

Organized activities in adolescence and pro-environmental behaviors in adulthood: The mediating role of pro-environmental attitudes

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Abstract

Introduction: Organized activities practiced in adolescence are known to foster positive development, including active citizenship. Active citizenship encompasses a wide range of behaviors, one of them being pro-environmental behaviors. Few studies focused on the developmental factors that may predict these behaviors in adults, despite their crucial role in counteracting the current climate crisis. However, prior research showed that attitudes were typically major predictors of behaviors. This study thus tested a model that posited participation in organized activities in adolescence as a predictor of pro-environmental attitudes in emerging adulthood and these attitudes as a predictor of pro-environmental behaviors in adulthood.

Methods: Three hundred twenty-one participants (61% girls) from Quebec (Canada) completed all time points across a 17-year period. Participants self-reported their participation in organized activities (sports, cultural, prosocial) from ages 14 to 17, pro-environmental attitudes, from ages 18 to 22, and pro-environmental behaviors, at age 30.

Results: Results revealed that pro-environmental attitudes mediate the relationship between adolescent participation in cultural activities and pro-environmental behaviors in adulthood. Practicing sporting or prosocial activities in adolescence did not predict stronger pro-environmental attitudes or behaviors. Interestingly, pro-environmental attitudes consistently predicted pro-environmental behaviors later in life.

Conclusions: These findings and prior research suggest that participation in cultural activities may provide a space to discuss, imagine change, and cultivate sensitivity towards nature. This may contribute to the development of pro-environmental attitudes and behaviors later in life.

KEY WORDS

adolescence, adulthood, emerging adulthood, organized activity, pro-environmental attitude, pro-environmental behavior

1 | INTRODUCTION

The current climate crisis is recognized as a first-order issue. Pressure is mounting on governments and corporations to come up with policy changes (Collins, 2020). These changes, however, must make their way down a long and winding pipeline. In the meantime, action can be taken at the individual level. Pro-environmental behaviors (PEBs) are conscious actions deemed protective of the environment (Krajhanzl, 2010). These include using re-usable bags, reducing water consumption, and buying environment-friendly clothes (Brick et al., 2017). Because PEBs often are more time and human-energy consuming (e.g., using public transportation instead of a car) and entail lifestyle shifts (e.g., eating less meat), not everyone may be

amenable to putting in the effort to protect the environment. Studies have explored the factors underlying these individual choices (for a review, see Li et al., 2019), focusing on gender and age. In this regard, women and younger people have been found to exhibit more PEBs (Li et al., 2019).

One developmental context that has received scant research attention to date in connection with PEBs is participation in organized leisure activities in adolescence. Organized activities (OAs), such as sports, cultural or prosocial activities, afford adolescents opportunities to develop their potential and to self-actualize (Larson et al., 2004). Participation in OAs has thus been positively associated with further civic engagement (Farb & Matjasko, 2012). Given that PEBs are a subtype of civic engagement, participation in certain types of OAs during adolescence might foster the acquisition of pro-environmental attitudes (PEAs). These attitudes could then consolidate in emerging adulthood and lead to more frequent PEBs in adulthood (Metzger & Smetana, 2010). Thus, our goal was to examine if certain types of OAs are prone to foster PEAs and PEBs. Such investigations are of considerable relevance, as PEBs are the most effective way of reducing greenhouse gas emissions at the individual level (Stern et al., 2016). Therefore, our findings could lead to changes in school curriculums, as the offer of the specific OAs favoring PEAs and PEBs could be increased.

1.1 | OAs as socialization contexts conducive to the adoption of PEBs

OAs generally take place in a group, are structured, supervised by adults, and serve to develop skills. Adolescents usually engage in OAs voluntarily and a majority of them practice at least one during the high school years (Denault & Poulin, 2009; Mahoney et al., 2005). Importantly, these activities involve socialization processes whereby adolescents internalize norms, rules, values, and attitudes through interactions with other participating peers and adult leaders (Vandell et al., 2015). These socialization processes seem to foster PEBs (Chawla, 2009) and civic engagement (Zarrett et al., 2021). Civic engagement refers to behaviors, values, knowledge, and skills favoring prosocial and political contributions to a community (Sherrod & Lauckhardt, 2009). PEBs are one specific subtype of civic engagement. Other subtypes are, for example, engaging in politics (e.g., voting) and volunteering (e.g., serving meals in a shelter Wray-Lake et al., 2017). However, as very few studies have examined the relationship between OAs and PEBs specifically, some insights might be gleaned more generally from the broader literature on civic engagement.

As mentioned earlier, prior research suggests that a positive association exists between OAs and civic engagement (Zarrett et al., 2021). Yet, this association might differ depending on the type of activity practiced in adolescence, as these are thought to offer different socialization experiences (Larson et al., 2006). Though there is no consensus (Hansen et al., 2010), three types of activity are usually considered: sports activities, cultural activities, and prosocial activities (Eccles & Barber, 1999; Hansen et al., 2003; Viau & Poulin, 2015).

1.2 | Sports activities

According to one study, American adolescents involved in sports are likely to endorse values favoring hierarchical and nonegalitarian structures (Oosterhoff et al., 2017). These values may have consequences for their PEBs. Indeed, social dominant personalities do not tend to prioritize pro-environmental policies nor collective identity or democratic attitudes (Flanagan, 2013; Pratto et al., 1994). Although no negative link between sport participation and civic engagement has been documented to date, most studies have suggested the absence of an association between the two (Fredricks & Eccles, 2006; Kahne & Sporte, 2008; McFarland & Thomas, 2006; Vézina & Poulin, 2019). Conversely, studies have occasionally reported a positive association between practicing sports and civic engagement (Perks, 2007; Rotolo et al., 2020). A meta-study summed up the ways sports participation could contribute to positive development (e.g., via socialization opportunities), suggesting that sports might play a role in shaping civic identity among adolescents (Holt et al., 2017). Given these contrasting claims, more research is needed to clarify whether sports participation leads to further civic engagement, including PEBs.

1.3 | Cultural activities

Cultural activities generally encompass religious, artistic, and scientific activities. Studies and reports have often documented positive associations between these activities and civic participation (Campagna et al., 2020; Leroux & Bernadská, 2014; Polzella & Forbis, 2016). Specifically, religious activities have been associated with civic engagement (i.e., voting, donating to charity; Zarrett et al., 2021). Other studies have found that socialization occurring in religious groups dampened environmental orientation by cultivating political conservatism and a “dominion-over-nature” view (Sherkat & Ellison, 2007). These relationships, however, appeared to depend on many moderators, (e.g., strength of beliefs, fear of divine sanctions; Sherkat & Ellison, 2007).

Concerning artistic activities, practicing these in the adolescent years was positively associated with civic behaviors in adulthood (Catterall, 2012). Various explanations have been put forth. Discursive theories speculate that the arts provide a space to discuss, form connections, imagine change, and take collective action (Stern & Seifert, 2009). Also, art fosters a sense of connectedness to the environment (e.g., by suggesting new ways of perceiving the natural environment's beauty; Curtis, 2009). This kind of emotional affinity towards nature has been shown to be predictive of PEB emission (Dutcher et al., 2007). Empirical observations support these hypotheses. For example, a theater activity acted as a "social catalyst" as it improved self-efficacy among disadvantaged adolescents (Rabkin, 2017). Also, esthetic beauty appreciation and creativity were positively correlated to PEB emission (Markowitz et al., 2012).

As for scientific activities, no study to our knowledge has examined the matter. However, the fact that the scientific community brought climate change to the fore strongly suggests that this type of OA should foster PEBs (Oreskes, 2004). The question remaining is whether early cultural activity experiences can shape one's PEBs in the long term.

1.4 | Prosocial activities

Prosocial activities include, among other things, volunteering, youth clubs such as scouts, and school committees. Practicing these activities in adolescence correlates negatively with social dominance (Oosterhoff et al., 2017) and positively predicts civic engagement (Fredricks & Eccles, 2006; Glanville, 1999; Kahne & Sporte, 2008). These links have been explained by the objectives usually targeted by these OAs. Prosocial activities aim to benefit others (out-group goals), whereas sports, for example, are centered on the performance of the individuals who practice them (in-group goals) (Padilla-Walker & Carlo, 2014). Thus, those who engage in prosocial activities are more likely to be socialized in a community and altruistic spirit, which is fertile ground for civic engagement. Also, some researchers claim that scouting is arguably the only activity that promotes environmental concerns explicitly. Scouting involvement was often ranked as a primary source of environmental commitment in adulthood (Chawla, 1999; Kim et al., 2016), although this result has not always been consistently reported (Wells & Lekies, 2006). Finally, no study to our knowledge has ever examined volunteering (in nonenvironmental groups) and school committee participation in relationship to PEBs.

In sum, studies suggest that the different types of OA could be differentially linked to civic engagement. However, it is not clear whether such links apply to the specific case of PEBs and what processes are involved.

Moreover, participation in OA has been operationalized in different ways across studies, the most frequent operationalizations being duration (i.e., number of years of participation) and intensity (i.e., frequency) of participation (Viau & Poulin, 2015). The respective contributions of duration and intensity of participation on civic engagement have been previously examined. The effect of the duration of participation was found greater to that of intensity in explaining the association between activities clusters and later civic engagement (Viau & Poulin, 2015). This highlights the importance of considering duration of participation in OA when investigating their influence on variables associated with civic engagement such as PEBs.

1.5 | Pro-environmental attitudes as a potential mediator between OA participation and PEBs

Pro-environmental attitudes (PEAs) are defined as a heightened concern for the environment (i.e., for issues such as pollution and the protection of animals; Gifford & Sussman, 2012). We believe that PEAs might act as a mediator between participation in OAs and PEBs. As mentioned above, OAs might foster internalization of attitudes promoting civic engagement over time (Denault & Poulin, 2009), including PEBs. In addition, various theoretical models highlight an attitude-behavior sequence, whereby positive attitudes towards a behavior should favor that behavior (Ajzen, 1991; Kraus, 1995; Metzger & Smetana, 2010). These models, as well as empirical studies, strongly suggest that PEAs could later translate into PEBs (Yuriev et al., 2020). We thus believe that some types of OAs considered in this study could possibly foster PEAs, since they all have been shown to foster civic engagement to different extents (Zarrett et al., 2021). In turn, PEAs should be positively associated with PEBs. Also, these links should be examined over a long period of time, given that OAs, PEAs, and PEBs entail saliency in different developmental periods.

1.6 | A longitudinal approach to examine links between OAs, PEAs, and PEBs

OAs represent salient developmental experiences during the adolescent years. Participating in OAs offers socialization experiences at a crucial period for identity formation (Erikson, 1968; Meeus, 2011). PEAs, for their part, may be acquired at any age but are more likely to stabilize in emerging adulthood (early 20s) even though identity formation initiated in adolescence is still ongoing (Arnett, 2000). It has been postulated that attitudes acquired in adolescence are not firmly

grounded. The attitudinal system “crystallizes” only within the transition to adulthood (Jennings, 1990). Some authors have argued that political and civic attitudes might already be formed in adolescence and remain stable afterwards (Wray-Lake & Shubert, 2019).

Yet, evidence about the importance of socialization and context in the development of civic attitudes suggests that emerging adulthood most likely offers more reliable data regarding PEAs (Lerner et al., 2014; Zarrett et al., 2021). As for PEBs, they too may be observed at any age. Children, adolescents, and emerging adults may, for example, recycle or reduce their energy consumption. However, the frequency of these behaviors appears to fluctuate during the adolescent years: older adolescents generally emit fewer PEBs than do younger adolescents (Krettenauer, 2017). Behaviors are thought to stabilize once adulthood is reached (around the age of 30; Mehta et al., 2020). Adults then assume the full responsibility of managing their residence, resources, and consumption habits (Nelson & Luster, 2014). Despite these considerations, studies examining PEBs have been cross-sectional for the most part and, for that reason, have failed to capture this developmental sequence.

1.7 | Objective and hypotheses

Against this background, we undertook a study to test whether participation in three types of OAs (sports, cultural, and prosocial activities) in adolescence (ages 14 to 17) positively predicted PEAs in emerging adulthood (ages 18 to 22) and whether these PEAs positively predicted PEBs in adulthood (age 30). We expected to observe this sequence for cultural and prosocial activities, as these were previously found to be associated with more civic engagement behaviors, probably owing to more grounded civic attitudes. Despite the mixed literature on the subject, we also expected not to observe this sequence for sports activities, which seem to cultivate in-group goals primarily. The mediation model is illustrated in Figure 1. Gender was included as a control variable as studies have reported differences between girls and boys in terms of participation in sports and cultural activities, and of PEAs and civic engagement, including PEBs (Li et al., 2019; Pedersen, 2005; Zelezny et al., 2000).

2 | METHODS

2.1 | Participants

Our longitudinal study was launched in 2001, when 390 participants (58% girls) were recruited in 6th grade classrooms ($M_{age} = 12.38$ years, $SD = 0.42$) in eight elementary schools in a large municipality in Quebec (Canada). The schools were in four different neighborhoods with varying socioeconomic realities. Most of the participants were Caucasian (90%) and nearly all were born in Canada (96%). At the start of the study, 69% of the participants lived with both their biological parents and

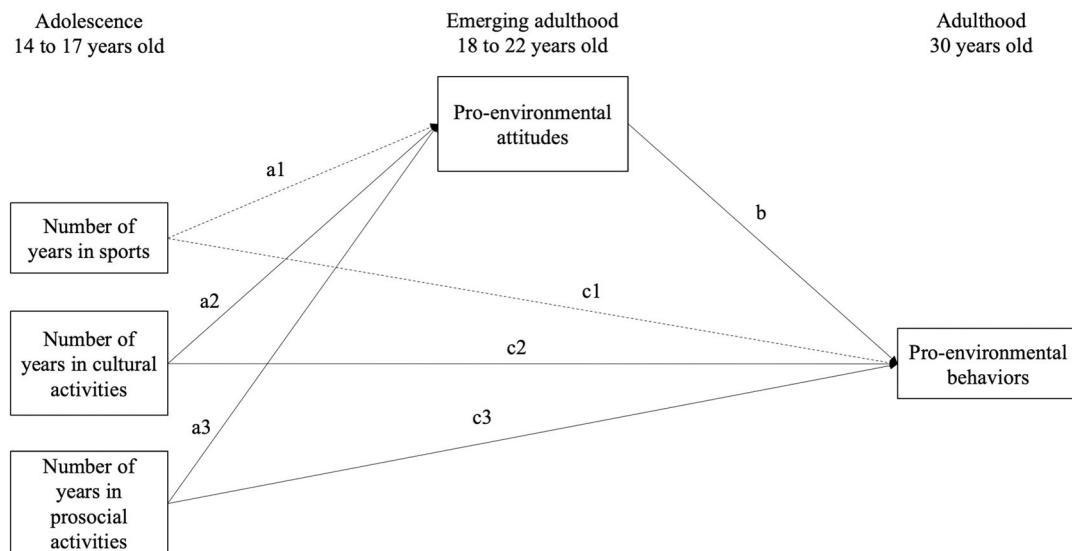


FIGURE 1 Mediating effect of pro-environmental attitudes in emerging adulthood on link between organized activities in adolescence and pro-environmental behaviors in adulthood. Dashed lines represent expected nonsignificant associations.

annual family income on average was \$50,000 or more. Mothers and fathers had a similar number of years of schooling, $M = 13.08$, $SD = 2.68$, and $M = 13.20$, $SD = 3.20$, respectively.

Participants took part in follow-up assessments at several time points until age 30. Data used in this study were collected at four points in adolescence during the high school years (ages 14, 15, 16, and 17), at five points in emerging adulthood (ages 18, 19, 20, 21, and 22), and at one point in adulthood (age 30). At age 30, 83.5% ($n = 321$) of the initial sample were still in the study. This subsample was used for analyses. Compared with the nonretained subsample ($n = 69$), these participants were more likely to be girls (61%), $\chi^2(1, N = 389) = 6.62, p = .010$, and to be living with both biological parents at the start of the study, $\chi^2(1, N = 387) = 16.63, p = .000$, but did not differ on family income and parent years of schooling.

2.2 | Design and procedure

When participants were 14, 15, 16, and 17, trained research assistants contacted them in May of each year to complete a structured phone interview on their participation in OAs. When participants were 18, 19, 20, 21, and 22, research assistants visited them at home to deliver a paper-and-pencil questionnaire for on-site completion. A small minority living more remotely (less than 5%) received the questionnaire by mail along with a postage-paid return envelope. At age 30, participants completed a questionnaire online. Consent was provided by parents until age 17 and by participants themselves from age 18 onward. At each time point, participants received financial compensation. Ethics approval was obtained from the institutional review board before conducting the study.

3 | MEASURES

3.1 | Participation in OAs at ages 14, 15, 16, and 17

The criteria defining OAs were presented to participants at the start of the phone interview. Activities had to have (a) been practiced during the school year (i.e., from September to June), (b) been supervised by adults, (c) a regular participation schedule (more than once a month), and (d) pre-established rules (Mahoney et al., 2005). Free recall procedures allowed participants to identify activities that they had engaged in over the past school year. These were grouped into three categories: (1) sports activities (e.g., ice hockey, gymnastics), (2) cultural activities (e.g., drama, faith-based activities), and (3) prosocial activities (e.g., volunteering, scouts, student committees). Three variables were then computed: (1) number of years of participation in sports activities, (2) number of years of participation in cultural activities, and (3) number of years of participation in prosocial activities. The possible range for these variables was “0” (no participation in this type of activity from ages 14 to 17) to “4” (participation in this type of activity every year from ages 14 to 17).

3.2 | PEAs at ages 18, 19, 20, 21, and 22

Each year, participants completed three items measuring PEAs drawn from a broader questionnaire on civic attitudes (Flanagan et al., 1998). These items targeted the importance given to various environment-related objectives: “How important is it to you to do something to stop pollution?”, “How important is it to you to protect animals?”, and “How important is it to you to preserve the earth for future generations?”. Participants answered each question on a Likert scale from 1 (*not at all important*) to 5 (*very important*). The measure’s internal consistency (Cronbach’s α) varied from .76 to .82 from one year to another. A confirmatory factor analysis revealed acceptable factor loadings of .54, .92, and .80. Score stability from year to year was relatively high (r from .59 to .68). Therefore, all five scores were averaged, resulting in a variable reflecting the PEAs for the period from ages 18 to 22.

3.3 | PEBs at age 30

PEBs were measured using the short version of the *Recurring Environmental Behavior Scale* (REBS; Brick et al., 2017), administered concurrently with other questionnaires measuring civic engagement. This validated scale includes 6 of the 21 items of the long version: “When you visit the grocery store, how often do you use reusable bags?”, “How often do you conserve water when showering, cleaning clothes, washing dishes, watering plants, or during other activities?”, “How often do you discuss environmental topics, either in person or with online posts (Facebook, Twitter, etc.)?”, “When you buy clothing, how often is it from environment-friendly brands?”, “How often do you engage in political action or activism related to protecting the environment?”, and “How often do you educate yourself about the environment?”

(Brick & Lai, 2018). Participants answered the questions on a five-point Likert scale from 1 (*never*) to 5 (*always or almost*). A mean score was computed for the six items ($\alpha = .77$). A high score indicates a high PEB frequency. A confirmatory factor analysis revealed factor loadings of .37, .59, .76, .54, .50, and .83. As the loading for the first item was under a threshold of .50, we ran our final model without this item. The results remained unchanged since the correlation between the two variables (with and without the item) was .97. All items were thus kept in the final analyses.

3.4 | Control variables

Gender in adolescence was coded “0” for boys and “1” for girls. It was entered as a control variable, given its association with variables in the model.¹ Of note, given that personality traits are highly relevant to attitudes and behaviors, we verified whether these traits were associated with PEAs and PEBs in our study. They were measured using the MINI-IPIP (Donnellan et al., 2006) when participants were 25 years old. The MINI-IPIP measures the main five personality traits (Extraversion, Agreeableness, Conscientiousness, Neuroticism, Intellect/Imagination). Given that the Intellect/Imagination scale was correlated with PEAs and PEBs, our model was tested with and without this scale as a covariate. As the results remained unchanged, this scale was excluded from the final model.

3.5 | Statistical analyses

The model illustrated in Figure 1 was estimated using MPlus (Muthén & Muthén, 2012) and tested using the maximum likelihood with robust standard errors (MLR) estimation method. This software deals with missing data using the full information maximum likelihood (FIML) estimation method. Models that fit data well generally have a statistically nonsignificant χ^2 value, a comparative fit index (CFI) above .90, and a root mean square error of approximation (RMSEA) below 0.08 (Browne & Cudeck, 1992; Hu & Bentler, 1999; Schumacker & Lomax, 2016).

The total effect of participation in the different types of OA in adolescence on frequency of PEBs in adulthood was parsed into its direct and indirect components via PEAs in emerging adulthood. Confidence intervals for the indirect effects were obtained using bootstrapping ($n = 5000$). An indirect effect is considered statistically significant when the value 0 does not fall within the confidence interval (Preacher & Hayes, 2008). Standard coefficients were used to estimate effect sizes and were interpreted as the change in the predicted variable for every one standard deviation change in the predictor (Fairchild et al., 2009).

4 | RESULTS

4.1 | Descriptive statistics

First, score distributions were examined. Skewness values for duration of participation in sports, cultural, and prosocial activities were, respectively, 0.86, 1.20, and 2.80, while Kurtosis values were -0.36, 0.30, and 8.28. As duration of participation in prosocial activities was not normally distributed, we dichotomized the three participation variables for consistency.² Accordingly, adolescents who had participated in a given type of activity for at least 1 year were attributed a score of 1 for that type of activity, while those who had never practiced that type of activity over the 4 years received a score of 0.

The means, standard deviations, and correlations between all variables are presented in Table 1. The three activity participation variables were not correlated to one another. Participation in cultural activities was positively correlated to PEAs and PEBs, but only weakly. Participation in sports activities was negatively correlated to PEAs and PEBs but also only weakly, whereas participation in prosocial activities was found to be unrelated to these two variables. PEAs and PEBs were positively and moderately associated. As for gender differences on the variables of interest, results showed that boys were more likely to participate in sports activities, $\chi^2(1, N = 321) = 6.16, p = .013$, and girls, in cultural activities, $\chi^2(1, N = 321) = 21.75, p = .001$. Also, girls scored higher on the PEAs variable, $t(303) = -3.55, p < .001$.

¹We verified whether gender could act as a moderator of the associations depicted in Figure 1 in a multiple group analysis (Muthén & Muthén, 2012). We generated one model with constraints (i.e., model parameters were constrained to be equal for boys and for girls) and one without constraints. Results revealed that the model without constraints did not fit the data better than the model with constraints, $\chi^2(7, N = 321) = 7.99, p = .33$. Consequently, gender was treated as a control variable in the analyses.

²Analyses were run twice, with and without dichotomizing duration of participation variables. Confidence intervals values were exactly on the significance threshold for the indirect effect, reassuring that the main finding remained unchanged.

TABLE 1 Bivariate correlations between variables and descriptive statistics

Variables	1	2	3	4	5	M	SD
1. Sports activities (ages 14–17)	-					0.57	0.50
2. Cultural activities (ages 14–17)	.05	-				0.48	0.50
3. Prosocial activities (ages 14–17)	.01	-.02	-			0.22	0.41
4. Pro-environmental attitudes (ages 18–22)	-.12*	.18**	-.01	-		3.74	0.75
5. Pro-environmental behaviors (age 30)	-.13*	.17**	.05	.33***	-	2.68	0.75

* $p < .05$; ** $p < .01$; *** $p < .001$.

TABLE 2 Mediation analysis results ($n = 321$)

	b	SE	z	p	β	95% CI β
Direct links						
SPT → pro-ENV attitudes (a1)	-.152	.089	-1.710	.087	-.10	-0.21, 0.01
CUL → pro-ENV attitudes (a2)	.211*	.089	2.384	.017	.14	0.03, 0.25
PRO → pro-ENV attitudes (a3)	-.047	.103	-0.457	.647	-.03	-0.13, 0.08
pro-ENV attitudes → pro-ENV behaviors (b)	.292***	.056	5.200	.000	.29	0.18, 0.40
SPT → pro-ENV behaviors (c1)	-.155	.081	-1.919	.055	-.10	-0.20, 0.01
CUL → pro-ENV behaviors (c2)	.179*	.079	2.269	.023	.12	0.02, 0.22
PRO → pro-ENV behaviors (c3)	.099	.097	1.018	.309	.05	-0.05, 0.15
Indirect effects						
SPT → attitudes → pro-ENV behaviors (a1b)	-.044	.028	-1.564	.118	-.029	-0.07, 0.002
CUL → attitudes → pro-ENV behaviors (a2b)	.062*	.030	2.052	.040	.041	0.01, 0.09
PRO → attitudes → pro-ENV behaviors (a3b)	-.014	.031	-0.453	.651	-.008	-0.04, 0.03

Note: CUL, cultural activities; ENV, environmental; PRO, prosocial activities; SPT, sports activities.

* $p < .05$; ** $p < .01$; *** $p < .001$.

4.2 | Mediation Model

The mediation model results are shown in Table 2. It should be noted that, based on descriptive statistics, participation in sports activities, participation in cultural activities and PEAs were regressed on gender. These results do not appear in this table. The model was a good representation of the data: $\chi^2(5) = 7.17$, $p = .213$, CFI = .974, TLI = .928, RMSEA = .04 (.00, .09), SRMR = .026.

First, results showed that sports and prosocial activities practiced in adolescence were not associated with PEAs in emerging adulthood (a1, a3). However, this link was significant for cultural activities (a2). Second, PEAs in emerging adulthood were positively associated with PEBs in adulthood (b). Third, concerning the proposed mediation sequence, the results showed that only the indirect link between cultural activities practiced in adolescence and PEBs was significant. In other words, the link between participation in cultural activities in adolescence and emission of PEBs in adulthood was partially explained by the adoption of PEAs during emerging adulthood.

Standardized coefficients show that, although cultural activities participation in adolescence was the sole predictor of PEAs in emerging adulthood among considered activities, the effect was quite small. Overall, the strongest association was between PEAs in emerging adulthood and PEBs in adulthood.

5 | DISCUSSION

In this study, we tested whether three types of OAs (sports, cultural, prosocial) practiced in adolescence were associated with the adoption of PEAs in emerging adulthood, and whether these attitudes were associated with more frequent PEBs in adulthood. Our results confirm the proposed sequence, but only for cultural activities.

5.1 | Cultural activities (religious, artistic, and scientific activities)

As anticipated, results revealed that adoption of PEAs in emerging adulthood partly accounted for the positive association between practicing cultural activities in adolescence and exhibiting PEBs in adulthood. This sequence supports prior research showing that cultural activities are related to enhanced civic engagement (Campagna et al., 2020; Leroux & Bernadska, 2014; Polzella & Forbis, 2016). This finding also supports discursive theories of action, suggesting that artistic activities are likely to lead to civic engagement through socialization (Stern & Seifert, 2009). Socialization experienced through culture appears to foster not only civic engagement in its broader sense, but also PEBs more specifically. However, it was not clear in previous studies whether religious activities are fertile ground for PEAs and PEBs, as seem to be artistic and scientific activities. Grouping religious activities with other OAs did not allow to clarify this issue. In our study, the small number of youths practicing religious activities did not allow for a more specific classification. Consequently, future research should examine youth's religious practices and associated beliefs more in depth and on a larger scale (Sherkat & Ellison, 2007).

Overall, however, the effect size of the association between cultural activity participation and PEAs remained small. This is not surprising, given that other major predictors of attitudes that are likely to account for most of the variance in PEAs (e.g., emotions, knowledge, cognition; Breckler, 1984) were not considered in our study. Moreover, twin studies have generated strong evidence indicating that both hereditary and environmental components play a nearly equally determining role for values and traits (Polderman et al., 2015). Nonetheless, it was interesting to find that participating in cultural activities in adolescence predicted, to some extent, greater importance given to environmental issues in emerging adulthood, which in turn was linked to more PEBs in adulthood.

5.2 | Prosocial activities (scouting, volunteering, and school committees)

Contrary to expectations, practicing prosocial activities in adolescence was not associated with PEAs in emerging adulthood or with PEBs in adulthood. While the developmental outcomes of prosocial activities have not been documented as much as those for sports or cultural activities, it seemed obvious to associate the former with a heightened concern for the well-being of the community. Indeed, the underlying goal of prosocial activities is often to serve the community (out-group goal), just as it is for civic engagement (Padilla-Walker & Carlo, 2014). However, there might exist different shades of out-group goals. Researchers have highlighted a “compassion fade” towards people and entities that are not directly identifiable (e.g., animals, the planet) (Markowitz et al., 2013). Prosocial activity participants might then be more inclined to help people directly (e.g., by serving meals to the poor) than to help nonhuman entities (e.g., by emitting PEAs). Also, certain prosocial activities are purposefully geared towards the protection of the environment, such as volunteering in “green” committees at school or scouting. These are more conducive to the development of PEBs (Chawla, 1999; Kim et al., 2016). However, because these activities were practiced by only one participant in our study, we could not isolate them from the other prosocial activities. As these explanations remain highly speculative, more research is needed to take a more refined look at the role played by prosocial activities in fostering PEAs and PEBs later in life.

5.3 | Sports activities

Our results show that practicing sports in adolescence was not associated with PEAs in emerging adulthood or with PEBs in adulthood. This corroborates prior studies on civic engagement (Kahne & Sporte, 2008; McFarland & Thomas, 2006; Vézina & Poulin, 2019). This lack of association between sports and PEAs might partly be explained by the fact that sports activities were treated as a homogeneous block: sports participation, by itself, does not seem to lead to clear developmental outcomes. Extensive reviews of potential mediators reveal that youth sports participation outcomes depend on a myriad of factors (e.g., sport played; actions of parents, peers and coaches; norms associated with the sport; social relationships formed; social characteristics of participants; Coakley, 2011; Logan et al., 2019). For example, if one coach made sure that every player on his team played an equal amount of time and another used only his best players, each would teach his team a totally different set of values. As we can see, more contextual data is needed to clarify the processes linking adolescent sport participation, PEAs, and PEBs.

5.4 | Limitations, strengths, future directions, and practical implications

Our study presents certain limitations. First, our study did not consider possible selection effects. For example, some adolescents may have already been socialized into exhibiting more or fewer PEAs and PEBs. As a result, they may have been more inclined to participate in specific activity types (Glanville, 1999; Rotolo et al., 2020). Additionally, future studies should propose a more complete model of major socialization contexts (e.g., OAs, family, friends, school, media) to examine their

unique contribution to PEAs and PEBs. For example, growing up in a family that values recycling or reducing one's consumption might explain a larger proportion of the variance in later PEAs and PEBs than do OAs. This study examined one specific context prone to foster PEAs and PEBs, without assuming that the influence of other contexts is negligible, as it is most certainly not. Second, our sample was relatively homogeneous from a sociodemographic and socioeconomic perspective. We thus did not control for sociodemographic or socioeconomic indicators. Participants were primarily Caucasian French-speaking Canadians, all from the same geographic area, the majority living with both biological parents at the start of the study, and with medium-to-high socioeconomic status. Consequently, our results cannot be generalized to other populations and will need to be replicated in more diversified samples. Otherwise, like most large-scale longitudinal studies, we have not examined the effect of question order on results (Lasorsa, 2003; Poškus & Sadauskaitė, 2015). Lastly, participation in OAs is a multidimensional construct that can be measured in terms of duration, but also in terms of intensity, breadth, consistency, and engagement, which can lead to different outcomes (Bohnert et al., 2010). These dimensions should be further examined in future studies.

Nonetheless, our study has several strengths that set it apart from earlier studies. First, the use of a longitudinal design spanning adolescence to adulthood (ages 14 to 30) with numerous time points allowed us to demonstrate that participation in some types of activity in adolescence is associated with frequency of PEBs in adulthood. It is undoubtedly crucial to measure PEBs in adulthood (age 30), which is when individuals generally achieve identity, family, and vocational stability, and thereby assume responsibility for their actions. Moreover, emerging adulthood embodies a key moment in human development when the attitudinal system is expected to crystallize. Our annual assessment of PEAs in the early years of emerging adulthood (ages 18 to 22) allowed us to combine several PEA measurements and produce a reliable evaluation of these attitudes. Given the increasingly important role of young people in environmental initiatives, future studies should aim to examine more precisely how and from where youth's environmental awareness emerged.

Importantly, our study highlights the possibility of identifying certain early socialization contexts that favor the adoption of PEAs and PEBs. Notably, our findings reveal that organized cultural activities in adolescence are a context conducive to a higher frequency of PEBs in adulthood by promoting PEAs in emerging adulthood. Our results are in line with prior studies that pointed out that some OA contexts in adolescence support the development of civic orientation. In light of these findings, we join our voices to those of others who call for greater government funding and institutional interest in cultural initiatives (Jacoby, 2019). Cultural activities appear to be a cost-effective way of stimulating ecological behaviors among people who might not be interested in direct environmental initiatives. Concretely, maintaining or even expanding the offer of cultural activities that stimulate creativity and a sense of community in high school students could be a promising strategy to raise their environmental connectedness and, ultimately, encourage their PEBs. Investing in such strategies in adolescence, the training ground of future citizens, is even more crucial in the context of the current climate crisis.

AUTHOR CONTRIBUTIONS

Lisa-Marie Davignon analyzed the data and drafted the manuscript. François Poulin designed the study, coordinated data collection, and helped to draft the manuscript. Anne-Sophie Denault analyzed the data and reviewed the manuscript. All authors read and approved the final manuscript.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data used in the research cannot be shared with any person because of confidentiality concerns.

ETHICS STATEMENT

Ethics approval was obtained from Internal Review Committee for Research Ethics with Humans at the Université du Québec à Montréal before conducting the study.

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