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Building Adolescents' Resilience: Evaluating the Impact of a 20-Week Inner-City Program

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ABSTRACT

Adolescence is a critical phase in any individual's life, marked by rapid growth and profound psychological changes. Adolescents living in inner-city environments face unique challenges, including sedentary lifestyles, academic dysfunction, and socio-emotional disorders due to adverse ecological factors, such as a lack of resources or exposure to violence. In an effort to support them, the current study implemented a 20-week after-school program aimed to enhance their resilience. A total of 134 adolescents from inner-city schools in Rotterdam, the Netherlands, participated in our program (58% male; $M_{age} = 11.20$, $SD = 1.04$). To assess the effectiveness of the program, two MANCOVA analyses were performed: one including all participants and a second specifically targeting those with lower resilience scores at baseline. Using the Resiliency Scales for Children & Adolescents (RSCA), our results revealed a significant improvement in participants' Sense of Relatedness ($p < .001$), particularly among adolescents with lower resilience scores at baseline. In sum, these findings provide evidence of the program's effectiveness in enhancing resilience among inner-city adolescents, particularly among those with initial lower levels of resilience.

KEYWORDS

Adolescence; lower-scoring; resilience; socio-emotional learning; sports-based positive youth development

For adolescents growing up in inner-city environments, resilience is paramount for fostering positive development. Inner-city communities often grapple with limited socioeconomic resources (McKinnish et al., 2010), lower levels of educational attainment (Kasarda & Ting, 1996), and an increased risk of exposure to violence (Ng-Mak et al., 2002). These adverse circumstances can contribute to psychological dysfunction and maladaptive behaviors (Bajo Marcos et al., 2021). Research has highlighted a higher prevalence of mental health difficulties among inner-city adolescents compared to the general population (Knowles et al., 2021). Resilience, however, can equip adolescents with the capacity to effectively navigate adversity and develop adaptive coping strategies (Dray et al., 2017). This, in turn, aids adolescents in maintaining their mental health despite challenging circumstances and increases their chance for positive development (Leventhal et al., 2015). Therefore, fostering resilience among inner-city adolescents is considered an essential building block within these communities.

Initially, resilience was defined as the ability to bounce back or cope successfully in the face of adversity (Earvolino-Ramirez, 2007). However, this approach to resilience as a fixed trait does not account for potential fluctuations in strength and vulnerability, as it can be influenced by cultural and developmental variables throughout one's life (Masten & Barnes, 2018). Taking this into

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consideration, resilience is currently viewed as a dynamic process in which individuals adapt successfully to adversities threatening their function, viability, or development (Anderson & Priebe, 2021). Drawing from developmental theory, Prince-Embury & Saklofske (2013) have proposed a three-factor model of personal resilience, characterized by three components: *Sense of Mastery, Sense of Relatedness, and Emotional Reactivity*. *Sense of Mastery* reflects an individual's belief in their own capabilities to deal with environmental demands and includes self-efficacy, optimism, and adaptability. *Sense of Relatedness* captures the extent to which one feels connected to others, that is, to what extent we find comfort in others, are able to trust others, can tolerate differences, and one's perceived access to support from others. Finally, *Emotional Reactivity* can be defined as how sensitive we are to negative emotions, the length of time we need to recover, and to what extent such episodes impair our psychosocial functioning.

The multifaceted nature of resilience and its dynamic qualities suggest that strategies aimed at enhancing protective factors can effectively buffer potential threats to its development. Protective factors encompass various dimensions, including individual (e.g., self-regulation, self-esteem, and self-concept), family (e.g., parenting style, family cohesion, and intimate-partner relationships), and community characteristics (e.g., safety in neighborhoods, recreational facilities, and accessibility to adequate health services; Llistosella et al., 2022; Zolkoski & Bullock, 2012). Additionally, lifestyle factors, such as the frequency and duration of physical activities, have been associated with the development of resilience (Moreno et al., 2016). These protective factors can enhance adolescents' perception of their environment and promote the adoption of positive and adaptive behaviors. Conversely, various factors can hinder the cultivation of resilience, including biological (e.g., congenital disabilities and low birth weight) and environmental factors (e.g., poverty, family conflict, and negative life experiences such as maltreatment and violence; Zolkoski & Bullock, 2012). Simultaneously, efforts can be made to mitigate potential negative consequences of personal risk factors that hinder positive development. It is important to note that many risk factors tend to accumulate and persist, compounding their adverse impact (Vanderbilt-Adriance & Shaw, 2008). Consequently, adolescents exposed to a high number of risk factors may exhibit lower levels of resilience compared to those in less challenging environments.

Considerable efforts have been dedicated to promoting resilience by strengthening protective factors and mitigating the adverse effects of risk factors. Evidence-based approaches, such as cognitive-behavioral therapy, are systematic and widely recognized methods utilized to promote the development of resilience, particularly among individuals needing special support, such as victims of violence (e.g., Giordano et al., 2019; Padesky & Mooney, 2012). According to Liu et al. (2020), programs intended to develop resilience often include themes or concepts such as boosting mindfulness, increasing social support, providing psychoeducation, or offering alternative or physical activities. Mindfulness programs aim to enhance resilience by bolstering attention regulation (e.g., Galante et al., 2018; Schonert-Reichl & Lawlor, 2010). Programs centered on providing social support leverage support behaviors from peers, teachers, parents, or the broader community to help individuals cope more effectively with challenges (e.g., Li et al., 2017; Tang et al., 2022). Psychoeducation programs are among the most prevalent, where facilitators try to model and teach socio-emotional skills and then encourage participants to practice what they have learned (e.g., Niu et al., 2021; Sanders et al., 2020). Lastly, programs involving alternative activities, such as music or art (e.g., Haase et al., 2020; Macpherson et al., 2016) or physical activity, tend to promote resilience by offering various intentional and structured activities (e.g., Sarkissian et al., 2018; Yook et al., 2017).

Interestingly, the effectiveness of programs designed to foster the development of resilience may vary among adolescents when susceptibility is considered. The differential susceptibility theory, as proposed by Belsky (1997), suggests that adolescents are not equally susceptible to the same environmental influences. For instance, children with lower well-being appear to be the most affected by exposure to adverse environments yet, they have also been found to benefit more from supportive rearing environments compared to less vulnerable children (Belsky et al.,

2007). Although no existing study has directly explored the association between resilience and susceptibility, previous research has discussed the relationships between risk factors of resilience and susceptibility (Belsky & Pluess, 2009). Empirical evidence suggests that certain individual risk factors such as social anxiety, sensitivity, and frustration can significantly moderate environmental influences (Aron & Aron, 1997; Lengua, 2008; Volling & Feagans, 1995). For example, Ab Ghaffar et al. (2019) reported that the beneficial effects of their school-based anxiety prevention program were more pronounced among anxious adolescents, demonstrating that adolescents are differentially susceptible to the program's effects. Low-resilient adolescents may be more likely to face the challenges mentioned above, which may lead to a higher level of susceptibility among them (Chu et al., 2022). In other words, adolescents with lower resilience may be more susceptible to the program's effects compared to adolescents with higher levels of resilience.

The developmental and growth trajectories of adolescents residing in inner-city communities may be negatively influenced by limited available resources and low levels of neighborhood cohesion (Trost et al., 2013; Morgan et al., 2011). Research indicates that adolescents living in inner-city areas are more likely to witness violence and crime, experience poverty, and exhibit poor school functioning, potentially leading to chronic and severe social or emotional disorders (Lever et al., 2004; McKinnish et al., 2010; Scorgie et al., 2017). Besides potential socio-emotional underdevelopment, inner-city adolescents may also be at risk for physical inactivity and obesity due to limited physical activity resources and safety concerns in their neighborhoods (Holt et al., 2009). Existing studies support this notion, as many have indicated that a majority of inner-city adolescents lack adequate physical activity in daily life (Galvez et al., 2013; Trost et al., 2013). Previous findings also suggest that physical activities tend to provide a vital context in which adolescents have the opportunity to learn to collaborate, communicate, cooperate with others, and develop a sense of mastery and self-confidence (Lubans et al., 2016). Given the close relationship between physical activity and resilience, the lack of physical activity may form a potential vulnerability to inner-city adolescents' positive development (Moljord et al., 2014; Xiang et al., 2020). Furthermore, research has shown that adverse environmental factors can negatively influence academic progress (Leventhal & Brooks-Gunn, 2000), contributing to a higher likelihood of reduced school performance among inner-city adolescents (Kim et al., 2014). The aforementioned factors underscore the pressing need for comprehensive and effective intervention programs tailored to mitigate the adverse impact of the ecological environment and to promote protective factors in order to enhance resilience among inner-city adolescents.

In light of these prevalent challenges stemming from ecological barriers, such as mental health issues, physical inactivity, and academic dysfunction among inner-city adolescents, the current study explores the effectiveness of a comprehensive program. This program encompassed individual coaching, physical activities, and remedial lessons tailored for these adolescents. The primary objective was to assess the program's effectiveness in the development of resilience among participants. Besides the normative group of participants, the current study also explores and will focus on a subgroup consisting of participants with lower levels of resilience at the baseline. To address these objectives, we investigated the following two research questions: (1) Does following a 20-week physical activity program increase adolescents' resilience? And (2) Does the program's effect differ between adolescents with lower levels of resilience and more resilient adolescents?

Method

Participants and procedure

The current project was conducted in collaboration with the social outreach program of a local football foundation. A 20-week program was developed to support adolescents in need of extra physical, emotional, or academic support. A total of 177 adolescents from inner-city schools in Feyenoord,

Rotterdam, the Netherlands, participated in our program, nominated by their teachers with the aim of boosting their academic performance and/or personal development. These participants generally come from the same area with a lower-than-average yearly spendable household income compared to Rotterdam (€40,800) or the Netherlands (€46,800), averaging €36,100 per year (Arends-Tóth et al., 2022; Graaf, 2023). Moreover, in this area, the majority of the population consists of immigrants, with approximately only 30% being Dutch natives, 13% Western immigrants, and 57% non-Western immigrants. The non-Western immigrant groups include Turks (16%), Moroccans (11%), Surinamese (9%), Netherlands Antilleans (6%), and individuals from other countries (15%; Statistics Netherlands, 2024). Of the initial 177 adolescents who enrolled in our study, a total of 134 adolescents (comprising 76 males, 53 females, and 5 participants who did not disclose their gender) completed the 20-week physical activity program, which included both the pre-and post-evaluations. Dropout from the study occurred primarily due to participants failing to meet the attendance requirement of at least 80% of the program sessions or being absent during either the pre- or post-test assessments. Additionally, five adolescents did not report their age. In the reported sample, adolescents' ages at baseline ranged from 10 to 15 years ($M = 11.2$, SD = 1.04). Within the subgroup of 35 adolescents with low levels of resilience at baseline (19 males, 13 females, and 3 who did not disclose their gender), ages ranged from 10 to 15 ($M = 11.65$ $SD = 1.31$).

The study protocol was approved by the ethical committee of Erasmus University of Rotterdam, the Netherlands. Written parental consent was obtained prior to participation. Each week, participants attended a two-hour session, which included (1) an individual coaching session (15 min), (2) small group physical activities (1 h), and (3) small group remedial lessons (45 min), conducted by professionally trained coaches. During the individual coaching sessions, coaches assisted adolescents in setting goals for the upcoming week and evaluating progress on previously set goals. Physical activities offered included boxing lessons and targeted group games to enhance leadership, cooperation, and communication skills. Small group remedial lessons focused on language, mathematics, and reading skills. To motivate children to engage in the program, some famous football stars were invited to interact with the participants and to provide encouragement. Participants were required to attend a minimum of 80% of the intervention sessions. Data from participants who did not meet this attendance criterion were excluded.

Materials

To measure personal resilience, the Resiliency Scales for Children & Adolescents (RSCA), developed by Prince-Embury (2008), was used. The RSCA is a self-report 64-item questionnaire that includes 3 subscales: Sense of Mastery (MAS; e.g., "*I am good at fixing things*", 20 items), Sense of Relatedness (REL; e.g., "*I can make friends easily*", 24 items), and Emotional Reactivity (REA; e.g., "*I get very upset when people don't like me.*", 20 items). Each item is rated on a five-point Likert scale, ranging from 0, "never", to 4, "almost always". High scores on MAS and REL and low scores on REA are indicative of high resilience. In Prince-Embury (2008) study, Cronbach's alpha values ranged from .86 to .87, indicating high internal consistency. In the current sample, Cronbach's alpha was calculated for each subscale, resulting in values ranging from $\alpha = .81$ to $\alpha = .92$, which demonstrates good reliability.

Data analysis

Statistical analyses were conducted using IBM SPSS Statistics 28.0. Prior to conducting the main data analysis, the dataset was screened to check the assumptions. First, the dataset was examined for multivariate outliers using Mahalanobis distance values. The Mahalanobis distance values were then converted into p-values using the $\chi 2$ distribution function. All p-values of Mahalanobis distance exceeded .001, indicating no outliers within the dataset (Leys et al., 2019). In addition, assumptions of

multivariate normality were assessed using the Kolmogorov-Smirnov (K-S) test. The K-S test revealed that the data were normally distributed at both baseline and post intervention ($p > .05$). These initial checks ensured the validity and reliability of the subsequent data analysis. Furthermore, descriptive statistics (i.e., mean and standard deviation) were used to summarize the participants' characteristics. To examine potential baseline differences in terms of gender or between participating schools, we conducted two separate one-way MANOVAs. A first MANOVA included gender (female vs. male vs. not reported) as the independent variable and the three subdomains of resilience as dependent variables. A second MANOVA utilized school type (primary school vs. special education vs. middle school) as the independent variable and the same three subdomains of resilience as dependent variables. No significant Gender or School differences were revealed ($ps > .05$, see Table 1).

To examine the impact of our 20-week program on resilience, we conducted a series of statistical analyses. Therefore, a one-way repeated measures MANCOVA was conducted, with time as the independent variable and MAS, REL, and REA as the dependent variables. This analysis was conducted twice, once for the entire sample, and once for a subset of the sample, to investigate potential differential susceptibility to the program's effectiveness. Specifically, participants who ranked within the lowest 30% on at least two resiliency subdomains at baseline, were selected as a subgroup and examined for their susceptibility to the program's effects. Additionally, we conducted an investigation on participants ranking within the highest 30% on at least two resiliency subdomains at baseline to assess the potential influence of regression to the mean. Participants' school, age, and gender were included in the analyses as covariates to account for potential influence.

Results

To assess the stability of measurements and the relationship among subdomains, Pearson correlations were conducted. Results indicated that all three subdomains were significantly correlated ($ps < .05$), with correlations varying between $r = -.24$ and $r = .72$. The stability correlations from baseline to post intervention were also significant ($ps < .05$), ranging from $r = .53$ to $r = .62$ (see Table 2), indicating consistent measurement across time. At baseline, there were no significant differences between girls and boys on any of the subdomains ($p > .05$). Additionally, there were no differences observed among the three types of schools ($p > .05$; see Table 1).

Main analyses

To evaluate the program's effectiveness across all adolescents, we employed a MANCOVA, with Time as independent variable and the three resiliency subdomains, namely MAS, REL, and REA, as dependent variables. Participants' school, age, and gender were included as covariates. Given that 5 participants did not report their age, they were excluded from the analysis, resulting in a sample size of 129. The results indicated no significant improvement on any of the subdomains (i.e., MAS, REL, REA) from pre to post-test ($p > .05$). This suggests that, on average, participants did not experience a significant increase in resilience as a result of the program.

Table 1. Baseline mean scores on the resiliency scale for children and adolescents (RSCA) for gender and school subgroups.

	Gender				School			
Variables	Female ($n = 53$) *M (SD)*	Male ($n = 76$) *M (SD)*	Not Reported ($n = 5$) *M (SD)*	*p*	PS ($n = 73$) *M (SD)*	SEP ($n = 49$) *M (SD)*	MS ($n = 12$) *M (SD)*	*p*
MAS	58.00 (8.53)	56.21 (10.55)	58.60 (10.16)	.555	57.32 (9.22)	57.49 (10.25)	53.17 (10.86)	.361
REL	70.85 (14.06)	72.80 (14.61)	56.60 (21.09)	.056	72.25 (14.44)	72.08 (15.55)	63.75 (13.22)	.172
REA	27.75 (15.55)	34.03 (16.34)	23.40 (12.64)	.051	31.73 (17.55)	29.82 (15.66)	33.08 (7.81)	.745

Note: SD: Standard deviation; PS: primary school; SEP: Special education primary school; MS: middle school; MAS: Sense of Mastery; REL: Sense of Relatedness; REA: Emotional Reactivity.

Table 2. Matrix of pairwise correlations of participants' scores on resilience and subdomains in the resiliency scale for children and adolescents (RSCA) at baseline (T0) and postintervention (T1).

	Variables	1	2	3	4	5	6
T0							
1	MAS	–	.72**	.30**	.62**	.43**	−.28**
2	REL		–	−.24**	.58**	.58**	−0.22*
3	REA			–	−.25**	−0.19*	.53**
T1							
4	MAS				–	.72**	−.27**
5	REL					–	−.25**
6	REA						–

Note.
*$p < .05$.
**$p < .01$; MAS: Sense of Mastery; REL: Sense of Relatedness; REA: Emotional Reactivity.

Table 3. Means and standard deviations at pretest and post-test, and results of repeated measures MANCOVA.

	All Participants ($n = 129$)					Lower-scoring Subgroup ($n = 35$)						High Resilient Subgroup ($n = 44$)				
	T0		T1			T0		T1				T0		T1		
	M	*SD*	*M*	*SD*	*F*(3,123)	*M*	*SD*	*M*	*SD*	*F*(3,29)	*Cohen's d*	*M*	*SD*	*M*	*SD*	*F*(3,38)
MAS	56.95	9.78	56.74	11.36	0.23	46.83	7.45	48.94	8.74	0.49		66.16	5.87	65.59	7.52	0.025
REL	72.00	14.36	70.76	15.93	2.20	54.91	11.86	60.46	15.95	21.61***	0.39	84.52	6.33	80.89	11.83	0.60
REA	31.45	16.26	31.77	16.98	1.31	42.11	13.48	39.80	13.13	0.86		20.77	16.14	22.61	17.68	2.65

Note.
*$p < .05$.
**$p < .01$.
***$p < .001$.
MAS: Sense of Mastery; REL: Sense of Relatedness; REA: Emotional Reactivity.

To investigate the program's effectiveness among lower-scoring adolescents, a similar MANCOVA was conducted, including only the subgroup of adolescents with lower resilience at baseline (see Table 3). Again, the results revealed no significant effect for MAS, $F(3,29) = 0.49$, $p > .05$, or REA, $F(3,29) = 0.86$, $p > .05$. However, a significant effect from pre-to post-test was observed for REL, $F(3,29) = 21.61$, $p < .001$. These results suggest that, among lower-scoring participants at baseline, the program effectively improved REL.

Finally, to investigate whether said significant increase could be attributed to regression to the mean, a similar MANCOVA was conducted, including only the subgroup of adolescents with high resilience at baseline (see Table 3). If regression to the mean were the sole explanation for the increase observed among the lowest-scoring adolescents, we would anticipate a decrease in scores among the 30% highest-scoring adolescents. However, the results reveal no significant difference in pre- and post-test scores for MAS, $F(3,38) = 0.025$, $p > .05$, REL, $F(3,38) = 0.60$, $p > .05$) or REA, $F(3,38) = 2.65$, $p > .05$, among the highest-scoring adolescents. This suggests that the significant improvement in REL among lower-scoring adolescents is unlikely to be due only to regression to the mean.

Discussion

The current study aimed to assess the effectiveness of a 20-week program on adolescent resilience. Our findings indicate that, overall, the program did not result in a significant improvement in resilience across all participants. However, a noteworthy outcome emerged as the program demonstrated a positive effect on the sense of relatedness (REL) specifically among lower-scoring adolescents. This suggests that the current program holds promise as an effective intervention tailored to support adolescents lower on resilience in enhancing their sense of relatedness, a crucial component of resilience.

With regard to the program's impact on resilience across all adolescents, no significant improvements in any of the three resilience domains was observed. In other words, the overall group did not experience a noticeable enhancement in resilience following our 20-week program. One possible explanation is that a substantial portion of the participants in this study already exhibited relatively high levels of resilience from the outset, leaving little room for further improvement. Previous research has indicated the existence of a ceiling effect in related mental health programs (Goedendorp & Steverink, 2017). That is, participants with high baseline scores, will only be able to show small improvements following an intervention, compared to participants with lower scores at baseline (Judd & Kenny, 1981). For the current study, it is important to consider that some teachers nominated their entire class to participate in the program, potentially creating a scenario where adolescents that took part in our program, already possessed high levels of resilience, which was also shown by our data. Among the nominated adolescents, a significant majority surpassed the norm scores of the general population, with 76% scoring higher than the mean for MAS, 89% scoring higher than the mean for REL, and 92% scoring lower than the mean for REA (Prince-Embury, 2008). These robust baseline scores suggest that the participants were presented with high baseline levels of resilience prior to taking part in our program, which likely constrained the potential for further improvement. Altogether, this may explain why the program's effectiveness did not reach statistically significant across all participating adolescents.

Interestingly, when considering only adolescents who presented with low levels of resilience at baseline—and thus showed room for improvement—significant effects for the program were revealed. That is, the results revealed a substantial increase in REL levels on the posttest compared to the pretest. This finding suggests that susceptibility indeed plays a role when targeting resilience, and that adolescents with lower initial levels of resilience may be more responsive to supportive environments. In fact, these results are consistent with Belsky et al.'s (2007) hypothesis, which posits that children with lower resilience are more prone to both the adverse effects of risky environments and the advantageous effects of supportive environments. Additionally, these findings also align with other empirical studies, suggesting that the efficacy of mental health interventions may be more pronounced among individuals with higher vulnerability than among those classified as typical (Blair, 2002; Klein Velderman et al., 2006).

Several factors may have contributed to the program's impact on lower-scoring adolescents' REL. Firstly, similar to well-established programs like "Ahead of The Game" (AOTG; Vella et al., 2018) that employ physical activities to bolster resilience and promote psychological development, the current program attempted to support adolescent psychosocial development using a structured sporting context. The combination of individual and group activities offered within our 20-week program may have facilitated the development of social skills and hence improved their sense of relatedness. Secondly, the sessions where coaches assisted adolescents in setting and reviewing their goals may have helped adolescents with regulating goal-directed behaviors and may have helped them increase their perseverance. When adolescents witness progress and accomplishments, it can boost their self-esteem and hence improve their engagement (Park & Park, 2015), which may in turn affect their ability to connect with others and develop a sense of relatedness.

It is important to note, however, that the current program did not yield significant effects on either MAS and REA, neither with respect to the full sample nor among the subgroup of adolescents with lower resilience at baseline. Interestingly, previous research has revealed that when adolescents take part in programs like the program here discussed, they actually run the risk of experiencing excessive pressure to win, may perceive themselves as lacking in abilities, or might feel vulnerable in the presence of (successful) teammates (Fraser-Thomas et al., 2005). Such adverse outcomes could then diminish MAS and increase REA. Moreover, the individual sessions that were held by the coaches to assist adolescents in setting and reviewing their goals may also have led to feelings of incompetence in case these goals were not achieved, potentially negatively affecting MAS. While no significant improvements in MAS or REA were revealed, fortunately,

also no such adverse effects were revealed. Future research, however, could consider mitigating the potential adverse impact of these types of programs by refining the teaching methods, enhancing adult support during physical activities, and setting appropriate and achievable goals in line with the students' abilities (Forneris et al., 2007; Fraser-Thomas et al., 2005).

Implications of findings

The findings of this study hold two important implications for future inner-city programs and educational practices targeting resilience. Firstly, the significant improvement in REL observed among adolescents with lower-level resilience at baseline provides initial support for the idea that the current program has the potential to enhance participants' social engagement. This enhanced social engagement can play a vital role in bolstering adolescents' resilience when faced with challenges or setbacks (Godor et al., 2023; Prince-Embury, 2008).

In other words, the current study offers an innovative approach to promoting positive development among adolescents who may lack resilience. Secondly, the current study and corresponding program have yielded a significant impact, not across all adolescents, but for adolescents with lower resilience levels at baseline. Consequently, we suggest that similar interventions should consider implementing stricter guidelines for participation, focusing on participants' resilience levels at baseline, given the observed differential effectiveness. For instance, more resilient adolescents may already possess well-established goal-directed behaviors and may perform adequately in academic challenges (Rouse, 2001). While participation in the program does not have adverse effects for this group, they may not derive further benefits from it due to ceiling effects. Therefore, it is important to reserve spots in such programs for adolescents who stand to benefit the most. Additionally, it is important to continue researching this issue, exploring optimal group compositions for those with lower resilience scores (e.g., a group comprising solely low-scoring adolescents or a mix). Furthermore, we recognize the importance of investigating strategies to mitigate dropout among adolescents with lower resilience scores.

Limitations and future directions

Our study has three limitations that are important to consider. A first limitation pertains to the study's design. Given that the current study did not employ a control group, it is possible that the observed increases in REL may have been the result of a placebo effect or may be due to other external factors. Secondly, adolescents who participated in our program were nominated by their teachers rather than randomly selected. Relying on teacher nominations, however, could introduce a potential bias and may have limited the current study's full potential. This might hinder the generalizability of the findings. Future research could consider implementing this intervention with the entire classes and/or randomly selected participants to investigate this potential limitation further. Finally, the current study did not include a delayed follow-up test to evaluate the sustainability of the program. Interestingly, it is possible that the improvements seen in REL may result in enhanced MAS and decreased REA over time (Dollar et al., 2023; Hughes & Chen, 2011). Future research could conduct additional follow-up assessments to investigate whether improvements in REL indeed result in improvements in MAS and/or REA after several months. Such evaluation would provide valuable insights into the long-term impact of the program.

Conclusion

To support inner-city adolescents' resilience, the present study offered a 20-week program aimed at bolstering resilience. The findings indicate that this program had a significant positive impact on the Sense of Relatedness (REL) among adolescents with lower resilience at baseline. This

suggests that multi-component interventions of this nature hold promise for future research targeting inner-city populations. Such interventions are practical to implement and can address multiple facets of the challenges faced by inner-city adolescents, including mental health issues, academic struggles, and sedentary behaviors. Future research in this area could explore potential adjustments to cater to the resilience needs of the general population residing in inner-city areas. Additionally, conducting studies to investigate the potential long-term effects of the current program is recommended. These endeavors will contribute to our understanding of how to best support the development and maintenance of resilience among inner-city adolescents.

Disclosure statement

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