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The Effect of Adverse Childhood Experiences (ACEs) and Positive Reinforcement on the Self-Control of Adolescents in Foster Care Based on the Mediating Role of Cognitive Flexibility

Majid Sabeti Yazdi[1], Mohammad Paydariniyam[2], Azam Omidi[3], Elham Gharibnavaz Esfandabadi[4], Zohreh Gandominejad[5*]

1 Department of Counseling. Quchan Branch, Islamic Azad University, Quchan, Iran.
2 Department of Psychology, Hamedan Branch, Islamic Azad University, Hamedan, Iran.
3 Department of Psychology, Payame Noor University, Bushehr International Branch, Asaloyeh, Iran.
4 Department of psychology, Central Tehran Branch, Islamic Azad University, Tehran, Iran.
5 Department of Psychology, South Tehran Branch, Payame Noor University, Tehran, Iran (Corresponding Author).

*** Corresponding author email address**: zohreh.gnd1380@gmail.com

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A B S T R A C T

Purpose: Growing up in foster care can significantly influence the psychosocial development and mental health of adolescents. This study aimed to explore how adverse childhood experiences and positive reinforcement affect the self-control of foster care adolescents through the mediating factor of cognitive flexibility.

Methods and Materials: The current study utilized a descriptive-correlational design with a cross-sectional research approach, employing the structural model method and path analysis to investigate the influence of the mediator variable. The statistical population for this research comprised all adolescents in foster care in Tehran from July to October 2023. The study's sample consisted of 129 individuals selected through random sampling. The assessment tools used in the study included the Psychological Flexibility Questionnaire (PFQ), Values in Action - Inventory of Strengths (VIA-IS), Brief Self-Control Scale (BSCS), and the Adverse Childhood Experiences Questionnaire (ACEQ). Data analysis was carried out using SPSS version 27 to describe the data, with the Pearson correlation method utilized, while JASP version 19 was employed to examine the relationships between variables. The study's p-value was established at 0.05.

Findings: The findings indicated that the positive reinforcement variable had a significant positive direct impact on self-control (β= 0.068, p <0.001). On the other hand, adverse childhood experiences did not show a noticeable detrimental impact on self-control (β= -0.008, p =0.500). It was observed from the results that positive reinforcement did not have a noteworthy indirect influence on self-control through cognitive flexibility (β= 0.011, p =0.076). Likewise, adverse childhood experiences did not have a significant indirect impact on self-control through cognitive flexibility (β= -0.006, p =0.106).

Conclusion: The findings of this research indicate that utilizing positive reinforcement may enhance self-control in adolescents residing in foster care, even though adverse childhood experiences can negatively impact self-control. Additionally, cognitive flexibility did not appear to influence this connection. These findings underscore the significance of emphasizing the development of positive traits in educational and therapeutic interventions for these adolescents.

Keywords: *Adverse Childhood Experiences, Personality Strengths, Self-control, Cognitive Flexibility, Adolescents in Foster Care*

1. Introduction

Children and adolescents living in foster care have a greater likelihood of experiencing psychological, behavioral, and social challenges compared to their peers living with their biological families. These difficulties are often a result of their past traumas, including childhood abuse and being placed in foster care, which can contribute to a higher risk of social exclusion (Pinheiro et al., 2024). Life changes such as separation from primary caregivers, changing schools, and adjusting to institutional environments can be sources of stress for these young people, impacting their mental well-being negatively (Lemos et al., 2021). Research has shown that adolescents in foster care are more likely to have insecure attachment styles and struggle with speech articulation, critical thinking, and social and academic skills, leading to a decline in social and emotional competence (Muzi & Pace, 2022). Furthermore, studies indicate that adolescents in foster care tend to view themselves as less resilient in terms of self-confidence and empathy towards others and have fewer goals and aspirations for the future (Lemos et al., 2021).

Adolescents residing in foster care often come from backgrounds with ACEs, such as abuse, neglect, and family issues. These experiences can lead to negative outcomes in emotional, behavioral, and social development, resulting in a lower quality of life (Singstad et al., 2021). The accumulation of these adversities during childhood significantly heightens the risk of health, psychiatric, and behavioral issues throughout their lives (Chapple et al., 2021). According to Annor et al. (2024), the absence of a parent, particularly the mother, during childhood is correlated to psychological problems and substance abuse in adulthood (Annor et al., 2024). Another study indicated that as adverse childhood experiences mount, adolescents' self-control diminishes (Chapple et al., 2021).

Adolescents in foster care may encounter unique challenges like a lack of family support. Emphasizing personality strengths such as resilience, empathy, and self-control can help them cope and thrive (Zhang et al., 2023). Developing these strengths can enhance mental health and adaptive processes, enabling adolescents to reach their full potential. It is crucial for social well-being and can prevent negative consequences from everyday challenges (Monteiro & Benevides Soares, 2024). Personality strengths are seen as psychological elements or processes that characterize virtues. These strengths consist of six fundamental virtues known as the "six noble virtues": wisdom, courage, humanity, justice, temperance, and transcendence (Casali et al., 2021). Studies have demonstrated that within personality strengths, the virtue of patience is linked to self-regulation skills like self-control, emotional management, and mindfulness, and enhancing the virtue of patience can enhance these abilities and self-control (Shubert et al., 2022). Studies have shown that personality strengths can protect against behavioral issues in early adolescence (Qin et al., 2022).

Adolescents residing in foster care require skills to help them better adapt to external challenges and handle psychological pressures arising from their unique social and environmental circumstances. The ability to exhibit self-control can significantly contribute to their psychological well-being and safeguard them against mental health issues (Zheng et al., 2022). Self-control is recognized as a crucial factor for achieving success and happiness, involving resisting automatic responses to meet societal expectations or attain long-term objectives. Research has shown that self-discipline affects emotional and behavioral regulation, and a deficiency in this area may suggest vulnerability to mental health issues or academic challenges (Zeng et al., 2025). One study found that low levels of self-control serve as a mediator in the correlation between adverse childhood experiences and involvement in delinquent behavior (Jones et al., 2023). Research has also shown that an increase in ACEs before the age of five is correlated with a decrease in self-control abilities (Jones et al., 2022).

Adolescents in foster care require skills to assist them in adjusting to changes. An important ability to have is cognitive flexibility, as it allows individuals to approach problems from different perspectives and come up with successful resolutions (Mir Drikvand, 2023). This mental flexibility encompasses abilities like cognitive shifting and task switching, serving as a type of advanced control that allows individuals to establish goals and tasks by rules (Sousa et al., 2023). A study by Amédée et al. (2022) on foster children revealed that cognitive flexibility aids children in managing their emotions better when confronted with ACEs, thereby mitigating the impact of maltreatment (Amédée et al., 2022). Research results also indicated that resilience, being a multifaceted attribute, can be linked with various personality strengths, and enhancing each aspect of resilience may contribute to bolstering specific strengths (Vylobkova & Heintz, 2023).

Adolescents residing in foster care confront a variety of psychological and behavioral issues, primarily stemming from adverse childhood experiences like abuse and neglect. These experiences can impair their mental well-being and make them more susceptible to various challenges. However, investigating the impact of favorable psychological traits like self-control and cognitive flexibility on these difficulties can offer valuable insights for managing them effectively. Previous studies have not directly explored the connection between adverse childhood experiences, positive reinforcement, and self-control among adolescents

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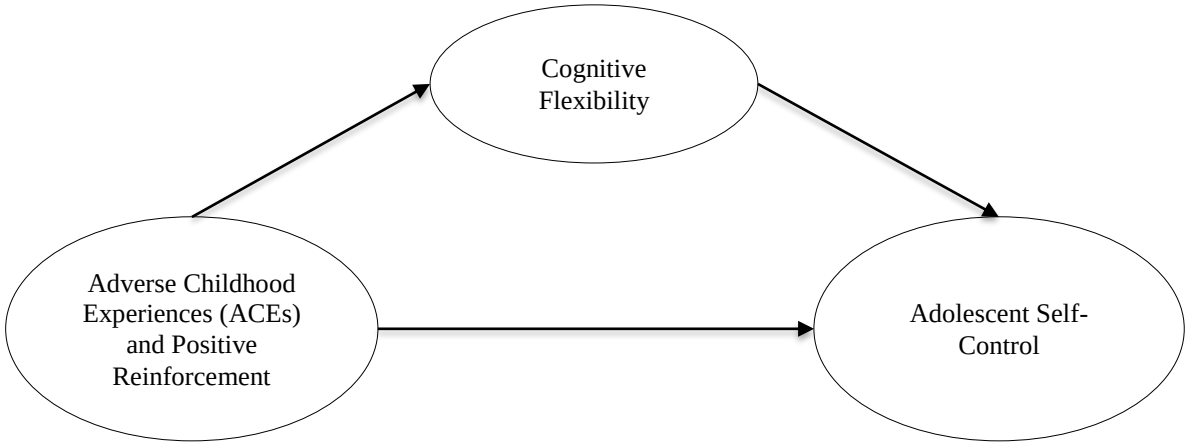
in foster care, underscoring the importance of examining the role of cognitive flexibility in this context. The primary goal of this research is to analyze how adverse childhood experiences and positive reinforcement influence the self-control of adolescents in foster care, with cognitive flexibility playing a mediating role in this process. The research framework is illustrated in Figure 1.

Figure 1

Conceptual framework of the research



2. Methods and Materials

2.1. Study Design and Participants

The current research utilized a descriptive-correlational approach with a cross-sectional design, employing the structural model method and path analysis to explore the impact of the mediating variable. Adverse childhood experiences (ACEs) and positive reinforcement were treated as independent variables, adolescent self-control as the dependent variable, and cognitive flexibility as the mediating variable. The statistical population consisted of all adolescents in foster care centers in Tehran from July to October 2023. A sample of 129 adolescents from centers was randomly selected. The sample size adequacy was determined using Cohen's formula in 2013 for SEM methods, considering observed and latent variables, effect size, desired probability, and statistical power levels (Cohen, 2013). With an effect size of 0.3, a statistical power level of 0.8, 4 latent variables, 113 observed variables, and a probability level of 0.05, the calculated sample size was 137. To account for potential attrition in the sample, the researcher chose to include 150 participants. The criteria for being included in the study involved having an official record with the welfare organization, being between 12 and 16 years old, providing informed consent to participate, correctly answering questionnaires, and possessing adequate literacy and understanding to respond to the inquiries. The exclusion criteria included individuals who chose not to continue participating, those with physical or mental conditions that made it difficult to respond, and those who did not complete at least seven items on the questionnaires, resulting in their removal from the study. To conduct the research, the researchers secured necessary permits from their university, contacted the General Welfare Department of Tehran Province, and obtained approval to visit two foster cares (one for boys and one for girls). Following this, the researchers coordinated with the center's administration to proceed with the study. A total of 137 questionnaires were utilized out of 150 completed forms by randomly selecting names from a list of adolescents. Thirteen questionnaires were excluded from the study due to incomplete or intentionally erroneous responses. Data on demographic variables, adverse childhood experiences, positive reinforcement, self-control, and cognitive flexibility were gathered in person from all participants, with each questionnaire taking approximately 40 minutes to complete. In adherence to ethical standards, participants were asked to sign a consent form in person before filling out the questionnaires, informed of the voluntary nature of their participation, and their right to withdraw at any time. It was also clarified to them that their responses would remain anonymous.

2.2. Measures

2.2.1. Psychological Flexibility Questionnaire (PFQ)

In 2014, Ben-Itzhak et al. developed a questionnaire to assess psychological flexibility in individuals (Ben-Itzhak et al., 2014). This questionnaire consists of 24 items and five subscales. These subscales measure positive perception of change, self-perception as a flexible person, self-perception

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as an open and creative person, perception of reality as dynamic and changeable, and perception of reality as multifaceted. Respondents rate each item on a 6-point Likert scale, with one indicating "never" and 6 indicating "very much." Scores on this questionnaire range from 24 to 124, with higher scores suggesting greater psychological flexibility. The questionnaire has a reported reliability of 0.91 using the Cronbach's alpha method. In another study, researchers found the scale to have a consistency ranging from 0.77 to 0.89 when assessing Cronbach's alpha (Ameri et al., 2020). In this study, the questionnaire's reliability was found to be 0.774 after analyzing Cronbach's alpha.

2.2. ۲*. Values in Action - Inventory of Strengths (VIA-IS)*

In 2004, Peterson and Seligman created a questionnaire to assess the personality strengths of individuals (Ruch et al., 2010). The scale aims to evaluate six universal values - wisdom, humanity, courage, justice, temperance, and transcendence - which are present in all religions. The questionnaire consists of 240 statements, with 10 statements measuring each strength. Participants must indicate their level of agreement or disagreement on a 5-point Likert scale. A shorter version of the questionnaire, containing 24 items, has been created to reduce its length. Previous studies have reported a Cronbach's alpha of 0.80 for this scale (Khodabakhash et al., 2015). The study found that the Cronbach's alpha of the survey in question was 0.807.

2.2. ۳*. Brief Self-Control Scale (BSCS)*

The questionnaire created by Tangney, Baumeister, and Boone in 2018 comprises two versions: one containing 40 questions and the other containing 13 questions (Tangney et al., 2018). Both forms aim to assess an individual's level of self-control. Each question is rated on a five-point Likert scale from never to very much, with options ranging from very low to severe. A higher score on the questionnaire suggests a stronger sense of self-control, while a lower score indicates the opposite. In this particular study, only the 40-question version of the scale was utilized, with scores ranging from 40 to 200. Tangney et al. (2018) confirmed the validity of the questionnaire by analyzing its correlation with measures of academic achievement, adaptability, positive relationships, and interpersonal skills. The reliability of the questionnaire was also tested in Iran, yielding Cronbach's alpha values of 0.83 and 0.85 from two separate samples (Moghadam et al., 2023). The Cronbach's alpha coefficient for this questionnaire was calculated to be 0.782.

2.2. ٤*.* Adverse Childhood Experiences Questionnaire (ACEQ)

The questionnaire created by Dube et al. in 2004 aimed to assess adverse childhood experiences in individuals (Dube et al., 2004). It comprises 25 items and 10 subscales, including emotional abuse, physical abuse, sexual abuse, emotional neglect, physical neglect, household physical violence, substance abuse, parental separation, parental mental illness, and parental crime. Respondents rate each item on a 4-point Likert scale, with one being not at all and four being very frequently. The total score ranges from 25 to 100, with a higher score indicating more adverse childhood experiences. The questionnaire's reliability, as measured by Cronbach's alpha, ranged from 0.46 to 0.86 according to the manufacturer. However, a study in Iran reported a reliability of 0.87 on the scale (Manvelian & Azadyekta, 2023). The current research found that the questionnaire had a reliability of 0.749 when evaluated with Cronbach's alpha.

2.3. Data Analysis

The researchers utilized SPSS version 27 software to analyze the data and employed the Pearson correlation method. Additionally, they utilized JASP version 19 software to investigate the relationships between variables. The Shapiro-Wilk test was used to evaluate the normality of the research variables. The results showed that the research variables were statistically significant ($p<0.05$), suggesting they did not follow a normal distribution. Consequently, the researcher opted to use the partial least squares method. The assumption of random sampling was satisfied in this study. A significance level of 0.05 was deemed appropriate for this research.

3. Findings and Results

In this research, 129 adolescents were involved. The participants were categorized into three age groups: 12 to 13 years old (73.6%), 13 to 14 years old (14.7%), and 14 years and older (11.6%). Similarly, in terms of gender, they were split into two groups: boys (34.9%) and girls (65.1%).

Table 1

Descriptive Statistics of the Variables

variables	Groups	F	%	Total	Md
Age	12-13	95	73.6	129	1
	13-14	19	14.7		
	14-15	15	11.6		
Gender	Boy	45	34.9	129	2

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	Girl	84	65.1

Table 2 displays the mean and deviation values for the variables examined in the study.

Table 2

Description of the Main Research Variables

Variable	N	M	SD	Skewness	Kurtosis	Shapiro-Wilk	P-value	Min	Max
Cognitive Flexibility	129	77.426	7.185	-0.303	-0.970	0.949	< .001	60	89
Positive Reinforcement	129	61.907	7.838	0.319	-0.749	0.969	0.004	46	79
Self-control	129	114.829	9.557	0.039	-0.815	0.977	0.027	94	136
ACEs	129	44.930	8.021	0.259	-1.141	0.937	< .001	33	63

Table 3 displays the relationship between the research variables using Pearson's correlation coefficient.

Table 3

Pearson's Correlations

Variable		1	2	3	4
1. Self-control	Pearson's r	—			
	P-value	—			
2. Positive Reinforcement	Pearson's r	0.696	—		
	P-value	< .001	—		
3. ACEs	Pearson's r	-0.540	-0.697	—	
	P-value	< .001	< .001	—	
4. Flexibility	Pearson's r	0.588	0.712	-0.638	—
	P-value	< .001	< .001	< .001	—

According to the information provided in Table 3, the data indicates a significant correlation between the Self-control variable and positive reinforcement (r=0.696, p <0.001) as well as cognitive flexibility (r=0.588, p <0.001). Additionally, there was a negative and significant relationship between the self-control variable and adverse childhood experiences (r=-0.540, p <0.001). After analyzing the data, the researcher evaluated the path coefficients and the p-value of the variables listed in Table 4.

Table 4

Direct and Indirect and Total Effects

		Estimate	Error	z-value	p	95% Confidence Interval	
						Lower	Upper
Direct Effects	Positive Reinforcement → Self-control	0.068	0.013	5.374	< .001	0.043	0.093

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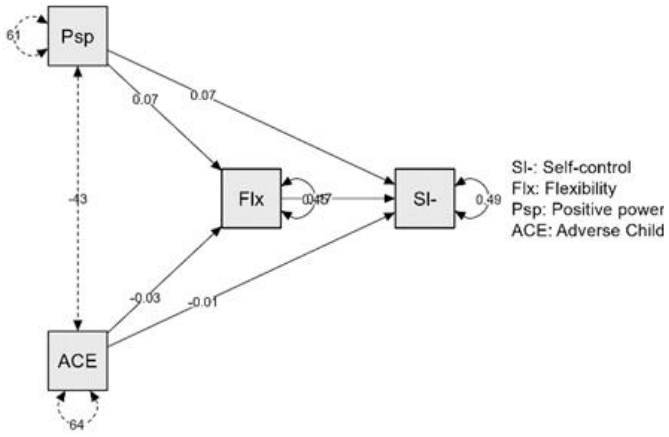
	ACEs → Self-control	-0.008	0.011	-0.675	0.500	-0.030	0.014
Indirect Effects	Positive Reinforcement → Cognitive Flexibility → Self-control	0.011	0.006	1.777	0.076	-0.001	0.024
	ACEs → Cognitive Flexibility → Self-control	-0.006	0.004	-1.618	0.106	-0.013	0.001
Total Effects	Positive Reinforcement → Self-control	0.079	0.011	7.081	< .001	0.057	0.101
	ACEs → Self-control	-0.013	0.011	-1.229	0.219	-0.035	0.008

The data presented in Table 4 and Figure 2 indicated that positive reinforcement had a significant positive impact on self-control (β = 0.068, p < 0.001), while adverse childhood experiences did not show a significant direct negative effect on self-control (β=-0.008, p=0.500). The researcher also investigated the indirect effects of the variables listed in Table 4, revealing that positive reinforcement did not have a significant indirect or mediating effect on self-control through cognitive flexibility (β=0.011, p=0.076). Likewise, adverse childhood experiences did not show a notable indirect influence on self-control through cognitive flexibility (β=-0.006, p=0.106). The researcher evaluated the reliability and validity of the research variables as outlined in Table 6.

Figure 2

Statistical Diagram




```
# ---------- ----------
# Mediation model generated: Formulation of direct and indirect effects investigation
# ---------- ----------
# dependent regression
Self-control ~ b11*Flexibility + c11*Positive power + c12*Adverse Childhood Experiences
# mediator regression
Flexibility ~ a11*Positive reinforcement + a12*Adverse Childhood Experiences
# effect decomposition
# y1 ~ x1
ind_x1_m1_y1 := a11*b11
ind_x1_y1 := ind_x1_m1_y1
tot_x1_y1 := ind_x1_y1 + c11
# y1 ~ x2
ind_x2_m1_y1 := a12*b11
ind_x2_y1 := ind_x2_m1_y1
tot_x2_y1 := ind_x2_y1 + c12
```

Table 6

Reliability and validity of the model

Variables	Cronbach's Alpha	Composite Reliability	AVE
Cognitive Flexibility	0.774	0.847	0.627
Positive Reinforcement	0.807	0.862	0.613
Self-control	0.782	0.847	0.781
ACEs	0.749	0.833	0.501

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Table 6 shows that the model is reliable and valid. The variables in the model have a Cronbach's alpha reliability score of over 0.6. The combined reliability of these variables is also above 0.7. Additionally, the model's validity was assessed using the average variance extracted index, which indicates a value over 0.5 for research variables, confirming the model's validity.

4. Discussion and Conclusion

The main goal of this research was to examine how adverse childhood experiences (ACEs) and positive reinforcement impact the self-control of adolescents in foster care facilities, considering the mediating influence of cognitive flexibility. The study findings showed that positive reinforcement affected self-control, but adverse childhood experiences did not negatively impact self-control. Additionally, both positive reinforcement and ACEs did not significantly influence self-control in terms of cognitive flexibility.

The results of the most recent study back the concept that positive reinforcement can enhance self-control, consistent with earlier research (Shubert et al., 2022; Qin et al., 2022). Previous studies have indicated that having patience as a personality strength is correlated to self-regulation abilities such as self-control, emotional management, and focus, and developing patience can enhance these abilities and self-control (Shubert et al., 2022). A different research study demonstrated that personality strength can help prevent behavioral issues during the early teenage years (Qin et al., 2022). However, it is worth noting that the discovery that adverse childhood experiences do not impact self-control contradicts previous studies (Chapple et al., 2021; Jones et al., 2023; Jones et al., 2022). One study found that as adverse childhood experiences increase, adolescents' self-control tends to decrease (Chapple et al., 2021). Another study reported that low self-control plays a role in the relationship between adverse early childhood experiences and delinquent behavior (Jones et al., 2023). Moreover, studies have indicated that having more ACEs during early childhood, before the age of 5, can result in a decrease in self-control (Jones et al., 2022).

The difference in findings between this current study and previous research may stem from variations in the target population. Jones et al. (2023) focused on adolescents in general settings, while Jones et al. (2022) examined adolescents from fragile and vulnerable families. This study examined adolescents living in foster care centers who are subject to various environmental factors that can support or hinder their self-control. Different definitions of self-control, characteristics of the target group, severity of adverse childhood experiences (ACEs), and the types of relationships studied could also contribute to this disparity (Jones et al., 2023; Jones et al., 2022). One potential explanation for these results could be correlated to protective factors in childhood or social support in adulthood. Those who have faced challenges during their childhood but have received significant support from different sources may be more capable of improving their self-control. Such support systems are crucial in enhancing coping mechanisms and promoting healthy behaviors. Positive changes in one's life circumstances or internal motivations could also bolster self-control in adulthood (Zhao et al., 2022). Moreover, some individuals possess innate positive traits that enable them to uphold a powerful sense of self-control, even when encountering challenging situations and setbacks. Variations in individuals' characteristics are significant; some individuals may exhibit greater resilience to emotional and behavioral issues stemming from adverse childhood experiences, while others may display increased vulnerability. Various factors, such as genetic predisposition, personality traits, and internal and external influences, play a role in shaping differences in self-control (Andrade & Hoyle, 2023). Similarly, when discussing the impact of positive reinforcement on enhancing self-control, it is important to emphasize that personality strengths, serving as optimistic traits and internal assets of each person, play a vital role in fostering self-control. These strengths, such as optimism, determination, and empathy, assist individuals in making well-thought-out decisions when confronted with challenges and reducing impulsive actions. The capacity to concentrate on long-term objectives and resist immediate temptations is reinforced with the help of these strengths, as individuals can utilize their internal assets to handle stress and manage emotions (Monteiro & Benevides Soares, 2024). Additionally, personality strengths boost self-assurance and a feeling of capability, indirectly enhancing self-control. Individuals with more strengths tend to have greater cognitive flexibility, enabling them to understand different perspectives and find better solutions, leading to better self-control. These characteristics assist people in adjusting their actions to match their beliefs and objectives, leading to increased self-control (Weziak-Bialowolska et al., 2023).

Another finding in this research revealed that resilience does not mediate the relationship between positive reinforcement and adverse childhood experiences on self-control. Although there was a lack of direct studies focusing on this specific issue due to the newness of the research title, this finding contradicts previous research (Georgoulas-Sherry, 2021; Vylobkova & Heintz, 2023; Amédée et al., 2022). Amédée et al.'s (2022) study on children in foster care centers revealed that cognitive flexibility helps children regulate their emotions better in the face of negative experiences by reducing the effects of maltreatment (Amédée et al., 2022). Additionally, the study indicated that resilience, as a

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multidimensional trait, can be correlated to various personality strength development, with each aspect of resilience enhancing specific strengths (Vylobkova & Heintz, 2023). Another study suggested that resilience is a significant predictor of strengths (Georgoulas-Sherry, 2021). Cultural differences could be the reason for the variation in this discovery. Amédée et al. (2022) and Vylobkova et al. (2023) conducted their research in Western nations, whereas this study took place in a different cultural and geographical setting. These cultural variations may influence how abuse impacts emotional regulation. Additionally, Vylobkova et al. (2023) investigated the direct correlation between various aspects of resilience and positive attributes, while this study considered cognitive flexibility as a mediating factor. It is plausible that cognitive flexibility did not have its full mediating effect under the influence of adverse childhood experiences or the environmental limitations of care centers. Furthermore, Georgoulas-Sherry et al. (2021) concentrated on US military cadets, who generally display a higher level of resilience and flexibility due to their military training and upbringing. In contrast, the current study's sample comprises adolescents from foster care centers, who may have lower cognitive resilience and flexibility due to exposure to adverse childhood experiences. This fundamental distinction in the characteristics of the study population could account for the differing outcomes (Amédée et al., 2022; Vylobkova & Heintz, 2023; Georgoulas-Sherry, 2021).

Further elaborating on this finding, it is important to mention that resilience, which refers to the capacity to deal with hardships and barriers, can assist people in conquering obstacles. Nevertheless, in certain situations, this trait may not fully compensate for the impact of adverse childhood experiences on self-control. This is due to the intricate nature of resilience and the influence of other elements like social support and various resources. If an individual lacks adequate support or undergoes severe emotional turmoil in childhood, resilience may not effectively mitigate the repercussions of these experiences (Mir Drikvand, 2023). Under specific circumstances, resilience can be compromised, particularly in the presence of high levels of stress. For instance, adolescents and adults who encounter emotional, physical, or social trauma during childhood might temporarily lose their resilience. Consequently, resilience may fail to function as an effective intermediary in diminishing the negative effects of past events. Moreover, ACEs can result in difficulties in managing emotions and controlling behavior, affecting one's ability to exercise self-control. Resilience may not entirely prevent these issues (Ronagh Sheshkalani et al., 2024). Environmental and social aspects also play a significant role in self-control. In settings lacking supportive resources or burdened by social and economic strains, resilience alone may not suffice. Even though people are generally positive, they may struggle with self-control due to external factors and obstacles in their environment. Particularly among adolescents in foster care centers facing multiple adversities, resilience might not effectively enhance their inner strengths (Jiang et al., 2022).

Various limitations had an impact on the findings of the study. One such limitation was the restricted statistical population comprising only adolescents in foster care centers, potentially limiting the applicability of the findings to other community groups. In order to improve the relevance of the results, upcoming studies should include a broader range of participants from larger and more diverse populations. Moreover, the reliance on self-reported data could have introduced social biases or a tendency to align responses with the researcher's preconceptions. To mitigate these biases, employing multiple data collection methods like clinical interviews and observation is advised in similar research endeavors.

Other constraints exist, such as not taking into account potential factors that could influence the findings. One example is the possibility that factors like social support or personal characteristics may have influenced the study's findings. Future researchers should recognize and deal with these variables in their analysis to improve the accuracy and dependability of the results. Furthermore, this study was carried out in Iran, suggesting that the results may only be applicable to a specific cultural context. Carrying out similar studies in diverse cultural settings can help generalize the outcomes. Other constraints consist of the absence of adolescents with particular mental health concerns, such as mental illnesses. It is proposed for future studies to incorporate adolescents with a range of mental health issues to explore the variations and consequences of factors within these groups. Lastly, some adolescents in foster care detention facilities refrained from answering the questions fully and candidly out of apprehension of divulging personal details or past experiences. One way to address this problem is by using methods such as conducting private interviews and creating a supportive environment that allows adolescents to express their thoughts and experiences openly and honestly.

The findings of this research indicated that positive reinforcement plays a significant role in enhancing self-control among adolescents in foster care facilities, while ACEs did not always exhibit a detrimental impact on self-control. Furthermore, cognitive flexibility, as an intervening factor, did not appear to influence this connection. These outcomes underscore the importance of prioritizing the development of positive traits in educational and therapeutic initiatives for these youths. Nonetheless, it is essential to consider the influence of environmental and cultural elements on the outcomes. The insights gained from this

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study could be valuable in formulating psychological and educational interventions for adolescents in foster care centers. With the positive influence of positive reinforcement on self-control, programs aimed at education and treatment can concentrate on reinforcing positive attributes like resilience, optimism, and determination. Additionally, the research indicated that ACEs do not necessarily diminish self-control, suggesting opportunities for interventions that enhance positive emotions in these adolescents. These discoveries are particularly beneficial for psychologists, caregivers at foster care centers, and developers of empowerment programs for adolescents. Furthermore, scholars exploring the effects of positive reinforcement, cognitive flexibility, and self-control in diverse populations may find value in these findings for future research studies.

Authors' Contributions

All authors significantly contributed to this study.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. Each participant received an informed consent form to understand the study's objectives.

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