Can Repeated and Reflective Prosocial Experiences in Sport Increase Generosity in Adolescent Athletes?

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Abstract

In partnership with a sport-based Experiential Philanthropy Intervention (EPI)—The Play Better Program—we conducted a pre-registered, longitudinal experiment examining whether repeatedly reflecting on prosocial activity could boost adolescents' objective generosity. Adolescents (*N*=114; aged 9–16) practiced charitable giving throughout their 2-month sports season and were randomly assigned to repeatedly reflect on the importance of their prosocial activity (*Reflection* condition) or to write about their everyday activities (*Control* condition). Adolescents completed an objective measure of generosity at pre- and post-intervention and self-reported measures of prosocial character. Across conditions, adolescents donated objectively more at post- vs. pre-intervention. However, adolescents in the *Reflection* (vs. *Control*) condition were no more generous and did not report greater prosocial character at post-intervention. Overall, these findings highlight the malleability of human prosociality and the need for additional scholar-practitioner collaborations to uncover whether and how EPIs boost long-term generosity among the next generation of givers.

Keywords: Generosity; Charitable Giving; Prosociality Interventions; Reflection; Prosocial Character Development; Adolescence; Sport

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Humans are an extraordinarily prosocial species (e.g., Fehr & Fischbacher, 2003, 2004; Rand & Nowak, 2013), yet some evidence suggests that generosity has steadily declined over recent decades. According to recent national and global data, fewer people are donating their money to help others over the last few decades, and those that do are donating less than in previous generations (Angus Reid Institute & Charitable Impact, 2017; Charities Aid Foundation, 2017; Giving USA, 2018, 2019; Rooney et al., 2018; but see Helliwell et al., 2022). Adolescents and young people (aged 10-24) today are expected to continue these trends as they currently engage with the charitable sector even less than previous generations (Lasby & Barr, 2018; Rooney et al., 2018). As such, many charities and non-profit organizations may be at risk as they unsustainably rely on fewer donors and those who give fewer of their resources (CanadaHelps, 2018). Meanwhile, adolescents are likely to miss out on the benefits of generous behavior, such as greater health, happiness, and social connection (Aknin et al., 2019; Curry et al., 2018; Post, 2005).

To address these concerning trends, numerous interventions have emerged to cultivate prosocial character—defined as having relatively stable motivations and tendencies to improve others' well-being—among adolescents to bolster both short- and long-term generosity (Berkowitz & Bier, 2007; Bjorhovde, 2002; Falk & Nissan, 2007; Kidron & Fleischman, 2006; Millisor & Olberding, 2009; Stuart, 2012; Taylor et al., 2017; Weber & Thayer, 2017). From the classroom to community sports programs, practitioners have designed prosocial interventions to integrate generosity into adolescents' everyday experiences based on the belief and research (e.g., Ottoni-Wilhelm et al., 2008, 2014) showing that increasing generosity early in life can help people contribute more to the collective good during their lifetime. Moreover, early intervention is thought to capitalize on

the formative developmental period of adolescence, where people begin to develop habits that they carry with them for their entire lives and seriously consider whether and how helping others is personally important as they develop their sense of self (e.g., Chase-Landale et al., 1995; Eisenberg et al., 2006; Steinberg., 2011).

Building on this research, we conducted a pre-registered, longitudinal experiment to test whether an adolescent-based prosociality intervention that was implemented in the context of sports teams could increase adolescents' long-term generosity. Specifically, we investigated whether providing adolescents with repeated opportunities to reflect on the importance of prosociality for themselves and others would bolster the efficacy of adolescent-based prosociality interventions for developing prosociality.

Adolescent Prosocial Development

Prosocial behavior is strongly shaped by social norms across cultures during middle childhood (ages 6 – 11; e.g., House et al., 2020) and many prosocial habits, values, and tendencies develop in teenage years and early adulthood (ages 12 - 18; Eisenberg et al., 2015; Eisenberg & Fabes, 1998; Schnitker et al., 2019). Adolescence is a period associated with a host of meaningful cognitive, social, and physical changes that may be critical to form virtues like generosity (Schnitker et al., 2017; Steinberg & Morris, 2001).

Due to their advancing cognitive capacities, adolescents may be better equipped than children to consider and reflect on complex ideas like poverty and to deliberately change their behaviors (Smetana, 1989; Steinberg, 2011). Driven by advanced social skills, adolescents (vs. children) may also be better attuned to the experiences of a broader network of people (e.g., peers, teachers, community members) and thus more adept at integrating prosocial experiences into their self-concept, which can, in turn, influence behavior (Steinberg, 2011; Steinberg et al., 2006). Given the possibility for interventions to positively impact behavior for individuals in this age range and because of the dearth of longitudinal

work examining prosociality development in adolescence (Padilla-Walker & Carlo, 2014), we specifically focus on adolescents between the ages of 10 – 18.

Adolescent-based Prosociality Programs

Early interventions can take many forms and target adolescents at various stages of development (Berkowitz & Bier, 2007; Mesurado et al., 2019; Taylor et al., 2017; see Table 1). Some popular programs involve prosocial mentorship. For example, youth and adolescents involved in Big Brothers and Big Sisters, an international program for individuals aged 6-18, are matched with a same-sex adult volunteer role model to engage in one-on-one school and extracurricular activities for support and prosocial modeling. Other popular programs make use of the time that children and adolescents spend in the K-12 classroom to teach students socioemotional skills (Hofferth & Sandberg, 2001; Taylor et al., 2017). A well-known example is the Roots of Empathy Program (i.e., ROE; Santos et al., 2011) which attempts to cultivate empathy and increase prosocial behavior by exposing students to parent-infant interactions and by asking students to identify the infant's emotions. In the ROE program, parents spend time playing with and caring for their infant in the classroom. Meanwhile, an instructor guides students to observe, articulate, and discuss what the baby may feel during the interactions. Through this process, students gain practice directing the same loving, positive emotions they observed from the parent-infant to other people.

Perhaps some of the most widely adopted forms of adolescent-based prosocial interventions – and those that we focus on here – are categorized as Experiential Philanthropy Interventions (EPIs; McDougle et al., 2017). In most EPIs, adolescents in classrooms receive funds which are then used to prompt discussion, research, and subsequent decisions about where to donate, all while encouraging a reflection on meaningful social issues. As such, EPIs provide adolescents with repeated hands-on opportunities to donate money to charity as they discuss and reflect on their contribution to the world more broadly. Importantly,

theoretical, and empirical work suggest that EPIs and adolescent-based prosociality programs may be effective in promoting adolescent generosity.

Repeated and Reflective Prosocial Experiences

According to theories of virtue development (Schnitker et al., 2019), prosocial experiences during adolescence can translate into sustained prosocial behavior in adulthood through two primary routes. First, early prosocial experiences may lead to sustained prosocial behavior when they are instilled as habits across time (Ahmed & Olberding, 2007; Benenson et al., 2014; Carlo et al., 2007; Lawford et al., 2005; Penner et al., 1995; Youniss et al., 1997). Habit formation typically requires hands-on repeated practice. Therefore, EPIs and other adolescent-based prosociality interventions can help encourage long-term generosity by providing adolescents with repeated opportunities to engage in prosocial action, thereby forming habits around generous behavior.

Second, early prosocial experiences may translate into sustained prosociality by providing the opportunity to reflect on generosity and help adolescents incorporate generous actions into their personal identity. According to theories of virtue development (Schnitker et al., 2019), one reason that reflection may be so critical for supporting sustained prosociality is because when giving is a reflective act, adolescents may develop greater prosocial character.

By giving prosocial experiences serious consideration, adolescents may develop what the literature considers to be three important aspects of prosocial character: (1) a *prosocial purpose*—a meaningful, enduring desire to improve others' well-being, (2) a *prosocial identity*—an identity as someone who cares about and acts in ways that benefit others, and (3) a *self-transcendent narrative*—an internal sense that one's daily actions in life have value that transcends beyond oneself (Brown et al., 2013; Finkelstein et al., 2005; Herzog & Mitchell, 2016; Ottoni-Wilhelm et al., 2014; Schnitker et al., 2017, 2019).

Past work supports this proposition and suggests that prosocial action may become more permanent in life when adolescents reflect on and integrate their prosocial experiences into their overall sense of self and character (Brown et al., 2013; Hampson, 2012). Thus, it is possible that by encouraging greater reflection on prosocial action, EPIs and other adolescent-based prosociality interventions shape adolescents' short-and long-term generosity by cultivating greater prosocial character, including a *self-transcendent narrative* and greater *prosocial purpose and identity*.[1] In this project, we explicitly test the extent to which an EPI shapes long-term generosity by impacting these three key elements of prosocial character.

Overcoming the Limitations of Past Work

In addition to rich theoretical rationale, there is also growing empirical evidence suggesting that EPIs and other adolescent-based prosociality interventions may effectively promote adolescent generosity. The most comprehensive meta-analysis on prosocial classroom interventions reports that these programs produce modest increases in self-reported prosocial behavior for children and adolescents ages 8-18 (Mesurado et al., 2019). Moreover, a recent correlational study by Benz and colleagues (Benz et al., 2020) found that university students reported higher intentions to donate to charity after participating in an EPI where they researched, discussed, and selected a local non-profit to receive $2,000 USD. Importantly, however, the current research examining EPIs (or other adolescent-based prosociality programs) is limited in several ways.

First, the research conducted on adolescent-based prosociality programs thus far has focused primarily on classroom-based interventions. Yet, much prosocial development occurs

[1] Of course, EPIs and other adolescent-based prosociality interventions might shape short-and long-term generosity through numerous mechanisms. However, from our review of the literature, we believe that developing these three key elements of prosocial character (i.e., a self-transcendent narrative, prosocial purpose, and prosocial identity) are likely the most important predictors of how prosociality interventions affect adolescent generosity.

in a variety of contexts outside of the classroom, including at home, through extra-curricular activities, and even online contexts (e.g., Carlo & Padilla-Walker, 2020). For example, outside of school, organized sport is a common activity in which adolescents spend their time (e.g., Larson, 2001; Larson & Verma, 1999). Critically, research suggests sport may be a fruitful context for prosocial development given that coaches can often act as prosocial adult mentors and adolescents can build teamwork and positive interpersonal skills as they learn to cooperate with their teammates (e.g., Fraser-Thomas & Côté, 2009; Holt et al., 2017, 2020; Wells et al., 2008). In this work, we study EPIs outside the classroom and in another context where adolescents spend a sizable amount of their time—on the sports field—to examine how adolescents can develop prosociality in their other important everyday contexts.

Second, there is little rigorous experimental evidence examining whether repeatedly reflecting on prosocial behavior in EPIs *causes* lasting changes in adolescents' generous behavior. While some experiments have examined the efficacy of these programs (see Chan et al., 2021 and Table 2 for a comprehensive list), none have examined the unique causal impact that reflecting on prosocial activities has on adolescents' prosocial development. In fact, a substantial proportion of the literature that examines the relationship between adolescent-based EPIs and generosity is correlational and does not provide causal evidence at all (e.g., Ahmed & Olberding, 2007; Macke et al., 2015; McDougle et al., 2016; Millisor & Olberding, 2009; Olberding, 2009, 2012; see also Mao, 2021). As such, it is possible that adolescents who are more generous or who already actively reflect on their prosocial action are also more likely to participate in prosociality programs, such as EPIs. Our experiment overcomes the limitations of past work by randomly assigning adolescents participating in a sports-based EPI to either repeatedly reflect on the importance of their prosocial action or to engage in a controlled writing activity. Thus, our experiment can examine whether privately

reflecting on prosocial action repeatedly over time can boost the efficacy of a sport-based EPI for creating long-term increases in adolescents' generosity

Third, most studies in the literature have examined self-reported prosociality (Mesurado et al., 2019). This is a critical limitation because self-report measures are subject to reporting bias (Nisbett & Wilson, 1977), particularly in moral domains where people want to present a favorable image and can easily exaggerate their donation behaviors (Orne, 1962). As such, objective measures of generosity are needed to assess the impact of adolescent-based prosociality programs on actual behavior. In our study, we use a modified version of a widely-used objective measure of prosocial behavior—a dictator game (Engels, 2011; Ibbotson, 2014; Kosse et al., 2020)—to examine the impact of a prosocial program on the objective giving behavior of adolescents.

Lastly, few (if any) experimental studies have been pre-registered, meaning that the study designs, recruitment plans, measurement, and analyses were not specified in advance, limiting their evidentiary value (Schimmack, 2020; Simmons et al., 2011; Wiseman et al., 2019). For example, the most recent meta-analysis in this area provides evidence for selective reporting—suggesting that some of the reported results could be inflated (Mesurado et al., 2019). Thus, pre-registration is critical to advance our understanding of adolescent-based prosociality interventions in accordance with current best methodological practices. In this project, we pre-registered our predictions and analysis plan (see Methods for details).

Current Research and Hypotheses

To overcome the limitations of past work, we used a pre-registered experiment and objective, behavioral measures to examine whether and how a sport-based EPI can impact adolescents' long-term giving behaviors. Specifically, we tested whether adolescents in organized sport who had repeated hands-on opportunities to donate money to charity and discuss the importance of their prosocial actions with others were objectively more generous

after the program as compared to before completing the program (H_1). Critically, to test the causal impact of reflection in shaping generosity, we randomly assigned some adolescents to have additional opportunities to privately reflect on the importance of their prosocial acts while other adolescents completed a controlled writing task. We pre-registered that adolescents in the reflection condition would demonstrate higher levels of objective generosity at the end of the program than those in the control condition, controlling for adolescents' pre-intervention (i.e., baseline) generosity levels (H_2).

We also explored the potential for repeated and reflected charitable action to increase generosity through several theoretical pathways. Specifically, we investigated whether prosocial purpose, prosocial identity, and self-transcendent narrative helped explain in part any effects that sport-based EPIs may have on adolescents' objective generosity. In line with past research, we hypothesized that adolescents who participated in the EPI and were randomly assigned to reflect on the importance of their prosocial action repeatedly privately throughout their sport season—vs. simply participate in the program and repeatedly complete a controlled writing activity—would develop greater prosocial character by the end of the program. Specifically, we predicted that adolescents in the *Reflection* (vs. *Control*) condition would report greater post-intervention (i.e., endline) prosocial purpose, prosocial identity, and self-transcendent narrative, controlling for baseline levels of prosocial character. In turn, we predicted that this increase in prosocial character would explain why participants who reflect on their prosocial action would act more generously than participants in the control condition by the end of the program.

Play Better Program

To test our research questions, we partnered with Charitable Impact Foundation, a registered public foundation in Vancouver, BC to examine their sport-based EPI called *The Play Better Program* (PBP) designed for children and adolescents participating in any

organized sport. Since its inception in 2011, Charitable Impact has enabled over 260,000 North Americans to donate more than $1 billion to charities through their online giving platform, Charitableimpact.com. Charitable Impact's platform offers a democratic approach to giving, allowing individuals to set up one-time or ongoing donations to any registered charity of their choosing.

In the PBP, parents, and coaches use the charitable impact platform to reward adolescents in sport for achieving training goals with small charitable donations for adolescents to give to causes that they care about. Specifically**,** children and adolescents (ages 8 - 18) earn small donations ($0.10 - $2 CAD) each week to direct to the team's chosen charitable cause when the players achieve daily and weekly developmental goals. For instance, adolescents may earn $0.10 CAD when they make 50 passes in a soccer game. Each week, the donations are rewarded to either specific players or the team in general by the coach and the adolescents' parents. Throughout the season, donations are stored on a team page and are donated by the team to any registered Canadian charity listed on the Charitable Impact platform at the end of the season (see Supplementary Methods for the platform interface). Thus, in a two-month season, for example, adolescents can earn charitable rewards for eight consecutive weeks, ensuring that the PBP provides adolescents with *repeated* hands-on charitable giving experiences.

During weekly, semi-structured and/or informal team discussions, the coaches remind adolescents that they are playing to help others and encourage them to consider their charitable values, the impact of their donations, and how and why giving to charity may be meaningful to them and others. The PBP offers some resources that the coaches can use to structure their conversations (see Supplementary Materials). However, the coaches ultimately have the capacity and freedom to adjust their discussions to accommodate the unique needs and capacity of their team. This flexibility ensures that coaches across teams of varying ages

and cognitive capacities can cover the same fundamental concepts of the PBP (e.g., discussing charitable values) in ways that best fit their unique team context.

Taken together, like many other EPIs, the PBP enables adolescents to repeatedly make their own giving decisions and discuss and reflect on their prosocial actions as they engage in actionable conversations about charity. Thus, the PBP is a representative and ideal EPI to examine and test the unique impact that reflecting on prosocial action has on shaping adolescent generosity. To conduct our experiment, we built on the existing PBP framework to test the importance of reflection in cultivating long-term changes in generosity.

Method

The pre-registration, materials, data, and analyses script can be found on the Open Science Framework (OSF) at the following link: https://osf.io/amsz2/?view_only=122151d9154244f2bb04b3c3b1044f94.

Scholar-practitioner collaborative approach

Throughout each stage of the research process, we worked closely with the head coaches of the Play Better program and directors of Charitable Impact to incorporate their practical expertise in designing and executing the present experiment. We adopted this scholar-practitioner approach to ensure that our experimental design would align with rather than interfere with the existing PBP context. Qualitative work supports the possibility that context is a critical feature in the overall success of the PBP. Bean and colleagues (2021) interviewed 23 coaches who had used the PBP in their sport, including their perceptions of how the program impacted adolescents' development. The researchers found that coaches believed that PBP had an overall positive impact, including in developing adolescents' prosociality, when the coaches thought that the PBP matched well with their existing coaching philosophy—that is, when the program fit with the team's overall structure and context. Thus, we detail several methodological decisions below which leveraged the coaches

and PBP directors' unique and invaluable practical knowledge about the local sport context so that our research would successfully and respectfully fit within our sample's context.

Participants

We began recruitment for our study in Vancouver, BC during April – May 2021, the first available time during the COVID-19 pandemic in which organized community sport was allowed to resume operations. As such, our sample size was limited to the few sports teams in the area who were both willing to resume operations during the pandemic and to incorporate the Play Better program into their regular practices.

We worked with Charitable Impact to recruit coaches for the study using their established connections with the one local community soccer club who had registered to use the Play Better Program during their May – June 2021 season. Together, we invited the club's 10 coaches to participate in our study to help us examine how programs like Play Better impact how adolescent athletes think and behave both on and off the field. Nine out of the 10 soccer teams were available and willing to participate (5 boys teams, 4 girls teams), enabling us to recruit up to 126 adolescent athletes (aged 9 – 16). Following our recruitment and data collection procedures approved by the Simon Fraser University Ethics Board (Ethics no. 30000297), we obtained consent from parents and assent from adolescents. Of the 126 adolescents that we recruited, a total of 11 parents did not provide parental consent and one adolescent did not provide assent, leaving a total sample of 114 (see Table 3 for participant demographics). A total of 19 adolescents did not provide data necessary to test our primary hypotheses (see procedures and hypotheses below), leaving an analyzable sample of 95 participants.[2]

[2] We pre-registered that 21 participants had not provided physical ticket data at one or both dictator games. However, after conducting the analyses, we noted that there were two participants who had self-reported giving "0" tickets but were entered as having no physical ticket data simply because they took the envelope of tickets home with them. Thus, to increase statistical power, we deviated from our pre-registration and included these two participants in our analyses. The pre-registered results are statistically identical without these participants.

Sensitivity analyses conducted through G*Power Version 3.1 indicated that this sample gave us at least 80% power to detect effects as small as Cohen's $d_z = .29$ using an $\alpha = .05$ when testing whether our overall sample would be more generous at pre- vs. post-intervention (H_1). We had adequate power to detect effects as small as Cohen's $d = .17$ when testing for between condition differences in post-intervention generosity, controlling for pre-intervention generosity levels (H_2).

Procedure

At four separate times during the teams' sport season in May – June 2021, two research assistants (RAs) visited the sports field where teams held their weekly soccer practice sessions and administered our study assessments via pen and paper (see Fig. 1 for complete experiment timeline). We followed the practical advice of the Play Better coaches and Charitable Impact team to limit to four assessments, scheduled roughly every two to three weeks, to reduce burden for both participants and coaches. During each assessment, participants were asked to find a spot on the field away from their peers where they could complete the survey in private and they were asked to not discuss their answers and keep their eyes on their own surveys. This ensured that participants would be minimally influenced by the responses of their peers. To ensure participant safety, the RAs were masked, sanitized all materials prior to and after use, and maintained mandated physical distancing guidelines.

Baseline (Time 1) Assessment

During the first week of the sports season in May 2021, prior to the start of the PBP and random assignment, participants completed a pre-intervention or baseline assessment at Time 1 (T1). In the T1 assessment, participants completed our pre-registered objective measure of generosity followed by our three proposed theoretical mechanisms. Specifically, we assessed participants' baseline levels of generosity using an adapted dictator game—a common, objective measure of generosity (Engels, 2011)—followed by self-reported

measures on each prosocial identity, prosocial purpose, and self-transcendent narrative (see Measures for details). Participants finished their T1 survey by responding to a few demographics and whether they had been exposed to the PBP prior to the T1 assessment (see Appendix for details).

Repeated prosocial experiences

After completing the T1 assessment, all adolescents began the PBP. In the program, adolescents were introduced to the PBP by their coach and discussed and chose as a team to which charitable cause that they wanted to earn and direct their charitable rewards (see Supplemental Materials for an example program introduction). Then, each week for eight consecutive weeks, adolescents set several daily and weekly goals (approximately 10) with their coach and their team to develop their soccer skills and knowledge (e.g., practice juggling skills for 30 minutes a day, watch a professional soccer game over the weekend). They tracked each goal that they completed using a tracking sheet which they had their parent sign and then brought back to their coach (see Supplemental Materials for an example tracking sheet).

For each goal that adolescents completed, they were rewarded $0.10 on the Charitable Impact platform to be donated to the charity of the team's choice, thus enabling adolescents to have *repeated* hands-on experiences with giving. We decided together with the PBP coaches and Charitable Impact team to reward adolescents with $0.10 for each goal achieved (i.e., a $1.00 a week per player, on average) to understand the impact of the program when costs were small-to-moderate. As a result, we would have greater confidence that if we found any evidence in favour of the program's efficacy, the PBP could be scalable and implemented in a variety of contexts, including contexts with relatively low economic resources. Beyond this practical consideration, we reasoned that this sum would be theoretically and psychologically relevant because past research has shown that even spending small amounts

of money (e.g., $2.50 CAD) to help others can have a meaningful impact on one's well-being (Aknin et al., 2013; Aknin et al., 2020; Dunn et al., 2008). Thus, we expected that over the course of the season, earning small charitable rewards could have a meaningful psychological impact for adolescents.

Experimental Conditions: Opportunities for Reflection (Time 2 – Time 4)

In addition to engaging in repeated prosocial experiences, during practice sessions throughout the season, all coaches had brief, informal discussions with the team about the importance of charitable behaviors. As such, adolescents had the opportunity to discuss their prosocial actions with an adult mentor (i.e., their coach) and their team. Critically, however, at Time 2 (T2), roughly 2 weeks after the T1 assessment, we randomly assigned half of our participants to the *Reflection* condition to have several additional, private opportunities to reflect on their prosocial actions. Specifically, we had participants write for roughly five minutes about whether and how they thought and felt that their prosocial acts through the PBP were important for themselves and others. Meanwhile, the other half of participants were assigned to a *Control* condition wherein participants privately wrote for roughly five minutes about how their weekend activities differed from their weekday activities to control for the time it took to write about a daily experience across conditions. Participants repeated their respective writing activities approximately every 2 – 3 weeks, both at Time 3 (T3) and Time 4 (T4). Overall, while participants across conditions could reflect on their prosocial actions through the discussions they had with their coach and peers during the season, only participants in the *Reflection* condition had more frequent opportunities to reflect on their prosocial action through the private, reflective writing activity.

We employed this experimental design for two key reasons. First, this design enabled us to test the unique impact that giving adolescents repeated opportunities to reflect on their prosocial action has on their objective prosocial behaviors and prosocial character

development. Second, this design enabled the PBP and Charitable Impact directors to test the impact of this relatively low-touch adaptation to the program. In past iterations of the PBP, the Charitable Impact directors noted that the frequency and depth of the reflective conversations that coaches would have with adolescents often varied by team and coaches' overall comfort in facilitating these conversations. Thus, based on our partner organization's practical knowledge of the local context, we believed that adding additional opportunities for adolescents to privately reflect on their prosocial acts could be a low-cost and theoretically interesting method by which to add value to the program without burdening the coach.

Time 2 – Time 4 Assessments

At T2 and T3, after participants completed their writing activities, participants would then complete the same measures assessing our theoretical mechanisms (see Measures for details). After the PBP had finished at the end of their season in June 2021, participants completed their post-intervention or endline assessment at T4. Specifically, after completing their writing activity, participants completed the same modified dictator game as T1, thus allowing us to measure adolescents' post-program levels of objective generosity. Finally, after completing the endline dictator game, participants once again completed the same measures tapping into their current levels of prosocial identity, prosocial purpose, and self-transcendent narrative.

Measures

Pre-registered Outcome: Objective Generosity (Dictator Game)

At baseline (T1) and endline (T4), we assessed objective generosity via a modified dictator game. In our modified dictator game, adolescents earned 10 raffle tickets for a chance to win one of five $25 bookstore gift cards and had the choice to give none, some, or all their raffle tickets to a sick child at a children's hospital. Given the logistical challenges of conducting the dictator game in the field, in the short time prior to adolescents' practice

session, we had participants direct themselves through the game by following a set of written instructions (see Supplemental Materials); participants were allowed to ask RAs for assistance and clarification as needed. We operationalized generosity as the number of physical tickets (0 – 10) that adolescents left in an envelope to be donated to sick kids at a children's hospital.

Our dictator game differs from a standard dictator game in two primary ways: (1) the commodity donated and (2) the target recipient of the participant's generosity. In a standard dictator game, participants are often asked to determine how much of a fixed sum they would like to give unilaterally to an anonymous person or party, thereby providing an objective, behavioral measure of generosity that is frequently used in research, including experiments with adolescents (Engels, 2011; Ibbotson, 2014; Kosse et al., 2020). However, we chose to use raffle tickets rather than actual money at the recommendations of both our partner organization and past research which has used dictator games with children and adolescents (e.g., Gummerum et al., 2008; Kosse et al., 2020). Moreover, utilizing raffle tickets was practically more feasible than physical money given that we collected data out in the field—an actual sports field—where transporting money may have been challenging.

We modified the target of the dictator game to involve an unknown albeit vulnerable target to encourage generosity (e.g., Lishner et al., 2011) and help fight floor effects that sometimes occur during dictator games. We expected this modification to help normalize donation rates to preserve statistical power and analyze donations as a continuous measure (Cohen, 1983). This decision is consistent with previously published research examining the emotional benefits of prosocial behavior (Aknin et al., 2012; Aknin, Dunn, Whillans, et al., 2013; Whillans et al., 2019).

Exploratory Mechanisms

Across each assessment (T1 – T4), we captured adolescents' self-reported levels of each of our three exploratory theoretical mechanisms: prosocial identity, prosocial purpose, and self-transcendent narrative. To reduce overall participant burden, at the request of our partner organization, we limited our assessment of each mechanism to two key items from validated scales with the highest factor loadings. Where necessary, we simplified the language of scale items and prioritized items that were not reverse coded to ensure measures were appropriate for the youngest participant in our sample.

Prosocial Identity. To assess participants' levels of prosocial identity, we adapted two items from the Moral Identity Scale, Internalization Subscale (e.g., *"Being helpful is an important part of who I am*;" 1-*Disagree a lot*; 5-*Agree a lot*; Aquino & Reed II, 2002). The two items showed acceptable levels of reliability at both T1 (α = .72) and T4 (α = .74). Thus, as pre-registered, we formed a mean composite by averaging across the two items.

Prosocial Purpose. To assess participants' levels of prosocial purpose, we adapted two items from the Prosocial Motivation Scale (e.g., "*I get energy from doing things that could help others*;" 1-*Disagree a lot*; 5-*Agree a lot*; Grant & Sumanth, 2009). The two items did not show acceptable levels of reliability at either T1 (α = .53) or T4 (α = .62). Thus, as pre-registered, we analyzed each item separately.

Self-transcendent Narrative. To assess participants' levels of self-transcendent narrative, we selected the two items from the Claremont Purpose Scale, Self-Transcendence Subscale (e.g., *"How important is it for you to make a world a better place in some way?"* 1-*Not at all important*; 5-*Extremely Important*; Bronk et al., 2018). The two items did not show acceptable levels of reliability at either T1 (α = .42) or T4 (α = .69). Thus, as pre-registered, we analyzed each item separately.

Results

We conducted several pre-processing checks before examining our pre-registered analyses. These checks probed for consistency in participants' self-reported and actual donations in the dictator game. Details can be found in the Appendix.

Pre-registered Analyses

Although each of our pre-registered hypotheses were directional, we employed two-tailed tests for two key reasons. First, we believed that it was possible and theoretically interesting to know whether generosity may decrease over time over the course of the program. Second, we were interested in understanding if additional reflection on the larger meaning of prosocial activities to adolescent's identity may decrease generosity. We believed this decrease in generosity could be possible because repeated reflections on generosity could be perceived as less autonomous and more coercive (Aknin & Whillans, 2020 for a review).

H_1: Pre-post Changes in Generosity

As per our pre-registration, we first tested whether participants across conditions donated more raffle tickets to a sick child in a dictator game at the end of the PBP (T4) than at the start of the PBP (T1). As predicted, a paired-samples t-test revealed that the number of tickets that adolescents donated increased from T1 (M = 7.07, SD = 3.37) to T4 (M = 9.26, SD = 2.06), $t(94) = 5.57$, $p < .001$, $d_p = .78$, 95% CI [.48, 1.08]. The increase in generosity was observed in both the *Control* condition, $t(45) = 3.85$, $p < .001$, $d_p = .78$ 95% CI [.35, 1.22], and the *Reflection* condition, $t(48) = 4.01$, $p < .001$, $d_p = .76$, 95% CI [.36, 1.17]; see Figure 2.

H_2: Condition Differences in Generosity

We next tested our prediction that adolescents in the *Reflection* condition would donate more raffle tickets at endline as compared to adolescents in the *Control* condition, controlling for baseline generosity. As pre-registered, we used an Ordinary Least Squares (OLS) regression to regress the number of physical raffle tickets donated at T4 on both

condition (0 = *Control*; 1 = *Reflection*) and the physical raffle tickets donated at T1. In contrast to our predictions, adolescents randomly assigned to the *Reflection* condition did not donate significantly more tickets at endline (M = 9.30, SE =.30, n = 49) than adolescents in the *Control* condition (M = 9.23, SE = .31, n = 46) while controlling for baseline generosity, b = .07, SE = .43, 95% CI [-.78, .92], β = .02, 95% CI [-.83, .87], $t(92)$ = .17, p = .863.

Exploratory Analyses

Indirect Effects. While we observed no significant difference in objective levels of generosity, we explored whether there were any indirect effects of condition on endline generosity through each of our three proposed theoretical mechanisms (see Hayes & Rockwood, 2017; Zhao et al., 2010).

We conducted three separate indirect effect analyses analyzing each one of our three proposed mechanisms captured at endline—self-transcendent narrative, prosocial identity, and prosocial purpose. Across each test, we additionally controlled for adolescent's baseline levels of both their generosity and the corresponding mechanism. Specifically, using the PROCESS macro (Model 4, 50,000 bootstrapped resamples; Hayes, 2013), we entered endline generosity as the outcome and condition as the independent variable. We entered each proposed mechanism captured at T4 as the mediator across separate analyses. Last, we entered both T1 generosity and the baseline reports of each mechanism as covariates, respectively across analyses. As previously mentioned, we achieved adequate reliability on our 2-item measure of prosocial identity at both T1 (α = .73) and T4 assessments (α = .74). However, our 2-item measures of each self-transcendent narrative and prosocial purpose did not display adequate reliability at either time point (αs < .68). Thus, we report the findings of our indirect effect analyses using a mean composite of our prosocial identity measure and for each self-transcendent narrative and prosocial purpose item separately.

In contrast to our predictions, we found no evidence that adolescents assigned to the *Reflection* (vs. *Control*) condition reported greater endline generosity indirectly through greater endline reports of self-transcendent narrative, prosocial identity, or prosocial purpose, controlling for baseline generosity and reports of each mechanism respectively (see Table 4).

Gender and Age Effects. We then conducted exploratory analyses looking at whether the results differed based on gender or age. Overall, we found no discernable evidence of moderation by either gender (*p*s > .313) or age (*p*s > .141). This suggests that girls and boys and adolescents across ages gave similarly and reported similar levels of self-transcendent narrative, prosocial identity, and prosocial purpose across conditions.

Team Dynamics. Although randomization took place at the individual player level, the PBP was implemented at the team level, and thus it is possible that team membership may have a meaningful impact on our outcomes. Including team membership in our regressions did not alter the conclusion of our analyses: condition and team dynamics did not significantly predict endline generosity, controlling for baseline generosity, *p*s > .823. Including team membership as a covariate in each of our indirect effect analyses did not change the conclusion of any of our tests: we found no significant indirect effects through any of our proposed theoretical mechanisms. Thus, there is no evidence to suggest that team dynamics accounted for any meaningful variance in endline generosity in our analyses.

LIWC Analyses. We found no evidence that adolescents who reflected on the importance of their prosocial action over time donated differently or reported different levels of prosocial character compared to those who wrote about their weekday (vs weekend) activities. However, it is possible that various dimensions of adolescents' reflections about the importance of their prosocial action may predict adolescents' endline generosity or reported prosocial character. Thus, for adolescents across conditions, we coded each of the T2, T3, and T4 written activities using a computer text analysis software called the Linguistic

Inquiry and Word Count Program (LIWC; Pennebaker et al., 2015)—a text analysis program which calculates the presence of various dimensions within a text. As detailed further in the Appendix, we coded reflections for several interesting dimensions that we believed may have predicted adolescents' generosity (e.g., having a future focus, levels of insight). Despite evidence suggesting that adolescents in the reflection (vs. Control) condition displayed greater levels of each of these dimensions on average across time (see Fig. A1), none of these dimensions were reliably associated with either endline generosity, self-transcendent narrative, prosocial identity, or prosocial purpose (see Table A1 in the Appendix).

Discussion

In a pre-registered, longitudinal experiment, we found initial evidence that engaging in repeated, reflective prosocial action through a sport-based experiential philanthropy intervention—the Play Better Program—increased adolescents' objective generosity over the course of the program. In line with our pre-registered predictions, both adolescents who reflected on the importance of their prosocial activities to their overall identity (*Reflection* condition) and those whom did not have additional reflection opportunities (*Control* condition) donated more raffle tickets to sick kids in hospital during an endline (vs. baseline) dictator game. Contrary to our pre-registered hypothesis, adolescents in the *Reflection* condition did not donate more raffle tickets at the end of the program as compared to adolescents in the *Control* condition. Moreover, exploratory analyses showed that adolescents in the *Reflection* (vs. *Control*) condition did not donate indirectly more generously through either greater endline levels of self-transcendent narrative, prosocial identity, or prosocial purpose. Taken together, these findings suggest that repeatedly practicing and actively discussing charitable behaviors with one's coach and team through the PBP may increase adolescents' objective generosity. However, adding additional opportunities to privately reflect on the importance of prosocial activity may not boost the

efficacy of the PBP in increasing adolescents' objective generosity—neither directly, nor indirectly by cultivating greater prosocial character.

The increase we observed in adolescents' objective generosity from the start to the end of the PBP complements past research demonstrating that prosociality is malleable and can change over time (e.g., Astin et al. 1999; Hart et al., 2007; Pratt & Lawford, 2014). This research also builds upon and extends past work in several ways. First, much past work has focused on the prosociality development of children (e.g., Padilla-Walker & Carlo, 2014) and the impact of classroom-based prosociality interventions (e.g., Benz et al., 2020; Santos et al., 2011). The present work illustrates that prosociality can continue to develop and be positively shaped in adolescence and that interventions implemented in other contexts in adolescents' lives, like organized sport, may be rich, important environments to develop prosociality. Second, our work moves past researchers' predominant and potentially problematic reliance on self-report measures of generosity (e.g., Mesurado et al., 2019; Nisbett & Wilson, 1977; Orne, 1962). Indeed, by relying upon objective measures, we demonstrate both a potentially more robust assessment of prosociality and showcase the impact of prosociality interventions like the PBP on adolescents' real-world prosocial behaviors—an outcome of great interest to many practitioners. Finally, by using current best methodological and open science practices (i.e., pre-registration, open materials/data), we can have greater confidence in our results and ensure that future researchers have valuable guidance to further extend this work.

It is possible that like other adolescent-based prosociality interventions (e.g., Baumsteiger, 2019; Grossman et al., 1997; Schonert-Reichl & Whitehead Aruda, 2016), engaging in the repeated, reflective prosocial action through the PBP may help adolescents become more generous. However, an important alternative explanation for why adolescents might have become more generous from the beginning to the end of the program could be due to factors outside of our experiment like the passage of time and increasing maturity. It is

also possible that adolescents could have become more generous because of socially desirable responding, where adolescents believed that donating was an expectation of the program (e.g., Laguna et al., 2020). Of course, features of our dictator game, such as including an incentive to for adolescents to keep rather than donate the raffle tickets and increasing perceptions that their donation would be anonymous should have reduced socially desirable responding (Theilmann et al., 2016) Overall, it is critical that future work employ an experimental design with a non-prosocial activity or wait-list control group to help eliminate these alternative explanations (see Schreier et al., 2013; Whillans et al. 2016) and reveal the causal impact of engaging in prosociality interventions like the PBP on adolescent generosity.

While our experiment was not designed to test whether overall participation in the PBP causally increases long-term generosity, it does illuminate the causal role of reflection. Given past research underscoring the value of reflecting on prosocial action for subsequent generosity and prosocial character development (e.g., Brown et al., 2013; Finkelstein et al., 2005; Herzog & Mitchell, 2016; Ottoni-Wilhelm et al., 2014; Schnitker et al., 2017, 2019), why did we not detect differences in generosity or prosocial character between conditions?

One possibility for the null effects may be due to the ceiling effect we observed on generosity: 86% of the sample donated the full 10 raffle tickets to sick kids in hospital. As such, there may have been too little variability in donations overall to detect between condition differences. Another possibility is that the regular opportunities provided by the standard PBP for adolescents to reflect and discuss their prosocial action with their coach and peers already provided sufficient opportunity for reflection. As such, introducing additional instances for reflection may have provided minimal added value overall. Alternatively, our intervention may have been too brief or not engaging enough to impact objective levels of generosity or subjective perceptions of prosocial character.

Taken together, these possibilities suggest that there are various steps researchers can take to help rule out alternative explanations. For example, researchers could reduce a potential ceiling effect by modifying the target of the dictator game from someone who is vulnerable (e.g., sick kids in hospital) to a stranger in the community. Such a target may reduce feelings of sympathy that could potentially drive high levels of generosity (e.g., Batson et al., 1997, Small et al., 2007) and help normalize donation rates. Researchers could also consider using a more immersive or extended reflection exercise, assuming that research partners are willing and perceive this as scalable. In addition, researchers could consider measuring the extent to which the experimental intervention's repeated reflection exercise extends beyond a team's regular practice. Doing so may allow researchers to gauge whether and how much added personal reflection is required to effectively bolster generosity and prosocial character development.

Interestingly, despite rich theoretical rationale and past correlational evidence suggesting that prosocial character may be important predictors of long-term generous action (e.g., Finkelstein et al., 2005; Malin et al., 2015; Schnitker et al., 2019), exploratory analyses suggested that neither self-transcendent narrative, prosocial purpose, nor prosocial identity predicted greater endline generosity. Again, it is possible that we did not observe any meaningful correlations between prosocial character and endline generosity due to the observed ceiling effect on generosity. However, it is also possible that our 2-item scales of each measure of prosocial character did not adequately tap into adolescents' prosocial character development. While including fewer items was important to reduce overall participant burden, neither our self-transcendent narrative nor our prosocial purpose items displayed adequate reliability. It may be wise for future researchers to focus their measurement around the most promising and representative element of adolescents' prosocial character. Research suggests that self-transcendent narrative may be one of the most

important elements to developing many virtues like generosity (e.g., Schnitker et al., 2017, 2019). In fact, past qualitative work with the PBP suggests that coaches believed one of the greatest benefits of the PBP was that many of their adolescent athletes started to see the value of actions that help people beyond the self (Bean et al., 2021). Thus, future work may do well to dive deeper and more adequately measure self-transcendent narrative as a critical potential mechanism.

Lessons learned from our Scholar-Practitioner Collaboration

We collaborated closely with the head coaches of the PBP and directors of our partner organization, Charitable Impact, at each stage of the research process. Adopting this scholar-practitioner approach ensured that the research would not only be theoretically and methodologically robust but practically meaningful to the organization we partnered with.

Our community partners' practical expertise guided many of our research decisions. Notably, based upon our partners' recommendations, our design to infuse greater opportunities for reflection into the PBP was minimal and self-guided by adolescents. Our practitioner's experience with the local sport context suggested that coaches may not always be able or comfortable offering frequent deep, meaningful opportunities for reflective discussion about charity with their team. Because coaches vary in terms of both time, resources, and capacity to facilitate conversations about charity, there are practical implications in relying solely on the coach to offer opportunities for adolescents to reflect on their prosocial action. By offering private opportunities for adolescents to reflect on their prosocial action, our design may have overcome these practical limitations and better complement rather than interfere with coaches' existing coaching philosophies and the team's overall sport culture and context.

Our scholar-practitioner collaboration also enabled us to design the experiment to help make the program more easily implemented at scale. We worked together to design and

test a program that offered low-cost opportunities for both reflection and repeated prosocial action. Specifically, we structured our experimental design to offer easy-to-implement opportunities for reflection through private reflection. Moreover, adolescents could engage in repeated prosocial action through relatively low-cost opportunities for financial generosity (i.e., offering up to $1 CAD in charitable rewards to each player per week). As such, through our scholar-practitioner collaboration, we were able to balance the use of rigorous methods with practical considerations for the structure and scalability of the program.

Of course, while data collection for field experiments often presents numerous challenges (e.g., Paluck & Cialdini, 2014), engaging in a collaborative community research project in the context of a global pandemic posed additional challenges. To not overburden or weaken the quality of our partner organization's established connections with the sport community, we needed to make several methodological concessions. For example, we were unable to recruit a sample size that would offer high statistical power to detect smaller effects because our partner organization did not want to invite many of the teams they knew may be struggling to run their regular sports program amidst the pandemic. In fact, players, parents, coaches were understandably cautious and careful when participating, which required extra precautions as mandated by our ethics boards to maintain participant safety and health, which may have reduced participation rates. Moreover, we were unable to include additional assessments after the program—such as a 6-month or 1-year follow up—or assess a wider range of prosocial behaviours that would have enabled us to assess both the longevity and breadth of impact on adolescents' generosity (e.g., see Nelson & Norton, 2005). Indeed, our partner organization did not want to jeopardize their existing relationships with sports teams by overburdening teams with too long or frequent assessments. As such, we found it essential to work directly and have constant communication with our partner organization to ensure the research was mutually beneficial, including by making compromises as necessary.

By adopting a scholar-practitioner approach and leveraging the practical experiences of our community partners, we were better equipped to test an existing program in the real world. In line with recent recommendations to improve psychological science (e.g., Paluck & Cialdini, 2014; Jachimowicz, 2022) rather than create an analogue program to map existing efforts in an artificial lab context, we were able to examine the efficacy of a real program reaching upwards of 7,500 adolescent athletes. This model helped us broaden and amplify the potential impact not only for Charitable Impact and the Play Better program, but for the local and international communities which may be interested in adopting the PBP in their sports clubs. We recommend researchers interested in examining real-world interventions to similarly consider adopting a scholar-practitioner model. By thoughtfully engaging with partner organizations and the community, each party can help one another deepen their impact and advance both research and practical solutions to overcome real-world problems faced by the community and beyond.

Conclusion

Using a pre-registered, experimental design and objective measures of generosity, we partnered with the practitioners of a sport-based Experiential Philanthropy Intervention to test whether giving adolescents repeated opportunities to reflect on their prosocial activity promotes long-term generous behaviors. Adolescents who practiced and discussed prosocial activity with their coach and team through the Play Better program donated objectively more generously by the end of their sport season than the start. However, compared to completing a controlled writing activity, providing repeated opportunities for adolescents to privately reflect on the importance of their prosocial activity did not meaningfully boost generosity or cultivate greater prosocial character. While data suggest that over the last few decades, fewer people have been donating to charity around the world, adolescent-based prosociality interventions may be one potential lever by which to promote sustained giving habits that

adolescents carry with them into adulthood. It is critical for researchers and practitioners to continue to partner together to conduct additional well-powered, pre-registered experiments to examine whether and how real-world interventions like the Play Better program can help people tap into and sustain their exceptional capacity for generosity.

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Declaration of Interests Statement

The authors declare the existence of a financial competing interest of the first author who holds a paid research consultation position at the partner organization (Charitable Impact) in addition to his position as a graduate student at Simon Fraser University.

Data availability statement

The data and code to produce the findings can be found on the Open Science Framework (OSF) at https://osf.io/amsz2/?view_only=122151d9154244f2bb04b3c3b1044f94

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Appendix

Data Pre-processing Checks

While the number of physical tickets donated during the dictator game was our central pre-registered outcome, we also asked adolescents to self-report the number of tickets that they wanted to donate at each of the T1 and T4 dictator games. During data entry and in conducting descriptive analyses on our outcomes, we noted several discrepancies between the self-reported tickets and the physical number of tickets donated. Critically, at the endline assessment, a total of 17 adolescents did not self-report the number of tickets that they wanted to donate but left all 10 tickets in the envelope to donate to sick kids; this issue did not occur during the baseline assessment. Because adolescents self-directed themselves through the dictator game and survey, it is possible that these adolescents either 1) wanted to donate all tickets, but simply did not complete the accompanying self-report measure or 2) did not complete the dictator game and left the 10 raffle tickets untouched in the envelope that they submitted. We pre-registered conducting a pre-processing check to determine whether the number of adolescents who appeared to have donated all 10 tickets—but were suspected to not have completed the T4 dictator game—differed significantly by condition. A chi-square analysis revealed that the number of adolescents who may not have completed the dictator game in the *Reflection* condition (n = 10) did not differ significantly from the *Control* condition (n = 7), χ^2 (1) = .31, p = .579. Thus, as pre-registered, we included all 17 of these participants in our analyses. The conclusions of our analyses do not change whether these adolescents are excluded from our sample or not.

Beyond the number of adolescents whom we suspect may not have engaged in the dictator game, we noted several other systematic discrepancies between the self-reported and physical number of tickets donated at each of the baseline and endline dictator games. Specifically, a number of adolescents self-reported donating between 0 – 9 tickets but

included all 10 tickets in their envelope at either baseline (n = 9) or endline (n = 22). As above, it is possible that adolescents may have intended to donate the number that they self-reported but failed to engage with the physical tickets or they may have wanted to donate all 10 tickets but failed to reflect this in their self-report. As pre-registered, we conducted a chi-square analysis to determine if the number of discrepant cases differed significantly by condition. Analyses revealed no significant differences in discrepant cases by condition at either baseline or endline (χ^2s < 2.48, ps > .115), thus as pre-registered, we kept all 31 participants in our analyses.

We noted several cases with discrepancies between the self-reported and physical number of tickets in which adolescents seemed to have engaged with the physical tickets. Specifically, some adolescents at baseline (n = 4) kept the number of raffle tickets they self-reported to donate (e.g., reported donating 10 or two tickets, but donated 0 or 8 physical tickets, respectively). Another four adolescents at baseline self-reported a number of tickets to donate that simply did not match the physical tickets (e.g., ten self-report vs seven physical tickets, five self-report vs two physical tickets). Again, chi-square analyses suggested that the frequency of these miscellaneous discrepancies did not differ significantly by condition, χ^2 (1) = .79, p = .374, and thus as pre-registered, all eight participants were included in our analyses.

Finally, given that we recruited teams from a sports club which had implemented Play Better in the past, it is possible that adolescents may have been exposed to or participated in the PBP in a previous season. Thus, in the T1 assessment, we additionally asked participants to indicate if they had taken part in the PBP prior to completing the T1 assessment and for how long they had engaged in the program. A total of 30 adolescents (32%) reported that they participated in a previous season prior to the T1 assessment. Excluding these participants from the analyses did not change the conclusions of our results, and thus we

included them in our sample to preserve statistical power. Due to our small sample, however, we are unable to test whether the duration of past participation moderates the effects of the program.

Exploratory LIWC Analyses

We used the Linguistic Inquiry and Word Count Program (LIWC; Pennebaker et al., 2015) to quantify several potentially revealing dimensions of participants writing activities. These dimensions included: (1) levels of affiliation; (2) total use of first-person plural pronouns (i.e., "we"); (3) overall levels of insight; and (4) having a future focus. We reasoned that these dimensions may tap into an adolescent's awareness of how their actions can bring them closer to others, provide insight or meaning, and encourage a forward-looking approach that could be beneficial in the long-term. Across dimensions, LIWC calculates the number of times the text contains a word that is representative of the coding dimension and then divides this number by the length of text. For example, for affiliation, LIWC counts words which mention another person (e.g., "friend") or prosocial acts designed to promote affiliation (e.g., "help," "donate," "share"). For insight, LIWC counts words which represent greater reflection and awareness (e.g., "notice," "learn," "feel," "think") while for future focus, LIWC codes words which may represent intentions or an orientation towards the future (e.g., "I'll," "plan" "hope").

As shown in Fig. A1, on average, adolescents who were assigned to reflect on the importance of their prosocial acts reported higher scores on each of the four LIWC dimensions compared to adolescents who merely reflected on their weekday (vs. weekend) activities. Specifically, averaging across time points, the written responses of adolescents in the *Reflection* (vs. *Control*) condition contained greater levels of: (1) affiliation, $M_{Reflection}$ = 5.26, SD = 3.52, 95% CI [4.35, 6.17] vs. $M_{Control}$ = 2.68, SD = 2.83, 95%CI [1.91, 3.45], $t(110.6) = 4.33$, $p < .001$, $d = .81$, 95% CI [.23, 1.40]; (2) first-person plural pronouns,

$M_{Reflection}$ = 1.10, *SD* = 1.95, 95% CI [.60, 1.61] vs. $M_{Control}$ = .15, *SD* = .50, 95% CI [.02, .29], *t*(67.5) = 3.65, *p* = .001, *d* = .66, 95% CI [.40, .93]; (3) insight, $M_{Reflection}$ = 2.53, *SD* = 3.15, 95% CI [1.72, 3.34] vs. $M_{Control}$ = .99, *SD* = 1.88, 95% CI [.48, 1.50], *t*(98) = 3.20, *p* = .002, *d* = .59, 95% CI [.11, 1.07]; and (4) a focus on the future, $M_{Reflection}$ = 1.35, *SD* = 1.90, 95% CI [.85, 1.84] vs. $M_{Control}$ = .30, *SD* = .74, 95% CI [.10, 51], *t*(78) = 3.92, *p* < .001, *d* = .71, 95% CI [.45, .98].

It is possible that adolescents in the *reflection* condition who were more communally oriented (i.e., greater affiliation, greater use of first-person plural pronouns like "we"), expressed greater insight, or had a more future focused mindset may have donated more generously or reported greater prosocial character at endline. Thus, we next tested to see for adolescents within the *reflection* condition whether any of the dimensions as coded by LIWC were associated with adolescent's objective generosity or reported prosocial character. As shown in Table A1, we found no consistent, reliable evidence to suggest that any of these dimensions were meaningfully associated with endline generosity or levels of self-transcendent narrative, prosocial identity, or prosocial purpose.

Table 1. Characteristics of representative list of adolescent-based prosociality interventions

Primary Intervention Model Type	Example Programs	Age Range (years)	Program Features	Location
Experiential Philanthropy	Play Better Program (PBP)	8–18	Adolescents engage in **repeated (i.e., weekly) acts of charitable giving** by earning charitable rewards as they complete sport training goals. Donations are made using the Charitable Impact platform. Coaches facilitate **regular (e.g., weekly) team-wide discussions about charitable giving**, **encouraging adolescents to reflect** on their values, preferences, and impact.	Canada
	Charitable Allowance Program (CAP)	10–18	Adolescents engage in **repeated (i.e., monthly) acts of charitable giving** using the Charitable Impact platform. Teachers facilitate **monthly class-wide discussions about charitable giving**, **encouraging adolescents to reflect** on their values, preferences, and impact. Adolescents also learn various philanthropy skills (e.g., charity-centered financial literacy, donating to make large impact)	Canada
	Youth Philanthropy Initiative (YPI)	13–18	Adolescents research and learn about local social issues in their community and choose a charity who can help solve that issue. Adolescents learn more about the charity's services by contacting and scheduling a visit with the charity. In teams, **adolescents present their research and make an argument why their charity should be funded with a $5,000 grant from the YPI.** The YPI granting panel judges top performing presentations in a final round. Winning teams have their charity funded with a $5,000 grant. Teachers help adolescents **connect the YPI project to course content** (e.g., Language Arts or Social Studies courses). Additionally, teachers help adolescents research and learn about social issues, get in contact with a charity and schedule site visits, and create their presentations.	Canada
Service Learning and Community Engagement	Learning to Give	5–18	Adolescents engage in **repeated acts of service (e.g., volunteer work, gift giving, and fundraising)** throughout the year. Teachers integrate lessons about philanthropy, civic engagement, caring and service into their curriculum to **help students reflect** on the value of philanthropy and the impact of their service learning projects.	USA
	365Give	5–18	Adolescents engage in **daily acts of giving** of their choice, giving clothes, books, money, to others in their community. Adolescents can complete this challenge over the entire year or longer or for a shorter timeframe (e.g., a few weeks, months). Adolescents have access to various giving ideas and can track their giving on the 365Give platform. Teachers regularly encourage adolescents **to consider how their actions influence others and reflect** upon their growth as a positive actor in class-wide discussions.	International

Table 1 (Cont.)

Primary Intervention Model Type	Example Programs	Age Range (years)	Program Features	Location
Social and Emotional Learning	Roots of Empathy (ROE)	5–13	A local parent and their newborn infant visit adolescents across 27 sessions over the course of the year. Across these sessions, students **repeatedly** observe parent-child interactions and the infant's development and **identify the infant's emotions**. Teachers and a trained ROE instructor help adolescents learn to read emotional cues, **reflect on their and others' emotions**, and take other people's perspectives. They additionally teach various topics including early development, infant temperament, attachment, social inclusion, and communicating thoughts/feelings to others.	International
	Kindness in the Classroom	5–14	Adolescents learn about 12 different concepts around kindness (e.g., compassion, helpfulness, caring) through 16 weekly lessons (30-45 minutes) over the course of the year. Adolescents engage in various activities (e.g., role-playing, games, and group discussions/activities) and projects to **practice kindness**. Adolescents **reflect on the concepts of kindness**, sharing their experiences of kindness in and outside of the classroom with their teacher and peers. Teachers facilitate core lesson plans and lead class discussions, helping adolescents identify concrete ways in which they can act kindly in their everyday lives and **reflect on what kindness means** for them and others in their lives.	International
Values-based / Character Education	Olympic Education Program	5–18	Adolescents **repeatedly perform activities** in the classroom that center around Olympic values (e.g., fairness, respect, friendship, equality), such as sporting events that promote fair play or writing an Olympic oath. Teachers facilitate activities and class discussion about the activities, including how they espouse important values, and help **adolescents reflect** on how they can align their behaviors with these values in their day-to-day lives.	International
	Values-based Education Program (VbE)	5–18	Adolescents engage in **daily discussion and activities** (e.g., role-playing) in and outside of the classroom that center on positive values (e.g., determination, kindness, curiosity, friendship), such as showing their peers how they would show friendship to others. Teachers **model positive values** in their daily interactions with adolescents (e.g., being calm and respectful in all interactions rather than shout). Teachers help adolescents **reflect** on how positive values underlie their own and other people's behaviors through classroom-wide discussion.	International

Table 1 (Cont.)

Primary Intervention Model Type	Example Programs	Age Range (years)	Program Features	Location
Prosocial Mentorship	Balu und Du (“Baloo and You”)(Kosse et al., 2020)	7–9	Adolescents are paired with a university-aged **mentor to enrich the child’s context and model prosocial behavior**. Each week for a year, adolescents spend an afternoon with their mentor visiting sites like the zoo, sharing activities together, or just having discussion. The mentor attempts to enrich the social environment for the adolescent mentee and model benevolent behaviors. Adolescents have the opportunity to watch and imitate their mentor’s prosocial behaviors and **reflect** on these behaviors through close social interaction with their mentor.	Germany
	Big Brothers, Big Sisters (BBBS)	6-18	Adolescents are matched with a same-sex adult (18+) volunteer **role model** to engage in one-on-one, in-school, or group mentorship. Adolescents talk and share their experiences about school and growing up with their mentor either at school or on regular excursions out in the community. Adolescents **repeatedly** visit with their mentor for one hour a week in school or at least two community outings a month over a minimum of one year. Mentors listen to, support, and build a relationship with adolescents by playing games, engaging in activities in our outside of school, and having regular conversations. Mentors often **model prosocial behaviors and kindness** through activity and through regular social interactions with others in and outside of the school context.	International

Note. Each program example was chosen because it clearly represented its intervention model type and has been widely adopted in schools at national and international levels. Descriptions in bold highlight the repeated and reflective ingredients shared across intervention types as well as the unique characteristics commonly associated with the approach of its larger intervention model type.

Table 2. Experimental studies of prosociality interventions

Intervention Type	Program	Program Format [setting]	Design (Ref.)	Randomization Level	Experimental [N]	Control [N]	Sample Age (location)	Outcome [Measure Type]
Social Emotional Learning	Roots of Empathy (ROE)	Adolescents observe parent/infant interactions over 27 weekly sessions (30-45 min/session). Adolescents label infant emotions, reflect on their and other's emotions. [School]	Grade-matched cluster RCT (Santos et al., 2011)	School District	ROE Program [445]	Wait-list control [315]	5 – 14 (Manitoba, Canada)	[SR] Frequency engaging in prosocial behavior (e.g., comforting others; teacher and Adolescent rated)
	Second Step	Adolescents complete 30 lessons (~35 minutes) around the concepts of empathy, impulse control, and anger management. Adolescents repeatedly engage in activities (e.g., role-play, perspective taking) to practice core concepts like empathy and reflect on these activities. Teachers role model skills and help adolescents reflect on course concepts. [School]	School-matched RCT (Grossman et al., 1997)	School (matched by school district; proportionally representative of low income and ethnic minority students)	Second Step Program [418]	No program control [372]	7 – 9 (King County, USA)	[O] Observed prosocial behavior during social interactions in the classroom
	Kindness in the Classroom	Adolescents learn about and practice various concepts of kindness (e.g., caring, respect, compassion) repeatedly through activities (e.g., role play) and reflect on the value of kindness through classroom discussion. [School]	RCT (Schonert-Reichl & Whitehead Arruda, 2016)	Classroom	Kindness in the Classroom program [328]	No program control [327]	9 – 11 (Vancouver, Canada)	[SR] Intrinsic prosocial motivation (e.g., "I help others because it is good to do")

Table 2 (Cont.)

Intervention Type	Program	Program Format [setting]	Design (Ref.)	Randomization Level	Experimental [N]	Control [N]	Sample Age (location)	DV
Social Emotional Learning	Mate-Tricks	Adolescents play games targeting various social emotional competencies (e.g., communication; managing emotions; self-awareness; perspective taking; social problem solving; conflict resolution; peer pressure). [School]	RCT (O'Hare et al., 2015)	Adolescents	Mate-Tricks [220]	No program control [198]	9 – 10 (Dublin, Ireland)	[SR] Prosocial behavior questionnaire
	Promoting Prosocial and Emotional Skills to Counteract Externalizing Problems in Adolescence (CEPIDEA)	Adolescents practice prosocial behavior in 16 weekly prosocial sessions (e.g., role playing, modeling) and engaged in 21 class-wide discussions with their teacher, discussing values, emotion regulation, empathy and interpersonal-communication skills. [School]	Non-random control (Caprara et al., 2015)	School	CEPIDEA program [151]	No program control [140]	12-13 (Genzano, Italy)	[PR] Classmates ratings of prosocial behavior
Prosocial Mentorship	Balu und Du ("Baloo and You")	Disadvantaged adolescents are paired with a university-aged mentor and meet one afternoon a week for one year (~92 hours). Mentors enrich adolescent's social context, model prosocial behaviors, help adolescents reflect on the value of prosocial action. [Community]	SES-matched, stratified RCT (Kosse et al., 2020)	Adolescents (stratified by city and SES criteria)	Balu und Du Program [212]	Low SES, no program (n = 378) High SES, no program (n = 122) [500]	7 – 9 (Bonn and Cologne, Germany)	[B] Three incentivized dictator games

Table 2 (Cont.)

Intervention Type	Program	Program Format [setting]	Design (Ref.)	Randomization Level	Experimental [N]	Control [N]	Sample Age (location)	DV
Prosocial Mentorship	Big Brothers, Big Sisters (BBBS)	Adolescents spend time with an adult mentor (18+) to talk to and play games with for one hour a week for approximately 9 months. Mentors model prosocial behaviors for adolescents during regular interactions and help adolescents reflect on these behaviors. [School]	Stratified RCT (Herrera, 2007)	Adolescents (stratified by school)	BBBS Program [565]	Wait-list control [574]	8 – 18 (USA)	[SR] Frequency engaging in prosocial behavior (e.g., showing kindness and concern for other classmates; adolescent and teacher rated)
Service learning and community engagement	Baumsteiger Prosociality Intervention	Adolescents watch videos about prosociality and write about their values. Each day for 10 days, adolescents act prosocially and log their acts. Adolescents reflect on their prosocial behaviors as a whole at the end. [Community]	RCT (Baumsteiger, 2019)	Adolescents	Full program (n = 43) Daily prosocial acts (n = 41) [84]	Daily log of humorous activities (10 days) [32]	16 – 25 (Southern California, USA)	[B] Answering an optional question to help the researcher [SR] Frequency of prosocial behavior (i.e., helped stranger with something they lost)
	Minimal Prosocial Improvement Program (PMIP)	Across 12 sessions during six months, adolescents watch videos about prosociality, design prosocial experiments and discuss prosociality. [School]	Non-random control (Romersi et al., 2011)	School	Minimal Prosocial Improvement Program (PMIP) [128]	No program control [70]	14-16 (Barcelona, Spain)	[PR] Peer rating of prosocial behavior questionnaire
Values-based / character education	Olympic Education Programme	Adolescents engage in activities that focus on Olympic values (e.g., equality) throughout the year, such as organizing sporting events that prioritize fair play. [School]	Natural experiment (Sukys et al., 2017)	School	Olympic Education Programme [381]	No program control [402]	13-14 (Lithuania)	[SR] Prosocial tendencies

Table 2 (Cont.)

Intervention Type	Program	Program Format [setting]	Design (Ref.)	Randomization Level	Experimental [N]	Control [N]	Sample Age (location)	DV
Values-based / character education	Actively Caring for People (AC4P)	Adolescents receive 5 weekly lessons (22 minutes) practicing and discussing gratitude, courage and belongingness [School]	Non-random control (McCarty, 2014)	Classroom	Actively Caring for People (AC4P) [209]	No program control [194]	12-13 (Southwest Virginia, USA)	[SR] Prosocial behavior (e.g., "tried to make a person happier")
Prosocial /Moral learning	León Zarceño Prosociality Intervention	Adolescents play cooperative games and discuss the outcomes across 3 months in class. [School]	Non-random control (León Zarceño, 2008)	Classroom	Games and discussions [22]	No program control [19]	9-13 (Valencia, Spain)	[SR] Prosocial attitudes and values
	Psychological intervention program	Adolescents participate in weekly play sessions (e.g., cooperative games) and engage in moral debate throughout the year. [School]	RCT (Garaigordobil, 2008)	Classroom	A weekly play session throughout the academic year [54]	Ethics activities from the normal school curriculum [32]	10-11 (Basque Country, Spain)	[PR] Parent and teacher ratings of children's prosocial behaviors.
	Moral dilemma discussion group (MDG)	Adolescents discuss a series of questions about moral dilemmas (e.g., "to steal or to not steal") in groups. [School]	RCT (Binfet, 2000)	Adolescents	Moral dilemma discussion group [25]	Nonmoral discussion group [25]	10-13 (Vancouver, Canada)	[SR] [PR] Self, peer and teacher-ratings of prosocial and antisocial behavior.
	Moral reflective abstraction group (MRG)	Adolescents independently respond to a series of questions about moral dilemmas (e.g., "to steal or not to steal") in writing. [School]	RCT (Binfet, 2000)	Adolescents	Moral reflective abstraction group [23]	Nonmoral reflective abstraction group [24]	10-13 (Vancouver, Canada)	[SR] [PR] Self, peer and teacher-ratings of prosocial and antisocial behavior.

Note: RCT = Randomized Controlled Trial; SR= Self-report measure; B = Behavioral measure; O = Observational measure; PR= Peer-report measure. Randomization level in the case of the controlled non-randomized studies represents the unit that has been assigned to the experimental or the control condition.

Table 3. Summary of team and participant demographics.

	***N* =114 adolescent athletes**	
	***M* (*SD*)**	***Mdn* (Range)**
Age	11.66 years (1.49 years)	12.00 years (9 – 16)
Gender	***N***	**%**
Girl	54	47.4%
Boy	51	4.7%
Non-Binary	1	0.9%
Other	0	0.0%
Prefer not to answer	2	1.8%
Missing Data	6	5.3%
Race/Ethnicity	***N***	**%**
Indigenous/First Nations/Aboriginal	0	0.0%
Black	0	0.0%
LatinX	3	2.6%
Caucasian/White	43	37.7%
Asian	13	11.4%
South Asian	6	5.3%
Middle Eastern	0	0.0%
Multi-racial	13	11.4%
Other	17	14.9%
Prefer not to answer	6	5.3%
Missing Data	13	11.4%

Table 4. Exploratory mediation models with self-transcendent narrative, prosocial purpose, and prosocial identity as mediators while controlling for baseline objective generosity and baseline levels of each mediator, respectively.

Mediator	Covariates	Sample (N)	Path a	Path b	Indirect effect (ab) [95%CI]	Direct Effect (c`)	Total Effect (c)
T4 STN Item 1 "*How important is it for you to make the world a better place in some way*?"	T1 Generosity; T1 STN Item 1	89	-.12 (p = .377)	-.20 (p = .596)	.02 [-.03 .22]	-.01 (p = .974)	.01
T4 STN Item 2 "*How often do you hope to leave the world better than you found it?"*	T1 Generosity; T1 STN Item 2	89	-.04 (p = .814)	-.32 (p = .308)	.01 [-.08, .21]	.03 (p = .952)	.04
T4 Prosocial Identity (Mean Composite)	T1 Generosity; T1 Prosocial Identity [Mean composite]	93	-.04 (p = .646)	.59 (p = .327)	-.02 [-.27, .05]	.07 (p = .880)	.05
T4 Prosocial Purpose Item 1 "*I get energy from doing things that could help others*"	T1 Generosity; T1 Prosocial Purpose Item 1	86	.09 (p = .518)	-.32 (p = .395)	-.03 [-.33, .06]	.03 (p = .953)	.00
T4 Prosocial Purpose Item 2 "I *prefer to do things that allow me to make others happy*"	T1 Generosity; T1 Prosocial Purpose Item 2	86	-.09 (p = .464)	-.73 (p = .095)	.06 [-.08, .36]	-.15 (p = .751)	-.09

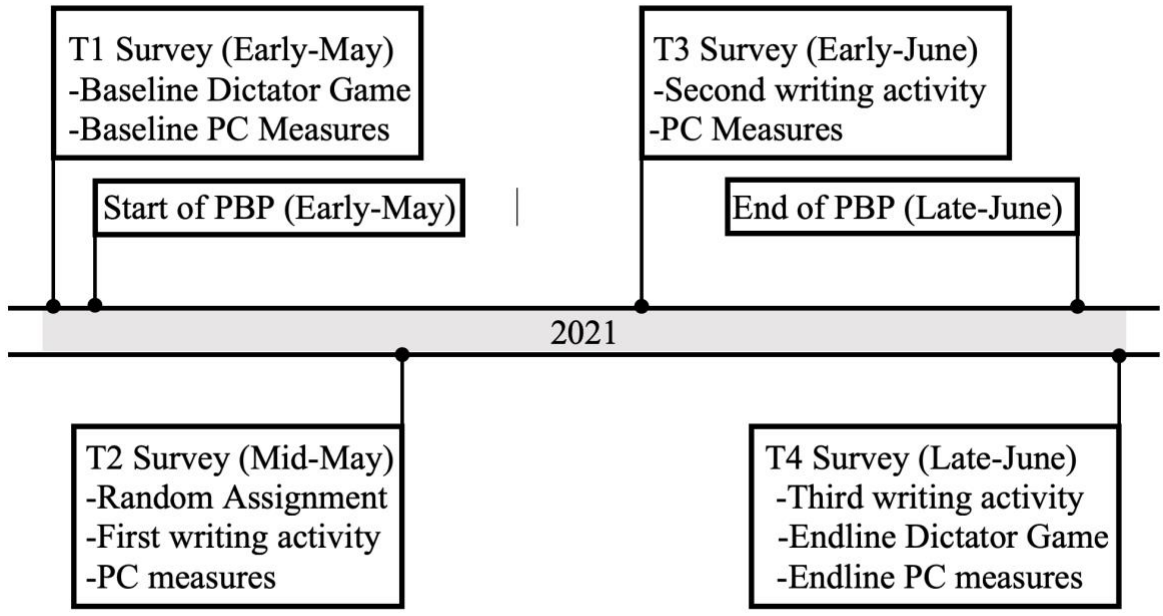
Note. T1 = Baseline; T4 = Endline; STN = Self-Transcendent Narrative. Generosity = Number of physical raffle tickets donated. Condition: *Control* = 0; *Reflection* = 1. Path a: Condition to mediator. Path b: Mediator to Endline Generosity. The total effect is approximately ab + c` (Kenny, 2018). All tests are two-tailed. Sample size varies across analyses due to missing data.

Table A1. Bivariate correlations between endline (T4) Linguistic Inquiry and Word Count (LIWC) codes, T4 objective generosity, and T4 mechanisms for adolescents randomly assigned to the *Reflection* condition.

	T4 Generosity	T4 STN #1	T4 STN #2	T4 P. Identity	T4 P. Purpose #1	T4 P. Purpose #2	Affiliation	First-person plural pronouns	Insight	Future focus
T4 Generosity	1									
T4 STN #1	.06	1								
T4 STN Item #2	-.13	**.44****	1							
T4 P. Identity	-.01	**.35***	.28†	1						
T4 P. Purpose #1	.01	**.40***	**.31***	**.66****	1					
T4 P. Purpose #2	-.03	**.40***	**.37***	**.32***	**.44****	1				
Affiliation	.11	-.14	-.02	-.17	-.17	-.05	1			
First-person plural pronouns	.14	-.13	-.18	-.05	-.20	-.01	**.48****	1		
Insight	.02	-.26†	-.09	-.05	-.27†	**-.30***	-.18	-.10	1	
Future focus	.12	-.19	-.13	-.15	-.02	-.00	.16	-.02	-.10	1

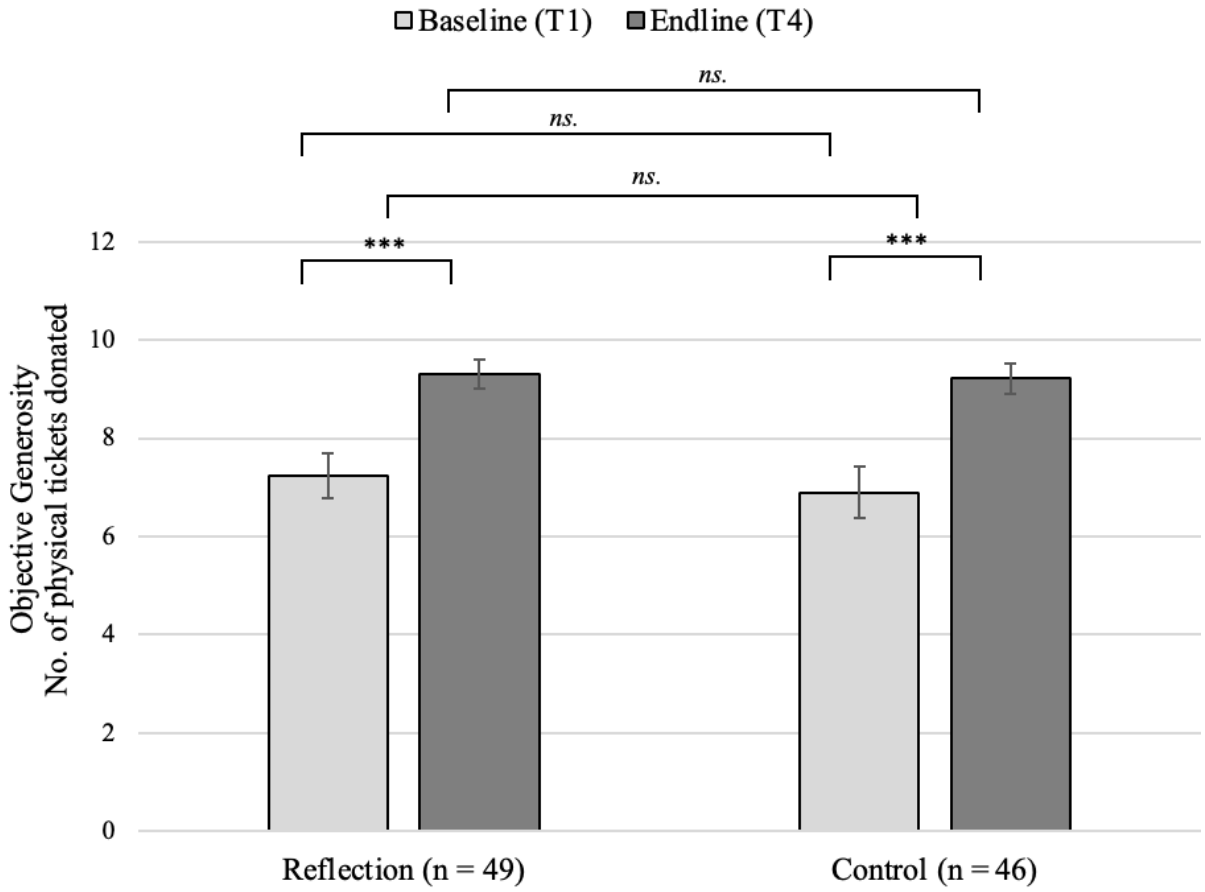
Note. All variables displayed evidence of significant nonnormality (*W*s > .214, *p*s < .001); bootstrapping techniques with 1,000 resamples were used to estimate correlation coefficients in the presence of nonnormal data. All bias-corrected accelerated 95% confidence intervals aligned with the interpretations provided by the *p*-values and are thus not included in this table. $^{\dagger}p < .10$; $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$. Bold means are significant at $p < .05$. T4 = Endline. STN = Self-transcendent Narrative. P. Identity = Prosocial Identity. P. Purpose = Prosocial Purpose.

Fig.1 Experiment timeline



Note. PC = Prosocial Character. PBP = Play Better Program.

Fig. 2 Objective generosity from before (T1) to after (T4) completing the Play Better Program



Note. $^{***}p < .001$, $^{**}p < .01$; *ns* = non-significant. Error bars represent standard errors.

Fig. A1. Means and 95% confidence intervals of adolescents' written activities across time and condition for four dimensions coded by the Linguistic Inquiry and Word Count (LIWC)

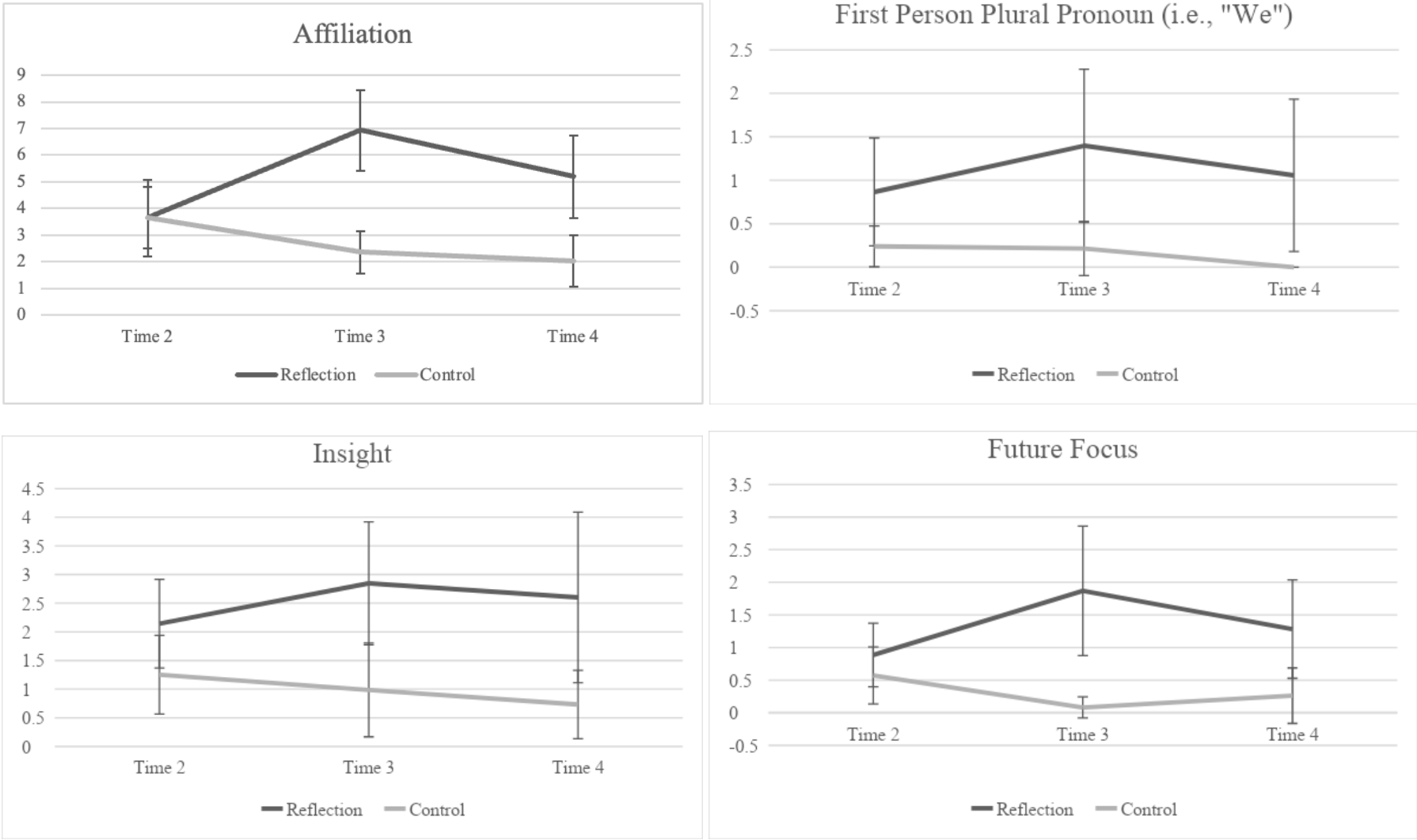


Figure Captions

Fig 1. *Note*. PC = Prosocial Character. PBP = Play Better Program.

Fig 2. *Note*. $^{***}p < .001$, $^{**}p < .01$; *ns* = non-significant. Error bars represent standard errors.