

Role of Resilience in the Relationship between Adverse Childhood Experiences and Behavior Problems among Thai Adolescents in a Province of Southern Thailand: A School-Based Cross-Sectional Study

Tikumporn Hosiri, M.D., Anawin Jongjaroen, M.Sc., Soisuda Imaroonrak, Ph.D., Thanayot Sumalrot, Ph.D.,
Sucheera Phattharayuttawat, Ph.D.

Department of Psychiatry, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok 10700, Thailand.

ABSTRACT

Objective: This study aimed to investigate the relationship between adverse childhood experiences (ACEs), behavior problems, and resilience among adolescents in Southern Thailand, with a particular focus on the role of resilience in mediating the relationship between ACEs and behavior problems.

Materials and Methods: A paper-and-pencil questionnaire, covering participants' general information, Thai Version of the Adverse Childhood Experiences Questionnaire (ACEs questionnaire), Adolescent Risk Behavior Inventory-12 Items, and Thai Version of the Connor–Davidson Resilience Scale (25-Item CD-RISC), was distributed to 383 senior high school students in a province in Southern Thailand. The data was analyzed using descriptive statistics, correlation analysis, and path analysis.

Results: Out of the 383 students the questionnaire was distributed to, 374 completed the questionnaire, resulting in a response rate of 97.65%. Alarming, 59.36% of the respondents reported experiencing at least one type of ACE. Correlation analysis revealed a significant positive association between ACEs and behavior problems ($r = 0.17$, $p < 0.01$) and a negative correlation with resilience ($r = -0.19$, $p < 0.01$). Path analysis demonstrated that ACEs directly influenced behavior problems ($\beta = 0.23$, $p < 0.01$) and resilience ($\beta = -0.24$, $p < 0.01$). However, the analysis did not support the hypothesis that resilience mediates the relationship between ACEs and behavior problems.

Conclusion: The findings indicate a troubling prevalence of ACEs among senior high school students in Thailand, likely contributing to current adolescent behavior problems. Although the study's path analysis did not align with prior research, it emphasizes the critical role of resilience in mitigating the adverse effects of ACEs. Therefore, resilience remains a necessary skill in helping adolescents cope with the consequences of ACEs.

Keywords: Adolescent; adverse childhood experiences; behavior problems; resilience (Siriraj Med J 2024; 76: 282-292)

INTRODUCTION

The Centers for Disease Control and Prevention (CDC) in the United States (US) defines adverse childhood experiences (ACEs) as traumatic events or circumstances that can cause lasting emotional harm to children. These events typically occur between birth and age 17¹ and

are categorized into 10 types: emotional abuse, physical abuse, sexual abuse, emotional neglect, physical neglect, household physical violence, household substance abuse, household mental illness, parental separation/divorce, and an incarcerated household member.² Studies have shown that individuals who have experienced ACEs are

Corresponding author: Anawin Jongjaroen

E-mail: new.anawin@gmail.com

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ORCID ID: <http://orcid.org/0009-0004-5136-5461>

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at an increased risk of substance abuse, mental health issues, and even physical illnesses, including heart disease and cancer.³

Research conducted in the US from 2011 to 2014 effectively underscores the extensive nature of this issue, revealing that a substantial 61.55% of individuals aged 18 years old and older in the US had encountered at least one ACE.⁴ Furthermore, scholarly inquiries in East Asian nations, including in locations such as Singapore,⁵ China,⁶ and Thailand,^{7,8} have consistently revealed congruent patterns. These findings provide compelling evidence that the prevalence of ACEs shows a remarkable degree of uniformity across a diverse array of cultural contexts.

In addition to the ACEs that exhibit associations with physical and mental health concerns, these experiences often demonstrate a pronounced link to behavior problems in adolescents, notably within the subset of children subjected to violent or abusive parental environments.⁹ Substantiating this connection, empirical research has highlighted that individuals who have endured ACEs are predisposed to a heightened likelihood of involvement in delinquent activities.¹⁰ An international study, encompassing data from teenagers aged 18 to 20 years old across a diverse array of countries, including Thailand, further underscored the nuanced impact of certain forms of household dysfunction in precipitating the emergence of behavior problems among adolescents. It is noteworthy also that the extent of this influence is contingent upon various factors, including gender and the level of social well-being.¹¹

Adolescent delinquency presents a pressing concern in the Thai context, demanding both careful attention and the formulation of pragmatic, evidence-based solutions. This issue is notably exacerbated by the participation of a significant proportion of adolescents in various criminal activities.¹² Empirical investigations conducted with adolescents in Bangkok have brought to light a discernible correlation between behavior problems, with a particular emphasis on drug use, and the occurrence of ACEs. Furthermore, these studies have revealed that over half of the participating adolescents had encountered ACEs, thus underscoring the pervasive nature of this problem among the youth in Thailand.^{7,8} These documented findings align coherently with analogous research conducted across different countries, emphasizing the global dimension of the challenges presented by ACEs and their associated ramifications.

Nonetheless, it is essential to acknowledge that not all children exposed to ACEs necessarily will manifest behavior problems. Some children demonstrate a capacity for effective adjustment and possess elevated psychological

resilience, which enables them to develop successful coping strategies. In this context, resilience represents a psychological attribute indicative of one's ability to adeptly navigate adverse circumstances. This multifaceted concept encompasses the adept adaptation to challenging situations, the shaping of one's worldview, the acquisition of adequate social support, and the implementation of more suitable problem-solving strategies.¹³

Supporting this perspective, prior research has emphasized that resilience is a skill that can be cultivated and enhanced.¹⁴ Additionally, resilience plays a pivotal role as a psychological attribute that can serve as a protective factor against the adverse consequences of ACEs, particularly concerning emotional and behavioral issues. For example, a study involving high school students aged 14 to 19 in Turkey revealed that resilience and self-esteem can collectively act as mediators in the relationship between exposure to child abuse and the development of emotional and behavioral challenges.¹⁵

Adolescence is a crucial period characterized by the emergence of behavior problems as individuals transition from childhood to adulthood. This developmental stage encompasses significant changes across physical, cognitive, emotional, and social dimensions. Notably, the age range of 15 to 18 years old is particularly noteworthy for the increased occurrence of behavior problems and delinquent behaviors.¹⁶

Furthermore, it's important to acknowledge the gap in scholarly research concerning the role of resilience amidst ACEs and their link to behavior problems, especially within Thailand's distinct context. Recognizing this gap, our study focuses specifically on investigating how resilience acts as a mediator between ACEs and behavior problems among adolescents in the southern region of Thailand. The research objectives aim to comprehensively explore the impact of ACEs on adolescent behavior. Firstly, the study delves into understanding how resilience mediates the connection between ACEs and behavior problems in adolescents. Secondly, it seeks to clarify the direct relationship between ACEs and adolescent behavior problems, shedding light on its nature and scope. Lastly, the study aims to assess the prevalence rates of ACEs, behavior problems, and resilience among adolescents, providing valuable insights into their co-occurrence. Through these objectives, the research endeavors to deepen our understanding of how ACEs, resilience, and behavioral outcomes interact among adolescents.

The collection of empirical data from this specific demographic holds the promise to provide valuable insights that can deepen our understanding and contribute to the prevention and mitigation of the behavioral challenges faced

by young individuals in Southern Thailand. Additionally, the foundations established by this study may serve as a fundamental knowledge base, with potential applications in guiding future research endeavors across diverse geographical areas within the nation.

MATERIALS AND METHODS

Participants

Twenty-two high schools located within a specific province in Southern Thailand were categorized into three groups: small, medium, and large to extra-large schools, according to the criteria set by the Office of the Basic Education Commission. Three high schools were randomly selected from each group. The population consisted of 8,909 students. The sample size, totaling 383 participants, was determined using Taro Yamane's formula. The participants in this study were senior high school students currently enrolled in these selected high schools. In order to be eligible for participation, individuals had to meet the following inclusion criteria: they had to be between 15 and 18 years old, be proficient in the Thai language, not have a history of psychiatric or developmental disorders, and must obtain parental permission and provide informed consent to partake in the research. Students who did not complete the questionnaires or who responded randomly were excluded from the final dataset.

Questionnaire

A paper-pencil-based questionnaire was used in this study and consisted of 4 parts:

1. General Information Questionnaire, which included questions on the participant's gender, age, grade level, co-resident parents, parent's occupation, parent's income, marital status of parents, and medical condition.

2. Thai Version of the Adverse Childhood Experiences Questionnaire (ACEs questionnaire)¹⁷, consisting of 28 items covering 10 different types of ACEs. Participants were requested to complete the questionnaire, and their scores were computed and categorized for each type of ACE. The scale of answers and scoring criteria varied based on the type of ACEs, and the total score ranged from 0–10, representing the number of different types of ACEs encountered. The questionnaire demonstrated good content validity and empirical validity. Internal consistency reliability was 0.79 for the child abuse question, 0.82 for the neglect question, and 0.66 for the household dysfunction question.¹⁸

3. Adolescent Risk Behavior Inventory-12 Items consisting of 12 items covering question about risk of

engaging in violent behaviors, such as "Carrying weapons or objects with the intent to harm others," "Assembling your own weapons," "Providing illegal drugs to others," and "Sexually harassing." Responses measured on a 5-point rating scale from 0 (Never) to 4 (Very often), with the total score ranging from 0–48. Higher scores are indicative of a greater number of behavior problems. The participants were asked to complete the questionnaire by themselves. The overall internal consistency was 0.928.¹⁹

4. Thai Version of the Connor-Davidson Resilience Scale (25-Item CD-RISC), as translated by Nauwarat Imlintharn and approved by Dr. Jonathan Davidson, one of the scale developers, consisting of 25 items. Responses were measured on a 5-point rating scale from 0 (Not true at all) to 4 (True nearly all the time). Self-reporting was required. The total score ranged from 0–100. Higher scores are indicative of a higher level of resilience. The overall internal consistency was 0.89.²⁰

Data collection

The study received approval from the Human Research Protection Unit at the Faculty of Medicine Siriraj Hospital, Mahidol University, under the COA number Si 069/2023. Data collection occurred during the months of June through August in 2023. Participants who met the inclusion criteria were invited to participate through a face-to-face invitation. These participants were provided with detailed information regarding the research's objectives, data-collection procedures, the expected duration of participation, the potential benefits and risks, data confidentiality, contact information for addressing any procedural concerns, and their right to withdraw from the research at any point. Interested participants received an informational document and a consent form for their parents. Those with parental consent were required to sign their own consent form before starting the questionnaire. After completing the questionnaires, a group relaxation workshop was conducted to mitigate any stress or potential effects that may have arisen during the questionnaire completion process.

Statistical analysis

The collected data were statistically analyzed using SPSS. The analysis was structured into three distinct segments. First, descriptive analysis was performed to present the frequencies and percentages of the main variable scores along with the demographic data, encompassing the respondents' gender, age, grade level, the co-residency of parents, parental occupation, parental income, marital status of parents, and any existing medical conditions. Second, correlation analysis was performed utilizing

the Spearman correlation coefficient (r_s) to assess the relationships between adverse childhood experiences (ACEs), behavior problems, and resilience, encompassing the analysis of the continuous variables. In cases where the relationships involved nominal dichotomous variables and continuous variables, Point Biserial Correlation analysis (r_{pb}) was applied. Additionally, Phi correlation analysis (r_ϕ) was employed to evaluate the relationships between two nominal dichotomous variables. Any unspecified data was considered as missing values. Last, path analysis was conducted, utilizing the mediation model (model 4) from the PROCESS Macro program. This path analysis aimed to investigate the role of resilience as a mediator in the relationship between ACEs and adolescent behavior problems.

RESULTS

Demographic data of the participants

Out of the total 383 participants, 374 completed the questionnaire adequately, for a response rate of 97.65%, resulting in a final sample size of 374 ($n=374$). The majority of participants were female, accounting for 61.2% of the sample. Additionally, a substantial portion of the participants were enrolled in Grade 10 (40.1%). The average age of the participants was 16 years old, with a small standard deviation of 1.02, indicating a relatively homogeneous age distribution. Regarding the participants' living arrangements, more than two-thirds resided with both their father and mother (66.6%), while 25.9% lived with either one parent, and 5.1% lived with their grandparents. In terms of parental occupation, the most common category was Agriculturist (32.4%), followed by Self-employed (24.3%), and Government officer/State enterprise (21.9%). The average monthly income among the parents was 26,684.13 baht, with a relatively high standard deviation of 35,087.41 baht, suggesting large income variability within the sample. However, over half of the parents fell within the income range of 0 to 20,000 baht monthly. A significant majority of the participants reported that their parents were married (73.5%). Notably, the majority of participants (90.1%) did not report any medical conditions, as detailed in Table 1.

Descriptive analysis

The research encompassed three key variables: ACEs, behavior problems, and resilience. Descriptive statistical analysis of these variables revealed specific characteristics. The mean number of ACEs was 1.36 with a standard deviation of 1.66, ranging from 0–8. Behavior problems had a mean score of 1.68 with a

standard deviation of 2.39 and ranged from 0–17. These scores indicate a group not at risk of engaging in violent behaviors. Resilience exhibited an average score of 68.52, with a standard deviation of 15.23, ranging from 19–100.

The data analysis provided insights into the prevalence of ACEs among the participants. Specifically, 40.64% of all participants reported no ACEs, indicating a considerable proportion of participants did not encounter these adverse events during their childhood. In contrast, 59.36% reported experiencing at least one type of ACE, underscoring the prevalence of these experiences within the sample. Among this latter group, 12.03% reported enduring the challenges of four or more ACEs, signifying a significant level of exposure to multiple ACEs.

An examination of the specific types of ACEs reported by the participants revealed that parental separation or divorce was the most commonly reported experience, acknowledged by 31% of the participants. Additionally, emotional neglect was reported by 20.6% of participants, followed by physical neglect (18.7%) and physical abuse (12.8%). These proportions are visually presented in Table 2, offering a comprehensive illustration of the various ACEs prevalent among the study participants.

Relationship between ACEs, behavior problems, resilience, and demographic data

ACEs displayed a low positive correlation with behavior problems ($r_s = 0.17$, $p < 0.01$) and a low negative correlation with resilience ($r_s = -0.19$, $p < 0.01$). Notably, resilience did not exhibit a significant relationship with behavior problems. Moreover, a significant, albeit low, negative relationship was observed between gender and behavior problems ($r_s = 0.12$, $p < 0.05$), indicating that males were more likely to experience behavior problems than females. Additionally, the marital status of parents showed noteworthy associations. Specifically, living with divorced parents was linked to a significantly low positive correlation with ACEs ($r_{pb} = 0.44$, $p < 0.01$) and behavior problems ($r_{pb} = 0.11$, $p < 0.05$), suggesting that children in such family structures had a higher likelihood of both experiencing ACEs and exhibiting elevated behavior problems. Further details are available in Table 3. Moreover, the correlation analysis between the types of ACEs and behavior problems showed low positive associations with SA ($r_{pb} = 0.23$, $p < 0.05$), HS ($r_{pb} = 0.23$, $p < 0.05$), EA ($r_{pb} = 0.17$, $p < 0.05$), IH ($r_{pb} = 0.17$, $p < 0.05$), and PD ($r_{pb} = 0.11$, $p < 0.05$).

Relationship between the number of ACEs, behavior problems, resilience, and medical conditions

Having no ACEs was found to be negatively associated

TABLE 1. Demographic data of the participants (n = 374)

		n	%
Gender	Male	140	37.4
	Female	229	61.2
	Not specified	5	1.3
Age (year)	15	106	28.3
	16	98	26.3
	17	123	32.9
	18	47	12.6
	(M = 16; SD = 1.02)		
Grade level	Grade 10	150	40.1
	Grade 11	95	25.4
	Grade 12	129	34.5
Co-residency of parents	Father and mother	249	66.6
	Father	16	4.3
	Mother	81	21.7
	Grandparents	19	5.1
	Relative	7	1.9
	Others	2	0.5
Parental occupation	Government officer / State enterprise	82	21.9
	Agriculturist	121	32.4
	Self-employed	91	24.3
	Company employee	14	3.7
	Freelance	63	16.8
	Unemployed	2	0.5
	Not specified	1	0.3
Parental income (bath monthly)	0–20,000	218	58.3
	20,000–40,000	92	24.6
	40,000–60,000	33	8.8
	60,000–80,000	5	1.3
	80,000–100,000	5	1.3
	100,000 or more	5	1.3
	Not specified	16	4.3
	(M = 26,684.13; SD = 35,087.41; Min = 0; Max = 500,000)		
Marital status of parents	Married	275	73.5
	Divorced	99	26.5
Medical conditions	No medical condition	337	90.1
	Allergy	24	6.4
	Asthma	6	1.6
	Thalassemia	2	0.5
	G6PD	1	0.3
	Diabetes	1	0.3
	Migraine	1	0.3
	Not specified	2	0.5

TABLE 2. Number and type of ACEs (n = 374).

		n	%
Number of ACEs	0	152	40.64
	1	91	24.33
	2	65	17.38
	3	21	5.62
	4 or more	45	12.03
Type of ACEs	Emotional abuse (EA)	36	9.6
	Physical abuse (PA)	48	12.8
	Sexual abuse (SA)	26	7
	Emotional neglect (EN)	77	20.6
	Physical neglect (PN)	70	18.7
	Household physical violence (HV)	56	15
	Household substance abuse (HS)	20	5.3
	Household mental illness (HM)	30	8
	Parental separation/divorce (PD)	116	31
	Incarcerated household member (IH)	30	8

Note. A participant can have more than one type of ACE.

TABLE 3. Correlation coefficients of the studied variables.

	1	2	3	4	5	6	7	8
Gender	1.00							
Age	0.18**	1.00						
Marital status of parents	0.07	0.02	1.00					
Parent's income	-0.08	-0.28**	-0.10	1.00				
Medical conditions	-0.09	-0.14*	0.13*	-0.04	1.00			
ACEs	0.07	-0.02	0.44**	-0.16**	0.07	(0.53)		
Resilience	-0.09	0.05	-0.09	0.03	-0.06	-0.19**	(0.93)	
Behavior problems	-0.12*	0.10	0.11*	-0.02	-0.007	0.17**	0.04	(0.64)

Note. The numbers in brackets refer to Cronbach's coefficient alpha.

*p < 0.05; **p < 0.01.

with medical conditions ($r_{\phi} = -0.13$, $p < 0.05$) and behavior problems ($r_{pb} = -0.14$, $p < 0.01$). In contrast, it displayed a positive association with resilience ($r_{pb} = 0.15$, $p < 0.01$). This suggests that individuals who reported having no ACEs were more likely to be free from medical conditions, exhibit no behavior problems, and possess higher levels of resilience compared to those who had experienced ACEs. Conversely, having four or more ACEs was positively

associated with behavior problems ($r_{pb} = 0.15$, $p < 0.01$) and negatively associated with resilience ($r_{pb} = -0.18$, $p < 0.01$). The specifics of these associations are presented in Table 4, providing a comprehensive overview of the relationships between the number of ACEs and the variables of medical conditions, behavior problems, and resilience.

TABLE 4. Correlation coefficients between the number of ACEs and other variables.

	0	1	2	3	≥ 4
Medical conditions	-0.13*	0.08	-0.01	0.08	0.04
Resilience	0.15**	0.05	-0.07	-0.05	-0.18**
Behavior problems	-0.14**	0.02	0.05	-0.03	0.15**

* $p < 0.05$; ** $p < 0.01$.

Mediating effect of resilience on ACEs and behavior problems

ACEs were found to have a significant negative effect on resilience ($\beta = -0.24$, $SE = 0.47$, $t = -4.84$, $p < 0.01$, $95\%CI [-3.20, -1.35]$, $R^2 = 0.059$). However, resilience did not significantly impact behavior problems ($\beta = 0.09$, $SE = 0.008$, $t = 1.70$, $p = 0.09$, $95\%CI [-0.002, 0.03]$). Additionally, a direct and significant effect of ACEs on behavior problems was observed ($\beta = 0.23$, $SE = 0.08$, $t = 4.39$, $p < 0.01$, $95\%CI [0.18, 0.48]$). Furthermore, the results of the Bootstrap Confidence Intervals (CIs) indicated that there was no indirect effect of ACEs on behavior problems that was mediated by resilience ($\beta = -0.02$, $SE = 0.02$, $95\% CI [-0.08, 0.009]$). These findings are presented comprehensively in Table 5 and Fig 1.

DISCUSSION

The study involved a cohort of 374 participants, of whom 40.64% reported having no ACEs, while 59.36% reported the presence of at least one ACE in their lives. A subset of participants, specifically 12.03%, disclosed the challenging experience of enduring four or more ACEs. These findings align with prior studies conducted both on an international scale and within Thailand itself.³⁻⁸ The persistence of a significant prevalence of ACEs over more than two decades of research underscores a concerning trend. This trend may be better understood when viewed through the lens of intergenerational transmission.

A meta-analysis, which primarily focused on studies published between 1975 and 2017 in Western countries, delved into the concept of intergenerational transmission,

TABLE 5. Mediation analysis of resilience on the relationship between ACEs and behavior problems.

	Unstandardized Coefficients		Standardized Coefficients		p	LLCI	ULCI
	B	SE	Beta (β)	t			
Effect of ACEs on resilience (path a)	-2.27	0.47	-0.24	-4.84	0.00	-3.20	-1.35
Effect of resilience on behavior problems (path b)	0.01	0.008	0.09	1.70	0.09	-0.002	0.03
Total effect of ACEs -> Behavior problems (path c)	0.30	0.07	0.21	4.09	0.00	0.15	0.44
Direct effect of ACEs -> Behavior problems (path c')	0.33	0.08	0.23	4.39	0.00	0.18	0.48
	B	Boot SE	Beta (β)	Boot 95% LLCI		Boot 95% ULCI	
Indirect effect of ACEs on behavior problems mediated through resilience	-0.03	0.02	-0.02	-0.08		0.009	

Note. SE = standard error; LLCI = lower level of the 95% confidence intervals; ULCI = upper level of the 95% confidence intervals; Boot = Bootstrap result.

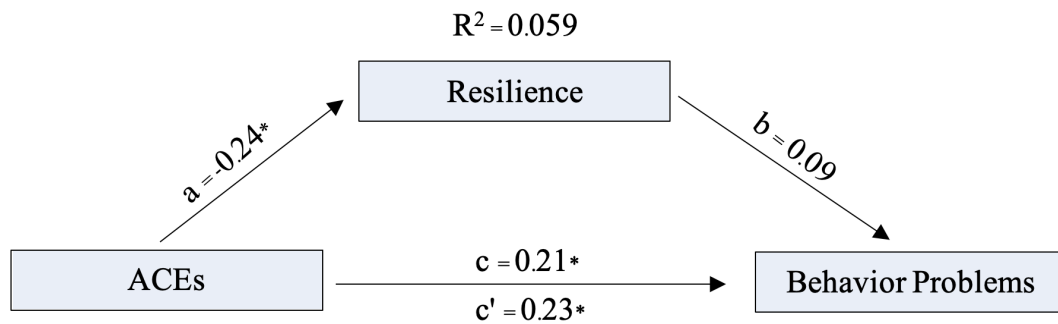


Fig 1. Mediating effect of resilience on ACEs and behavior problems.

revealing that parents who had themselves suffered childhood abuse were at a heightened risk of perpetuating abusive behavior toward their own children. However, it is crucial to emphasize that this transmission of child abuse is not a universal phenomenon; rather, it varies due to multiple contributing factors. These influencing factors encompass the characteristics of families marked by insecure attachment styles, experiences of social isolation among parents, early parenthood, elevated stress levels, economic hardship, parental psychopathology, maternal substance use, and ongoing exposure to parental violence. The meta-analysis ultimately concluded that parents who had endured childhood abuse often carry an ardent desire to shield their own children from similar suffering. Paradoxically, they often lack access to positive parenting role models and have been raised in environments characterized by insecure relationships. Consequently, they face a formidable challenge in cultivating a safe and secure parent–child relationship, inadvertently perpetuating the cycle of child abuse across generations.²¹ This enduring cycle consequently contributes to the continued exposure of a substantial number of children to ACEs. This aligns with research findings where participants reported experiencing family issues, particularly parental divorce, and household violence, indicating an upbringing in an insecure environment. Without adequate psychological support, there's a risk of passing on these emotional or mental challenges to the next generation.

Our findings show that the risk of engaging in violent behaviors is associated with experiences of abuse, household substance abuse, having an incarcerated household member, and parental divorce. These findings, consistent with a prior study, highlight a noteworthy connection between ACEs and behavior problems that emerge during adolescence.^{9,11} This observation corresponds to the foundational tenets of Bandura's social learning theory, which posits that behavior is significantly influenced by observational learning processes. To provide a theoretical

underpinning to this relationship, one can invoke Bandura's classic experiment, which involved exposing children to aggressive models interacting with a Bobo doll. The results of that experiment demonstrated that children who witnessed aggressive behavior directed at the Bobo doll were more inclined to exhibit similar aggressive behaviors when given the opportunity.²² This supports the idea that behavior is shaped through observation and imitation, thereby reinforcing the relevance of social learning theory. As a result, when children find themselves in environments characterized by abuse, insecurity in attachment, violence, substance abuse, or involvement in illegal activities, they are exposed to ample opportunities for observational learning. Consequently, they may imitate behaviors they have witnessed, with the potential culmination being the manifestation of future behavior problems during their adolescent years.

ACEs were found to have a negative association with resilience, suggesting that individuals who have experienced a higher number of ACEs tend to exhibit lower levels of resilience compared to those with fewer such adverse experiences. This finding aligns with prior research studies^{23,24} that have explored the relationship between ACEs and resilience. However, an intriguing perspective has emerged from an in-depth interview study involving individuals aged 50 to 77 years old. The results of that study indicate that individuals with a history of ACEs tended to develop higher levels of resilience. This counterintuitive outcome can be explained by the notion that challenging childhood experiences can, in fact, facilitate learning, self-development, and improved problem-solving abilities, ultimately contributing to greater resilience.²⁵ It is essential to note that the existing body of research on the relationship between ACEs and resilience is limited, and previous findings have been inconclusive. This ambiguity arises from the understanding that resilience is not a fixed personality trait but rather a dynamic quality that can either increase or decrease over time.^{26,27} Furthermore, most research studies define

resilience as a mediating or protective factor against the adverse impact of ACEs,^{28,29} adding complexity to the overall picture of this relationship.

The path analysis conducted in this study revealed that resilience did not function as a mediating variable in the relationship between ACEs and adolescent behavior problems. Moreover, it did not exhibit a direct impact on behavior problems. Interestingly, this result contradicts the findings of a previous study,¹⁵ which demonstrated that resilience, along with self-esteem, played a mediating or protective role in mitigating the influence of childhood abuse on emotional and behavioral problems. This discrepancy implies the existence of additional variables, apart from resilience, that mediate the relationship between ACEs and behavior problems. For instance, these variables might encompass self-esteem¹⁵ and impulsivity,³⁰ both of which have been implicated as contributing factors in prior research.

While this study did not find resilience to be a mediating or protective factor in the relationship between ACEs and behavior problems, it is essential to acknowledge that resilience can play such a role in various other contexts. For instance, research conducted among undergraduate students showed that resilience acted as a protective factor in the relationship between ACEs and depressive symptoms.³¹ Additionally, a study involving homeless individuals demonstrated that resilience served as a protective factor against mental health problems influenced by ACEs.³² These findings underscore the multifaceted nature of resilience and its varying impact in different scenarios. Previous research has demonstrated that resilience can be enhanced.¹⁴ Therefore, it is crucial to prioritize resilience development for children and adolescents through interventions such as mindfulness-based approaches.³³

Limitations of the present study and recommendations for future research

This research's exclusivity to school system participants potentially narrowed the diversity of the dataset, particularly in terms of the behavior problem scores; whereby the behavior problem scores in this dataset exhibited limited variability, with a majority of participants scoring low, and a significant 40.4% reporting no behavioral problems. Consequently, this dataset deviated from a normal distribution, thereby affecting the accuracy of the statistical analysis. Additionally, this study asked participants to self-assess their behavioral problems. Therefore, it may underestimate one's own problems. Different information may be obtained if parents or teachers are the respondents. In future research

endeavors, it is advisable to include behavior problem assessment data from parents or teachers, such as Strengths and Difficulties Questionnaire (SDQ), in the analysis to improve the accuracy of the information gathered. Moreover, future research should expand the scope by incorporating a broader range of population groups. This expansion could include vocational education students, children outside the conventional school system, and even those involved in criminal activities (known groups). The inclusion of such diverse groups could provide a richer spectrum of information and facilitate a deeper understanding of any variations between these groups, effectively overcoming the limitations associated with studying a single homogeneous population.

The generalizability of the research findings is inherently restricted by the study's narrow scope. Data collection was confined to students within a single province in the southern region of Thailand, primarily due to time and staffing constraints. It is imperative to recognize that social and cultural differences exist across various regions, potentially influencing research outcomes. For future research endeavors, extending the study's geographical coverage is advisable. This could involve conducting studies at the regional or even national level, allowing researchers to obtain more comprehensive and representative insights, ultimately enhancing the applicability and generalizability of their findings.

Furthermore, this research exclusively focused on the impact of ACEs on behavior problems, but previous studies have demonstrated that ACEs can have a wide range of effects that extend beyond just behavioral issues. It is therefore imperative that future investigations explore additional variables influenced by ACEs, including emotional problems and mental health concerns.

In addition to considering resilience, it is equally important to investigate other variables that may serve as protective factors against the impact of ACEs. These factors may include aspects such as self-esteem and emotional regulation skills. By examining a more comprehensive set of variables, we can gain a better understanding of the multifaceted effects of ACEs and identify potential avenues for intervention to reduce their impact.

In this research, the Intelligence Quotient (IQ) of participants emerges as a confounding factor that can significantly influence their adaptability and, consequently, their resilience levels. Additionally, psychiatric disorders can affect the severity of behavioral issues such as Conduct Disorder and Oppositional Defiant Disorder, as well as attention and concentration levels, and the ability to cope with adverse situations, such as Attention Deficit Hyperactivity Disorder (ADHD), Depression, and Post-

traumatic Stress Disorder (PTSD). However, the inclusion criteria for this study did not encompass individuals with psychiatric or developmental disorders. This criterion was solely based on self-evaluation by the participants. Therefore, for future research, it is essential to employ screening tests for both IQ and psychiatric disorders to control confounding factors. This may involve selecting groups with similar IQ or excluding those with psychiatric disorders from the study. Alternatively, considering IQ as a variable of interest in our research framework could provide an additional avenue for nuanced exploration.

CONCLUSION

The results of this study shed light on the prevalence of ACEs among senior high school students in Southern Thailand, with a notable presence revealed among those whose parents are divorced. This observation highlights a broader child welfare concern in Thailand, even though the data were specifically collected from students within the school system. This situation raises alarms regarding the potential adverse consequences, particularly behavioral and mental problems, that these children might face in the future. While it is true that resilience was not found to serve as a mediating factor between ACEs and behavior problems in this context, it is important to recognize that resilience is a vital skill that can help mitigate the mental and emotional impacts of stress and life difficulties. As such, there is a compelling need to prioritize the development of resilience in children to equip them for future challenges and reduce the risk of them developing emotional or mental health issues.

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Conflict of interest

The authors have no conflicts of interest to declare.

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