $\Delta\chi^2$  and  $\Delta CFI$  smaller than 0.01 between models indicated passing the measurement invariance test at each step (Cheung & Rensvold, 2002).

After establishing measurement models, the second step involved constructing latent change score models (LCSMs; Ferrer & McArdle, 2010) to investigate whether participating in service-learning and volunteering was associated with change in SEB skills. With the LCSMs, we investigated change descriptives including latent change intercepts (i.e., average change across all participants) and latent change variance (i.e.,

variability across participants around the mean change). The third step involved regressing each latent change score (i.e., the change in the SEB skill) on the binary group membership variable (1 = volunteers, 0 = comparison) with and without demographic controls, including age, gender, family socioeconomic status, and race/ethnicity. If the group membership predictor was significant, it would indicate that engaging in volunteering was generally predictive of change in the skill across the timepoints. The final step involved regressing the experiential feature variables (positive subjective perception, social interaction, and learning) on the change score with and without demographic controls. These last set of analyses were limited to the subsample of volunteers. Significant coefficients would indicate that specific features of volunteering are predictive of SEB skill change. All latent models were fitted using the ML estimator in the lavaan package in R (Rosseel, 2012), and full information maximum likelihood was utilized to account for missingness in latent analyses.

### 2.5. Transparency and openness

All analyses were conducted as two-tailed hypothesis tests at the  $\alpha = 0.05$  significance level. Post-hoc power analyses indicated that the full sample size provided statistical power of 0.80 to detect effects of  $\rho = 0.14$ , and power of 0.95 to detect effects of  $\rho = 0.17$ . For our core analyses, we conducted post hoc sensitivity analyses to determine the minimum detectable effect size (MDES) for our key parameters given the observed standard errors in our final models (see Table S1 and Figs. S1 – S3 on OSF for a complete list of MDESs and power curves). Our sample consisting of both the volunteers and comparison group achieved 80 % power to detect small latent mean changes (Cohen's  $d \cong 0.21$ ) and group differences in latent mean change ( $\beta \cong 0.22$ ). However, these analyses also indicated that our sample size of volunteers was less sensitive regarding individual predictors of change; for the regression paths of experiential features predicting latent change, our sample achieved 80 % power to detect effect sizes between  $\beta = 0.38$  and  $\beta = 0.57$ , depending on the model.

Therefore, our LCSM models in which experiential features predicted SEB skill change were underpowered to detect small and medium effects. Thus, there may be additional links between experiential features of volunteering and SEB skill change beyond those detected here. Partial<sup>1</sup> deidentified data, analytic code, power analysis code, and supplemental tables and figures are available at <https://osf.io/wsvxt/>.

## 3. Results

### 3.1. Descriptive statistics

Table 2 presents observed bivariate correlations across study variables. Similar to prior research, SEB skill domains had moderate to large positive intercorrelations at T1 and T2 ( $r_{\text{range}} = 0.25 - 0.51, ps < 0.05$ ). In addition, same domain SEB skills were strongly correlated across time ( $r_{\text{range}} = 0.67 - 0.74, ps < 0.05$ ), indicating substantial but not perfect stability. There were a few significant correlations among demographics and SEB skill domains such that male participants reported higher levels of emotional resilience skills at T1 and T2, but lower levels of cooperation skills at T1. Intercorrelations among the reflection codes (positive subjective perception, social interaction, and learning) were small and positive ( $rs = 0.10 - 0.20$ ) but did not differ significantly from 0 ( $ps > 0.05$ ), suggesting that these codes occurred independently from each other.

<sup>1</sup> Volunteer reflections are not available to protect participant anonymity. However, codes drawn from these reflections are available.

### 3.2. Did SEB skills predict volunteering?

Our first set of substantive analyses tested whether initial SEB skill levels differed between students who did vs. did not participate in the volunteering program. Specifically, Table 3 presents results of ANOVAs investigating volunteers and comparison group differences in SEB skills. Volunteers had higher levels of all SEB skills, apart from social engagement skills, than the comparison sample. These effect sizes ranged from small to medium in terms of Cohen's  $d$ . These results indicate that students with higher self-management, emotional resilience, cooperation, and innovation skills were more likely to belong to the volunteering group than were their less skilled peers.

### 3.3. Did volunteering experiences predict SEB skill change?

Supplemental Table S2 on OSF presents the goodness-of-fit indices for the configural, metric, and scalar invariance models for each SEB skill domain across time. All SEB skill configural measurement models demonstrated acceptable fit to the data ( $CFI_{\text{range}} = 0.94 - 0.97$ ,  $TLI_{\text{range}} = 0.90 - 0.96$ ,  $RMSEA_{\text{range}} = 0.06 - 0.09$ ,  $SRMR_{\text{range}} = 0.04 - 0.06$ ). Importantly, for all skill domains, model tests indicate that  $\Delta\chi^2$  was nonsignificant and  $\Delta CFI$  was smaller than 0.01 between configural and metric models as well as between metric and scalar models. Thus, all SEB skill domains were characterized by strong longitudinal measurement invariance, supporting subsequent longitudinal analyses.<sup>2</sup>

After establishing scalar measurement invariance, we constructed LCSMs for each SEB skill domain separately to investigate whether (a) students' SEB skills generally changed over time, (b) whether skills changed differently, on average, in the volunteers vs. the comparison group, and (c) whether experiential features of the volunteer experiences moderated these changes. Fit statistics for all of these models are presented on OSF Supplemental Table S3. Parameters for all LCSMs with predictors can be found on OSF Supplemental Tables S4 – S8. All simple LCSMs with no predictors fit the data adequately ( $CFI_{\text{range}} = 0.94 - 0.97$ ,  $TLI_{\text{range}} = 0.92 - 0.97$ ,  $RMSEA_{\text{range}} = 0.05 - 0.08$ ,  $SRMR_{\text{range}} = 0.04 - 0.06$ ). Table 4 presents the parameter estimates of these models. Between T1 and T2, students, on average across the volunteers and the comparison group, reported declines in emotional resilience skills. No other change score intercepts were statistically different from zero. However, every change score variance was significant, indicating that while several SEB skills did not demonstrate average change, participants in both groups significantly varied in the degree that they changed over time.

Next, to investigate whether engaging in service learning and volunteering generally predicted change in SEB skills, we regressed each change score on group membership. We ran models both with and without demographic controls. All models, without demographic controls, fit the data adequately ( $CFI_{\text{range}} = 0.94 - 0.98$ ,  $TLI_{\text{range}} = 0.92 - 0.97$ ,  $RMSEA_{\text{range}} = 0.04 - 0.07$ ,  $SRMR_{\text{range}} = 0.04 - 0.06$ ). Fig. 1 presents the only significant finding from these analyses. It shows that, on average, the volunteers experienced declines in cooperation skills, relative to the comparison group, when the quality of volunteering experience is not taken into account.

Finally, to explore whether experiential features of volunteering were associated with changes in SEB skills, we added the reflection

<sup>2</sup> We also investigated measurement invariance between the volunteering and comparison groups. Results from these analyses indicate that self-management, social engagement, and innovation skills demonstrate strong (scalar) measurement invariance across groups. Cooperation and emotional resilience skills demonstrate partial scalar measurement invariance, meaning one item intercept in both models was freed rather than constrained to equality. These findings suggest that the structure and scaling of SEB skills are mostly equivalent across groups. Fit statistics from these analyses are reported in on-line supplemental table S14.

**Table 2**  
Observed Bivariate Correlations among Study Variables.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. gender	–														
2. age	–0.01	–													
3. self-management_t1	–0.04	–0.03	–												
4. social engagement_t1	–0.02	–0.01	0.32*	–											
5. cooperation_t1	–0.14*	0.03	0.44*	0.50*	–										
6. emotional resilience_t1	0.18*	0.00	0.52*	0.36*	0.48*	–									
7. innnovation_t1	–0.08	–0.01	0.30*	0.40*	0.42*	0.35*	–								
8. self-management_t2	–0.02	–0.10	0.67*	0.19*	0.24*	0.30*	0.12*	–							
9. social engagement_t2	0.00	0.02	0.21*	0.74*	0.33*	0.26*	0.25*	0.33*	–						
10. cooperation_t2	–0.06	0.01	0.30*	0.36*	0.68*	0.37*	0.22*	0.41*	0.51*	–					
11. emotional resilience_t2	0.20*	0.12*	0.29*	0.22*	0.33*	0.68*	0.11*	0.39*	0.41*	0.51*	–				
12. innnovation_t2	0.03	0.00	0.19*	0.25*	0.20*	0.15*	0.67*	0.25*	0.40*	0.39*	0.29*	–			
13. volunteering	0.05	–0.11*	0.26*	0.08	0.18*	0.19*	0.12*	0.10	–0.01	–0.04	0.04	0.02	–		
14. subjective perception	0.10	–0.21	0.12	0.08	0.03	–0.07	–0.19	0.18	0.23	0.04	0.05	0.14	–	–	
15. social interaction	–0.10	0.01	0.03	–0.03	–0.03	–0.14	–0.08	0.18	0.28	0.23	0.04	0.04	–	0.10	–
16. learning	–0.06	0.08	–0.02	0.05	0.03	–0.02	–0.01	–0.11	–0.19	–0.12	–0.06	–0.09	–	0.21	0.21

Note. Bivariate correlations for volunteering factors (14 – 16) only apply to the subsample of participants that volunteered, tracked hours, and wrote reflections ( $N = 82$ ). All other reported bivariate correlations are for the total sample ( $N = 455$ ). For gender, 0 = female, 1 = male. For subjective perception, 1 = positive emotional valence, 0 = lack of positive emotional valence. Missing data in these observed analyses was handled via list-wise deletion.

\*  $p < 0.05$ .

**Table 3**  
Group Differences in SEB Skills at T1.

SEB Skill Domain	Volunteering M (SD)	Comparison M (SD)	F (df)	Cohen’s d	95 % CI
Self-management	3.84 (0.55)	3.54 (0.52)	31.7* (1, 437)	0.56	0.36, 0.76
Social engagement	3.39 (0.64)	3.28 (0.72)	2.7 (1, 440)	0.16	–0.03, 0.36
Cooperation	4.05 (0.50)	3.85 (0.55)	14.3* (1, 433)	0.38	0.18, 0.57
Emotional resilience	3.50 (0.70)	3.22 (0.69)	16.5* (1, 441)	0.40	0.20, 0.59
Innovation	3.44 (0.60)	3.28 (0.59)	6.7* (1, 425)	0.26	0.06, 0.46

Note. Degrees of freedom differed across tests depending on missingness. 95 % CI = 95 % confidence interval of Cohen’s d.

\*  $p < 0.05$ .

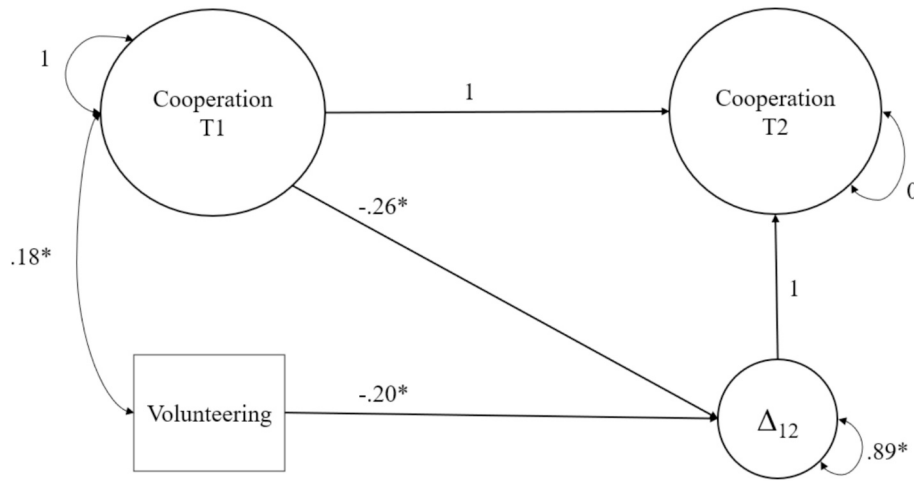
**Table 4**  
Parameter Estimates of Average Change for All Participants.

SEB Skill Domain	Latent Mean $\Delta$ T1/T2			$\Delta$ Score Variance			T1 Regressive Path		
	EST.	SE	95 % CI	EST.	SE	95 % CI	$\beta$	SE	95 % CI
Self-management	–0.08	0.07	–0.22, 0.06	0.83*	0.05	0.73, 0.94	–0.41*	0.07	–0.54, –0.28
Social engagement	0.02	0.05	–0.13, 0.16	0.89*	0.06	0.79, 0.98	–0.34*	0.05	–0.48, –0.19
Cooperation	–0.05	0.07	–0.19, 0.10	0.92*	0.05	0.83, 1.00	–0.29*	0.08	–0.44, –0.14
Emotional resilience	–0.18*	0.07	–0.32, –0.04	0.86*	0.05	0.76, 0.96	–0.38*	0.07	–0.50, –0.25
Innovation	0.12	0.08	–0.03, 0.27	0.95*	0.04	0.87, 1.00	–0.23*	0.08	–0.39, –0.08

Note. T1 Regressive Path = latent SEB skill domain T1 score predicting SEB skill domain latent mean change. EST = standardized estimate, SE = standard error, 95 % CI = 95 % confidence interval.

\*  $p < 0.05$ .

codes to the LCSM model and limited analyses to the subset of volunteers. We ran models both with and without demographic controls. All models, without demographic controls, fit the data adequately ( $CFI_{range} = 0.90 - 0.95$ ,  $TLI_{range} = 0.87 - 0.93$ ,  $RMSEA_{range} = 0.06 - 0.07$ ,  $SRMR_{range} = 0.08 - 0.09$ ). Table 5 presents key parameter estimates from these models. Holding all other predictors constant, social interaction predicted positive growth in social engagement and cooperation skills. Similarly, positive subjective perceptions of volunteering also predicted growth in social engagement and cooperation skills. By contrast, descriptions of learning negatively predicted changes in social



**Fig. 1.** Volunteering Predicted Declines in Cooperation Skills without Accounting for Features of the Experience *Note.*  $\Delta_{12}$  = latent mean change score. Single-headed arrows indicate regression paths and double-headed arrows indicate correlations. All coefficients were standardized. Item loadings and residuals for Cooperation skills at T1 and T2 are omitted for clarity. Paths with 1s and 0s are latent change score modeling constraints. Findings were robust with the inclusion of demographic controls, and parameter estimates from these models can be found on osf Supplemental Table S5.

**Table 5**  
Parameter Estimates of Experiential Features of Volunteering Predicting SEB Skill Change Without Demographic Controls.

Predictor	Self-Management $\Delta$			Social Engagement $\Delta$			Cooperation $\Delta$			Emotional Resilience $\Delta$			Innovation $\Delta$		
	$\beta$	SE	95 % CI	$\beta$	SE	95 % CI	$\beta$	SE	95 % CI	$\beta$	SE	95 % CI	$\beta$	SE	95 % CI
Social Interaction	0.27	0.18	-0.09, 0.63	0.36*	0.13	0.09, 0.62	0.36*	0.13	0.10, 0.62	0.03	0.15	-0.27, 0.34	0.05	0.15	-0.24, 0.33
Subjective Perception	0.20	0.20	-0.19, 0.60	0.33*	0.14	0.06, 0.61	0.29*	0.14	0.01, 0.57	0.19	0.15	-0.14, 0.51	0.28	0.15	-0.02, 0.58
Learning	-0.30	0.18	-0.66, 0.06	-0.40*	0.14	-0.67, -0.13	-0.33*	0.14	-0.60, -0.07	-0.18	0.15	-0.48, 0.13	-0.16	0.15	-0.45, 0.14

*Note.*  $\beta$  = standardized regression coefficient, SE = standard error, 95 % CI = 95 % confidence interval. Parameter estimates with demographic controls can be found in supplemental Table S7 on OSF.

\*  $p < 0.05$ .

engagement and cooperation skills. There were no other significant findings.<sup>3</sup>

As a robustness check, we also investigated whether simply writing a reflection or volunteering more hours predicted change in SEB skills (see Supplemental Table S3 on OSF for fit statistics and Supplemental Table S8 for parameter estimates from these models). In general, neither writing a reflection nor volunteering more hours predicted change in any SEB skill ( $ps > 0.05$ ). However, writing a reflection predicted declines in emotional resilience skills ( $\beta = -0.29$ , SE = 0.11,  $p = 0.006$ ). Taken together, these findings indicate that changes in SEB skills over

<sup>3</sup> Parameter estimates from models that include demographic controls are available in Supplemental Tables S4 and S6 on osf. In terms of volunteering predicting latent SEB skill change, findings did not differ with the addition of more demographic predictors. When additional demographic predictors were added to the models in which experiential features of volunteering predicted SEB skill change, findings for social engagement and emotional resilience skills did not differ. However, findings for self-management, cooperation, and innovation skills differed in terms of one parameter. For self-management skills, learning from the experience negatively predicted SEB skill change. In addition, positive subjective evaluations predicted gains in innovation skills but not cooperation skills. We caution over interrupting these effects because when demographic controls were added to the models, fit significantly worsened with CFI, TLI, RMSEA, and SRMR falling below commonly-used thresholds for acceptable fit. Poor model fit in SEM is an indication that the theoretical model does not match the correlation matrix in the observed data. Thus, all parameter estimates presented in the main text come from models without demographic controls.

the course of a volunteering program substantially depended on the features of participants' volunteering experiences and investment in the experience. Participants whose experiences involved social interaction and led to positive perceptions of volunteering were more likely to show positive growth in social engagement and cooperation skills. By contrast, those whose experiences sparked learning showed declines in social engagement and cooperation skills.<sup>4</sup> In addition, those who wrote reflections on their experiences demonstrated declines in emotional resilience skills.

#### 4. Discussion

The present findings support three key conclusions about the relationship of service learning and volunteering with SEB skills. The first conclusion is that volunteering and service-learning programs on college campuses attract emerging adults who have high levels of SEB skills. Participants who were engaged in service-learning and extracurricular volunteering reported higher initial levels of all SEB skills, except for social engagement skills, than participants in the comparison sample at T1. These findings complement previous quasi-experimental work that

<sup>4</sup> As a sensitivity test, we also conducted all of the main analyses with and without the subset of extracurricular volunteers. Results from these analyses are reported in Supplemental Tables S10 – S13 on OSF. Findings from these sensitivity tests are generally consistent with findings using the total volunteering sample with a few idiosyncratic differences. Importantly, the findings support the three key conclusions about the relationship between volunteering and SEB skills that are elaborated in the discussion.

found strength in SEB skills predicted the number of hours that college students volunteered during the COVID-19 pandemic (Sewell et al., 2023). College students may seek out civic opportunities to use their existing SEB skillsets and these skillsets, in turn, may help them sustain their involvement in prosocial civic activities. Conversely, however, some college students with lower SEB skill levels may be missing out on important civic opportunities that could help them more deeply engage with their coursework and promote later civic engagement (Celio et al., 2011). This implication underscores the need for civic opportunities on college campuses that are accessible to students with low skill levels and opportunities for emerging adults to develop the skills associated with selecting into these more “high skill” civic opportunities.

The second conclusion is that simply engaging in volunteering and service-learning and writing reflections about the experience does not necessarily entail positive SEB skill development. Volunteers did not generally show gains in any SEB skill domains, relative to the comparison group of non-volunteers, across the study duration. In addition, when features of the volunteering experience were not taken into account, volunteers demonstrated declines in their cooperation skills, relative to their comparison group. Though this finding may seem counterintuitive at first glance, there are likely both statistical and conceptual interpretations for this effect. The first is ceiling effects: Volunteers reported high initial levels of cooperation skills, on average, at T1 ( $M = 4.05$ ; maximum score = 5). Thus, if volunteers did change in cooperation skills across the study, they may have experienced decline as there was not much room to grow in these skills. Similarly, the volunteering experience may not have been rigorous enough in terms of cooperation skill demands to promote skill growth in this relatively higher-skill group. A second conceptual interpretation of these findings is that once students were involved in the broader community, they gained insight into the realities of their cooperation capacities. High self-evaluations in cooperation skills may have led college students to volunteering experiences, but putting those skills to use in interactions with community members and other students may have led volunteers to reevaluate their cooperation capacities in comparison to updated, and more rigorous, standards.

The third key conclusion that can be drawn from this work is that domain-relevant actions and positive subjective perceptions may be necessary for positive skill development. In the current study, neither writing reflections about the experience nor a high number of hours volunteered were enough to guarantee SEB skill growth. However, descriptions of social interactions while volunteering predicted positive changes in social engagement and cooperation skills. These skills capture capacities for leadership, teamwork, perspective-taking, and communication. Theoretical perspectives on SEB skill development emphasize that intentional practice may be critical for skill development (Soto et al., 2021), and empirical research suggests that performing specific behaviors, rather than simply wanting to change, is often necessary for growth in personality traits (Hudson et al., 2019). Our findings complement these perspectives and suggest that volunteering *can* promote gains in social and cooperative skills *if* there are opportunities to engage in these behaviors (Celio et al., 2011; Gordon et al., 2022; Khasanzyanova, 2017; Salam et al., 2019). Importantly, descriptions of social interactions did not predict changes in other SEB skill domains, suggesting that practicing specific kinds of behaviors predicts growth in corresponding SEB skills, rather than an undifferentiated effect on all perceived skills.

Similarly, we found that positive subject perceptions of volunteering predicted growth in social engagement and cooperation skills. One interpretation of these findings could be that participants who felt more positively about their volunteering experience may have also received positive feedback from relevant others about their social and cooperative skills. Feedback is speculated to be an important element of intentional SEB skill development (Soto et al., 2021). For instance, tutoring a child who is actively engaged in the session may feel more rewarding, and, for participants, reinforce notions that they have the social skills

necessary to meet the demands of the volunteering task. As an example, one volunteer explained, “I altered my methods and tried other ways to help them remember... It was also nice to see the enthusiasm for learning coming from the[m] [the youth].” Though the present study is limited in understanding the mechanisms behind why positive subjective perceptions predict SEB skill change, future research could explore this possibility.

By contrast, we found that descriptions of learning predicted declines in social engagement and cooperation skills. Reflecting on knowledge gained through volunteering or service-learning may have also prompted reevaluations of one’s social and cooperative skills. For instance, a volunteer described this sort of learning in their reflection:

“By participating in this experience, I was able to better understand the structure of a non-profit organization... However, the learning involved was not limited to this. I was also able to learn how to work with other[s] – not only of my age group but also with those older than me.”

Prior to their volunteering experience, students’ understanding of their social competencies were likely built upon interactions with same-age peers and family. Engagement with others in new social contexts may have brought on new challenges and subsequent reconsiderations of their competencies. At the very least, the experience may have provided novel insight into the realities of their social and cooperative skills. We also found that the act of simply writing a reflection was related to declines in emotional resilience skills. Those who had greater investment in the volunteering experience, as indicated by their volitional submission of a written reflection, may have reported lower levels of emotional resilience skills because they were balancing more obligations (e.g., academics and volunteering). These interpretations and all others should be explored in future work. As a whole, these findings suggest that, in order to get a full picture of how certain life events and experiences may lead to SEB skill development, subjective perceptions, experiential features, and degree of investment in the experience should be considered— rather than assuming that life events and experiences will have equivalent impacts for all individuals (Dugan et al., 2024; Schwaba et al., 2023).

It is also important to acknowledge that several experiential features had small-to-medium effects on changes in self-management, innovation, and emotional resilience skills, though they did not reach statistical significance. This may reflect the smaller sample size (and therefore more modest statistical power) for testing these effects, which could have yielded failures to detect some true links between experiential qualities and SEB skill change. Thus, the impact of positive subjective evaluations, social interactions, and learning from the experience on changes in these skills remains uncertain, and future research with larger sample sizes should build on the present findings and further probe these effects. In a similar vein, our experiential coding scheme was necessarily exploratory, and a future preregistered study should test the replicability of these findings.

#### 4.1. Strengths, limitations, and future directions

Though this study has multiple methodological strengths such as its use of pre- and post-tests and inclusion of a comparison sample, there are also several limitations. Participants were not randomly assigned to engage in the service-learning and volunteering program. Though this study was able to investigate selection effects, random assignment or use of a waitlisted control group would allow for stronger causal inferences about the impact of service-learning and volunteering on college students’ SEB skills, and future research should utilize experimental methodologies to further investigate causality. In addition, due to the small number of extracurricular volunteers, we combined this subset of volunteers with students who were participating in service-learning courses. Students who engage in volunteering during their free time may differ in terms of their SEB skills from students who engage in

volunteering because it is a course requirement. Service-learning may also provide a more structured and supportive context for SEB skill development as compared to extracurricular volunteering. Future research could explore these possibilities.

Approximately half of the volunteers did not write reflections, so we do not know their subjective perceptions of their volunteering experience nor the activities that these participants were engaged in. However, sensitivity analyses suggested that simply writing reflections was not generally predictive of SEB skill change. Future research could further incentivize participants to provide these written reflections to better understand how subjective perceptions and experiential aspects of life events and experiences are related to SEB skill change. This study also only used one post-test measure of SEB skills. It is therefore uncertain whether declines and gains in skills are temporary or enduring. Future research should utilize multiple post-experience assessments to investigate the longitudinal stability of SEB skill change.

The generalizability of the findings is limited to students at four-year universities in the US and not emerging adults broadly. College students are often more civically engaged than their peers who are not enrolled in postsecondary institutions, and these differences in civic engagement are often apparent in high school (Finlay et al., 2010; Flanagan & Levine, 2010; Syvertsen et al., 2011). Future research would benefit from investigating the bidirectional associations among SEB skills and civic engagement in a sample of emerging adults that includes those actively enrolled in four-year and two-year institutions as well as those who are not.

The context of this data collection was during the COVID-19 pandemic. Thus, community organizations had to necessarily adapt some existing volunteer opportunities or create remote-friendly opportunities in consideration of public health. Importantly, this may have limited the number of students who could practice their social engagement and cooperation skills by engaging face-to-face with other volunteers and community members. Future work could explore the associations between SEB skills and volunteering in less disruptive circumstances. Finally, this study exclusively used self-report data. Future work could draw on other data sources such as from peers, supervisors, and/or community members to measure both SEB skills and features of volunteering experiences.

#### 4.2. Conclusion

The present research advances our understanding of the links between SEB skills and volunteering in three key ways. First, service-learning and volunteering opportunities attract college students with higher levels of SEB skills. Second, simply engaging in service-learning and volunteering does not necessarily entail positive SEB skill change. However, domain-relevant actions predicted positive skill change, especially for socially relevant skills, and positive subjective evaluations of the experience predicted skill growth. These findings broaden our understanding of the psychological factors associated with college students' civic engagement and underscore that not all service-learning and volunteering opportunities are supportive of positive personal development. Rather, opportunities to enact specific, domain-relevant behaviors and positive appraisals of the experience appear to be key active ingredients for skill growth.

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#### CRedit authorship contribution statement

**Madison N. Sewell:** Writing – review & editing, Writing – original draft, Formal analysis, Data curation, Conceptualization. **Christopher M. Napolitano:** Writing – review & editing, Funding acquisition, Conceptualization. **Hee Jun Yoon:** Writing – review & editing, Conceptualization. **Christopher J. Soto:** Writing – review & editing, Conceptualization. **Brent W. Roberts:** Writing – review & editing, Conceptualization.

#### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

#### Appendix: Examples of volunteer opportunities

1. Support outdoor family game night.
2. Support playground and indoor activities with children.
3. Provide tech support creating social media content and promotional material.
4. Teach virtual media programs to youth and adults.
5. Volunteer in non-profit stores doing sorting, pricing, stocking, quality control, and direct assistance of customers and staff.
6. Support communication initiatives
7. Support community building activities and facilitate discussions with small affinity groups of 6–10 students from similar backgrounds.
8. Provide tech support to Senior Citizens.
9. Collaborate in the identification of relevant grants and support funding efforts.
10. Assist with gardening efforts.
11. Provide technical support in virtual meetings.
12. Mentor kindergarten to fifth grade students in STEM programs.
13. Lead STEM activities with middle school students & families.
14. Provide after-school activities for middle school students during after-school programs.
15. Provide once-a-week STEM activities with elementary and middle school age girls that are culturally responsive and centered on creativity, problem solving, and empowerment.
16. Provide tech support in building and maintaining a website.
17. Support in door-to-door canvassing.
18. Organizing production of print materials.
19. Organizing books and providing support at larger book sales.
20. Support fundraising events.
21. Develop infographs and organize materials for community programming.
22. Create bibliography for services relevant to client needs.
23. Create social media posts, blogs, and review book materials.
24. Develop literature reviews.
25. Support recruitment of students to the program.
26. Support registration of attendees and assemble training packets for mentor trainings.
27. Write letters to isolated seniors.
28. Direct runners in a 5 k race.

#### Data availability

Partial deidentified data, analytic code, power analysis code, and supplemental tables are available on OSF.

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