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Coping Styles and Defense Mechanisms Mediate Associations Between Exposure to Adverse Childhood Experiences and CPTSD Symptoms in Faroese Adolescents

Paulo Ferrajão[1,2]*, Carolina Isabel Batista[1], Rebeca Rocha[1], Ask Elklit[3]

[1]Department of Psychology, Faculty of Health Sciences, European University of Lisbon, Lisbon, Portugal
[2]CIDESD - Research Center in Sports Sciences, Health Sciences and Human Development, University of Trás-os-Montes and Alto Douro, Vila Real, Portugal
[3]Naional Center for Psychotraumatology, University of Southern Denmark, Odense, Denmark

*Corresponding author: pauloferrajao@gmail.com, paulo.ferrajao@universidadeeuropeia.pt

Abstract

Background: The experience of several adverse childhood experiences (ACEs) has been shown to be associated with Post-Traumatic Stress Disorder (PTSD) and Disturbances in Self-Organization (DSO) symptoms among adolescents. Defense mechanisms and coping styles are psychological processes involved in the association of ACEs with PTSD and DSO symptoms. However, there is a lack of research on the joint association of these variables among Faroese adolescents.
Aim: The aim of this study was to analyze the effect of exposure to ACEs on PTSD and DSO symptoms trough the indirect effect of defense mechanisms and coping styles in a sample of Faroese adolescents.
Method: Six hundred and eighty-seven Faroese adolescents were recruited from 19 schools. Participants responded to validated self-report questionnaires. A multiple step mediation and a serial mediation methodology were conducted through structural equation modeling.
Results: Exposure to ACEs was linked to PTSD and DSO symptoms through the indirect effect of immature defense mechanisms, emotional coping, and detachment coping. Exposure to ACEs was linked to PTSD symptoms through rational coping.
Conclusions: The results suggest a mutual relationship between defense mechanisms and coping styles in coping with multiple adversity among adolescents.

Keywords: adverse childhood experiences; defense mechanisms; coping styles; serial mediation; Faroese adolescents

Background

Adverse childhood experiences (ACEs) are potentially stressful and/or traumatic events experienced in the first 18 years of life, namely physical abuse, and emotional neglect (1). The exposure to ACEs seems to be highly pervasive among adolescents (2, 3), related to the developmental tasks specific to this period (e.g., independence from parents, relations with peers, coherent sense of self), often engaging in risk-taking behavior which tend to co-occur (4). Moreover, exposure to a single ACE increases the risk of being exposed to other types of ACEs among adolescents (5, 6).

Exposure to ACEs may undermine adolescents' healthy adjustment causing negative effects throughout one's life course (7). Prior research has documented that higher exposure to multiple ACEs is a stronger predictor of mental and physical health problems compared to a single or repeated experience of a specific type of trauma (1, 8).

In Northern European countries, it was observed that between 8% and 10% of adolescents reported having been exposed to multiple ACEs (9, 10). It was found that 90% of the youth of the Faroe Islands reported exposure to at least one ACE (11).For some Faroese adolescents, exposure to ACEs seems to be a life condition. These findings may be associated with factors particular to the Faroe Islands context.

The Faroe Islands Context

The Faroe Islands are a small and isolated North Atlantic country within the Danish Kingdom with a current population of approximately 54,000 people.

The Faroese value autonomy and independence, thus youth grow up with little guidance from their parents. From an early age, children are allowed to play unsupervised, and are expected to solve problems on their own or to rely on their peers (12). Furthermore, small-scale societies such as the Faroe Islands, are characterized by close social networks and high levels of familiarity. Although this means people identify more deeply with one another, it also means that anonymity is almost impossible (13).

The Faroese adolescents are an under-researched population, and the context of Faroe Islands may be a factor of exposure to ACEs (11). The Faroe Islands also represent a society facing the challenges of economic restructuration and out-migration, due to the economic crisis (12). Furthermore, mental health services in the Faroe Islands lack resources to adequately provide care for its region's youth (11).

The unique context of the Faroe Islands in which children and adolescents may be highly vulnerable to exposure to multiple types of ACEs requires a better understanding of the psychological factors underlying mental health problems associated with exposure to ACEs. These findings could offer some insight about this cultural context and information that can improve both prevention policies and psychological interventions.

It is recognized that exposure to multiple ACEs increases risk of developing Post-Traumatic Stress Disorder (PTSD) and Complex Post-Traumatic Stress Disorder (CPTSD) in European and Asian samples (14, 15, 16). PTSD includes three symptom clusters: re-experience of the traumatic event or events; avoidance of thoughts and memories of the event(s); persistent perceptions of heightened current threat. CPTSD was introduced as a distinctive disorder from PTSD and includes three additional symptom clusters: affective dysregulation; negative self-concept; disturbed relationships (17). These additional symptoms clusters are indicators of Disturbances in Self-Organization (DSO).

In adolescence, the development of CPTSD may undermine the maintenance of a coherent sense of self, which result in impairment in identity formation (18). To the best of our knowledge, only one study analyzed the prevalence of PTSD among Faroese adolescents. It was found that 20% of the total sample fulfilled the criteria for PTSD (11). As far as we can tell, no previous study has examined CPTSD in a sample of Faroese adolescents.

Recent studies have found a positive association between higher exposure to ACEs and PTSD symptoms and DSO symptoms (6, 15, 19). Meanwhile, some studies observed that ACEs had only an indirect effect on DSO symptoms (15, 16, 20). This suggests that some psychosocial variables may mediate the link between ACEs and trauma symptoms. A better comprehension of these variables can help improve knowledge of the underlying psychological processes involved in the development of both PTSD and CPTSD.

Importance of Coping Styles and Defense Mechanisms

Coping strategies is a potential protective or risk factor for the individuals' mental health (21). Coping strategies involve conscious and voluntary use of both cognitive and behavioral strategies to manage either internal (e.g., emotional) and/or external (e.g., environmental) challenging circumstances to restore internal and external balance. The process of emotional regulation in the face of challenging circumstances is referred to as coping styles (22).

Two major complementary coping styles can be distinguished: emotion-focused and problem-focused coping styles. Coping styles have also been distinguished between engagement versus disengagement coping (23). Coping styles and their characteristics are presented in Table 1.

Exposure to multiple ACEs and living in an environment appraised as uncontrollable could impact adolescents' coping styles. In accordance, previous studies found higher use of disengagement and maladaptive coping styles (e.g., avoidance and emotion-focused coping) in individuals exposed to ACEs when compared to individuals who did not experience ACEs (24, 25). These maladaptive coping styles are short-term approaches that only temporarily decrease the psychological impact of ACEs (21),

Furthermore, the development and maintenance of PTSD symptoms seems to be connected to specific coping styles among diverse samples and age groups. It was observed that emotional and disengagement coping styles, and cognitive avoidance were associated with higher levels of PTSD symptoms (26). In adolescents, a meta-analytical study evidenced that emotional avoidance coping styles predicted PTSD (27).

Recently, it was found that coping styles partially mediated the relationship between childhood maltreatment and mental health in a sample of college students (22). Maladaptive coping mediated the association between exposure to ACEs and internalizing symptoms in adolescents (24). Specifically, both emotional and avoidance focused coping mediated the relationship between exposure to ACEs with PTSD in a sample of Danish adolescents (28).

In the meantime, implicit emotion regulation has been found to have a greater protective effect against psychopathology, in youth exposed to ACEs, compared to explicit emotion regulation mechanisms. Defense mechanisms and implicit

TABLE 1. Description of coping styles and defense mechanisms.

Coping styles	Description	Example
Emotion-focused	Attempt to escape from the emotional distress associated with the stressor	Acceptance Forgiveness
Problem-focused or rational	Deliberate and rational approach, in which individuals make conscious efforts to cope with stressful circumstances	Alternative solutions Setting boundaries
Engagement	Confrontation of the stressor and/or related emotions/thoughts	Planning ahead Searching for instrumental support
Disengagement	Seeking to avoid the threat and/or related emotions/thoughts	Avoidance Detachment
Defense mechanisms	*Description*	*Example*
Mature	Complex cognitive processes enabling the maximization of gratification while maintaining more conscious awareness of psychosocial stressors	Humor Sublimation
Neurotic	Prevent the acknowledgment of specific feelings, ideas, or memories by keeping them out of awareness	Reactive formation Displacement
Immature	Cognitive simple processes aiming to prevent the awareness of unacceptable ideas and/or feelings that result in marked distortion of the significance and source of stress	Projection Splitting

emotion regulation are similar processes in coping with ACEs (29). Defense mechanisms are automatic and unconscious psychological processes intended to protect the individual against distressing emotions and mental representations associated with stressful events (30), which are involved in adaptive or maladaptive adjustment to stressful life events (28). Defense mechanisms have been grouped into three levels: immature, neurotic, and mature (31). Defense mechanisms and their characteristics are presented in Table 1.

In a context of exposure to multiple ACEs, defense mechanisms may be critical to emotional regulation associated with harmful and adverse experiences (32). Therefore, it is likely that exposure to ACEs may have an impact on the use of defense mechanisms. This is corroborated by previous studies that found that exposure to ACEs was associated with higher use of less mature defense mechanisms, namely neurotic and immature defense mechanisms (33, 34, 35).

The predominant use of less mature defense mechanisms has been attributed to a process of regression to survival-serving defenses to cope with a context of multiple and repeated adversity (36). The use of less mature defense mechanisms is an attempt to protect from a violent and harmful environment by creating an illusion of control over the generalized violence and adversity (32, 37).

It has been noticed that higher levels of immature defense styles are associated with increased psychological symptoms severity among individuals exposed to traumatic events (33, 38, 39, 40). Higher use of immature defense mechanisms was associated

with PTSD in refugees (41) and war veterans (31, 42). Conversely, mature defense mechanisms were associated with lower PTSD symptoms in war veterans (31).

More recently, some studies noticed that immature defense mechanisms mediated the association between exposure to ACE and higher psychological symptoms severity in adolescents (34) and adults (40, 43). It was also noticed that both neurotic and immature defense mechanisms mediated the association between exposure to ACEs and PTSD symptoms in Danish adolescents (44).

It seems that both defense mechanisms and coping styles are complementary psychological processes involved in adjustment to exposure to adversity (45). Chabrol and Callahan (46) proposed that defense mechanisms precede coping styles. From a developmental point of view, defense mechanisms emerge earlier, whereas coping styles are activated once the individual's fundamental unconscious defensive organization has been established. Thus, coping styles may be restricted or promoted by underlying defense mechanisms.

In accordance, neurotic and immature defense mechanisms were strongly associated with avoidant coping, whereas mature defense mechanisms were strongly associated with focused on problem or emotion coping (45, 47). Two patterns of responses to ACEs have been proposed: active response involving the use of mature defense mechanisms and problem or emotion-focused coping; passive response involving the use of less matured defense mechanisms and avoidant coping (35, 45). In a sample of Danish adolescents, higher exposure to

ACEs was related to higher use of immature defense mechanisms, which were associated with higher levels of both emotional and avoidance coping, which, in turn, were associated with higher severity of PTSD symptoms (28).

Present Study

The joint study of defense mechanisms and coping styles has rarely been conducted. Considering the complementary role of both processes in adjustment to multiple exposure to ACEs (45), more research is needed on the topic. Moreover, the study of the relationship between two core features of different approaches may provide some evidence, to some extent, in favor of the underlying mechanisms for psychotherapy integration.

The present study analyzed the effect of exposure to ACEs on both PTSD and DSO symptoms trough the indirect effect of defense mechanisms and coping styles in a sample of Faroese adolescents. Based on the findings mentioned above, the following hypotheses were proposed: 1) higher exposure to multiple types of ACEs will be associated with higher levels of PTSD and DSO symptoms; 2) higher exposure to multiple types ACEs will be indirectly related to higher levels PTSD and DSO symptoms through higher levels of immature defense mechanisms; 3) higher levels of exposure to multiple types of ACEs will be indirectly related to higher levels of PTSD and DSO symptoms through higher levels of emotional and avoidance coping; 4) exposure to multiple ACEs will relate to higher levels of immature defense mechanisms, that will relate to higher levels of both emotional and avoidance coping, which will then relate to higher levels of both PTSD and DSO symptoms.

Material and Methods
Participants

The sample included 687 Faroese adolescents who were enrolled in eighth grade. Sample characteristics are presented in Table 2. The mean age of the sample was around 14 years old (age range: 13-16 years old). The proportion of females (51.4%) was slightly higher than proportion of males (48.6%). Most participants lived with both their parents (81.8%) and a very small proportion had other arrangements (2.0%). More than half of the adolescents' parents have completed college or university education.

Procedure

This study aimed to collect data about previous exposure to ACEs and psychological reactions among Faroese adolescents. Participants were recruited from 19 schools, located in six different islands. According to the Faroese Ministry of Education, there were 804 students in eighth grade at the time the data were collected; that is 85% of all the Faroese students enrolled in eight-grade participated in this study.

The research protocol was sent, successively, to the Faroese Data Inspection, Faroese Ministry of Education, and the Faroese Ethical Board, who approved the study. Next, the research protocol was

TABLE 2. Sample demographic characteristics

	Female (n= 353)	Male (n = 334)	Total (N = 687)
Age			
13 years	7 (2.0%)	13 (3.9%)	20 (2.9%)
14 years	177 (50.1%)	179 (53.6%)	356 (51.8%)
15 years	167 (47.3%)	137 (41.0%)	304 (44.3%)
16 years	2 (0.6%)	5 (1.5%)	7 (1.0%)
Mean (SD)	14.5 (SD=0.5)	14.4 (SD=0.6)	14.4 (SD=0.6)
Living with			
Both parents	290 (82.2%)	272 (81.4%)	562 (81.8%)
One of their parents	58 (16.4%)	53 (15.9%)	111 (16.2%)
Other arrangements*	5 (1.4%)	9 (2.7%)	14 (2.0%)
Father education			
Did not report	34 (9.6%)	46 (13.8%)	80 (11.6%)
Primary school	86 (24.4%)	59 (17.7%)	145 (32.8%)
High school	42 (11.9%)	62 (18.6%)	104 (15.1%)
College	112 (31.7%)	80 (24.0%)	192 (27.9%)
University	79 (22.4%)	87 (26.0%)	166 (24.2%)
Mother education			
Did not report	32 (9.1%)	46 (13.8%)	78 (11.4%)
Primary school	74 (21.0%)	68 (20.4%)	142 (20.7%)
High school	121 (34.3%)	112 (33.5%)	233 (33.9%)
College	81 (22.9%)	64 (19.2%)	145 (21.1%)
University	45 (12.7%)	44 (3.2%)	89 (13.0%)

uncles, siblings, grandparents or other relatives

presented to the school principals, who approved the study. It was applied passive consent which is a usual procedure in most school studies, i.e., the parents were informed about the study and have the right to refuse the participation of their child. The students were informed that their answers were anonymous, and they were asked to answer as openly as possible, despite the somewhat uncomfortable subject. All students present accepted to participate in the study. The research protocol was introduced to the students verbally and by letter. The participation was voluntary and those accepting to participate, gave their informed consent directly. The students filled in the questionnaire in the classroom, supervised by a team researcher in co-operation with the "head teacher".

Measures

Sociodemographic data. Participants provided information on their sex, age, highest level of parental education and current living arrangements.

Adverse Childhood Experiences

It was asked to participants whether, or not, they had been exposed to 20 life-threatening experiences (e.g., rape) and stressful family conditions (e.g., neglect). These experiences are presented in Table 4. The list of events was selected from scientific literature and clinical experience (48). This measure was developed to collect information on previous exposure to ACEs in different settings but has not yet been validated.

Defensive Style Questionnaire (DSQ-40)

The DSQ-40 (49) is a measure that assesses 20 defenses divided into three groups of factors: mature, neurotic, and immature. This self-report measure includes 40 questions answered on a 9-point Likert scale (where "1" indicates "completely disagree" and "9" indicates "fully agree"). In this study, the total scores on the immature, neurotic, and mature defense mechanisms was computed. The internal consistency of the subscales was good (Immature

defense mechanisms α = .84; Neurotic defense mechanisms α = .80; Mature defense mechanisms α = .82).

Coping Style Questionnaire (CSQ)

The CSQ (50) is a self-report measure that assesses how respondents generally deal with stressors. A short version of 37 items, rated on a 4-point Likert-type scale (1 = never to 4 = always), was used in this study (51). It evaluates four coping styles: rational coping, emotion-focused coping, avoidance coping, and detached coping. The internal consistency of the subscales were acceptable to good (Rational coping α = .82; Emotion-focused coping α = .85; Detached coping α = .76; and Avoidance coping α = .80).

PTSD and CPTSD Item Set

The symptoms of PTSD and CPTSD were assessed through a item set (52). Six items, answered on a 4-point Likert scale (from "not present" = 1, to "very often present" = 4), were selected from the Harvard Trauma Questionnaire: Part IV (53) to assess PTSD symptoms. These items were selected based on a latent class analysis that identified the two dimensions of PTSD and DSO symptoms. The internal consistency of the PTSD Item Set was good (α = .84). Likewise, five items, answered on a 4-point Likert scale (from "never" = 0, to "very often" = 3), were selected from the Trauma Symptom Checklist (54) and one item from the HTQ-IV to assess DSO symptoms. The total score on the PTSD and DSO item set was analyzed in this study. The items representing PTSD and DSO symptoms are shown in Table 3. The internal consistency of the PTSD (α = .84) and DSO Item Set (α = .80) were good.

Statistical Analysis

Data analysis was conducted using the IBM SPSS Statistics for Windows (version 29). Multiple Pearson correlation analyses were first conducted to test bivariate relationships between the study variables. The analyses of indirect effects were divided into two

TABLE 3. Items representing PTSD and DSO symptoms.

Cluster	Test items
PTSD symptoms	HTQ 2. Feeling as though the event is happening again
	HTQ 3. Recurrent nightmares
	HTQ 6. Being jumpy or easily startled
	HTQ 9. Feeling on guard
	HTQ 11. Avoiding activities that remind you of the traumatic or hurtful event
	HTQ 15. Avoiding thought or feelings associated with the traumatic or hurtful events
DSO symptoms	TSC 16. Temper outburst that you could not control
	TSC 14. Crying easily
	TSC 28. Feelings of inferiority or insecurity
	TSC 29. Blaming yourself
	TSC 6. Feeling isolated from other people
	HTQ 27. Feeling that you have no one to rely upon

Note. PTSD = Post-Traumatic Stress Disorder; DSO = Disturbances in Self-Organization

steps. A multiple step mediation methodology, with a bootstrapped confidence interval for indirect effects (55), was conducted to test our hypothesis of serial mediation. Both models described above included two outcome variables (PTSD and DSO symptoms), so that examination through Structural Equation Modeling (SEM) was chosen.

First, to address our multiple mediation hypotheses, it was examined: (a) direct effect of exposure to ACEs on PTSD and DSO symptoms; (b) the indirect effect of exposure to ACEs on PTSD and DSO symptoms through defense and the coping styles. All variables were defined as observed variables. Considering the lack of research on the association between our study variables in Faroese adolescent samples, all subscales of defense and coping styles were included in the models, although they were not considered in our hypotheses.

Second, to assess our serial mediation integrated model, it was examined: (a) direct effect of exposure to ACEs on PTSD and DSO symptoms; (b) the indirect effect of exposure to ACEs on PTSD and DSO symptoms through defense styles; (c) the indirect effect of exposure to ACEs on PTSD and DSO symptoms via a two-step mediation process through defense styles and coping styles. Only variables whose indirect effect was statistically significant in the first step of the analysis were included in the model of serial mediation (55). There were no missing values in our data due to cautious procedures adopted during data collection (e.g., checking if participants did respond to all items).

SEM (56) strategy using the AMOS software (Version 29) and the Maximum Likelihood method were employed. The following criteria for models fit were adopted: (a) χ2 test should be non-significant; (b) comparative fit index (CFI), normed fit index (NFI), and Tucker Lewis Index (TLI > 0.95; (c) root mean square error of approximation (RMSEA) and standardized root mean square residual (SRMR) ranging from 0.00 to 0.08. To assess significance of

indirect paths, a bootstrapped confidence interval for the ab indirect effect was adopted (57). A total of 5,000 bootstrapped samples were obtained to estimate indirect effects of each variable.

Results
Prevalence of exposure to traumatic events, depression, and anxiety symptoms

As can be seen in Table 4, the most reported event was the death of someone close, followed by threats of violence. The least prevalent events were pregnancy/abortion and rape. The average number of direct events per participant was 2.9 (SD = 3.1; range 0-20).

TABLE 4. Adverse childhood events according to exposure.

Event	Count (%)
Traffic accident	115 (16.7)
Other serious accidents	80 (11.6)
Physical assault	66 (9.6)
Rape	28 (4.1)
Witnessed other people injured or killed	66 (9.6)
Came close to being injured or killed	87 (12.7)
Threats of violence	217 (31.6)
Near-drowning	150 (21.8)
Attempted suicide	68 (9.9)
Robbery/theft	94 (13.7)
Pregnancy /abortion	21 (3.1)
Serious illness	88 (12.8)
Death of someone close	362 (52.7)
Divorce	90 (13.1)
Sexual abuse	35 (5.1)
Physical abuse	50 (7.3)
Severe childhood neglect	34 (4.9)
Bullying	207 (30.1)
Absence of a parent	101 (14.7)
Other events	48 (7.0)

TABLE 5. Correlation matrix of study variables-

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Exposure to ACE	-	-.03	-.04	.22***	.12**	.28***	.08	.08	.36***	.37***
2. MDM		-	.48***	.49***	.44***	.08*	.35***	.36***	.13**	.08*
3. NDM			-	.41***	.36***	.18***	.20***	.34***	.20***	.20***
4. IDM				-	.35***	.42***	.19***	.37***	.33***	.41***
5. Rational coping					-	.35***	.55***	.48***	.28***	.26***
6. Emotional coping						-	.09*	.42***	.45***	.65***
7. Detachment coping							-	.39***	.06	.05
8. Avoidance coping								-	.28***	.29***
9. PTSS									-	.54***
10. DSOS										-

*p < .05. **p < .01. ***p < .001. *Note*. ACE = Adverse childhood experiences; MDM = Mature defense mechanisms; NDM = Neurotic defense mechanisms; IDM = Immature defense mechanisms; PTSS = Post-traumatic stress disorder symptoms; DSOS = Disturbances in self-organization symptoms.

Intercorrelations between study variables

Intercorrelations between the study variables are presented in Table 5.

Multiple Mediation Analyses

The model that tested the direct paths from exposure to ACEs to PTSD symptoms, and indirect paths through defense mechanisms and coping styles showed a good fit to the observed data ($\chi2$ (2) =1.19,

p = .55; NFI= 1.0; CFI =1.0; TLI = 1.0; RMSEA =.01; SMSR =.01). Unstandardized coefficients and bootstrap solutions are presented in Table 6, and unstandardized results are presented in Figure 1. The direct paths from exposure to ACEs to PTSD symptoms (b = .44, p <.001, 95% CI, .34, .54) were significant. Higher levels of exposure to ACEs were associated with higher levels of PTSD symptoms. The indirect effects from exposure to ACEs through
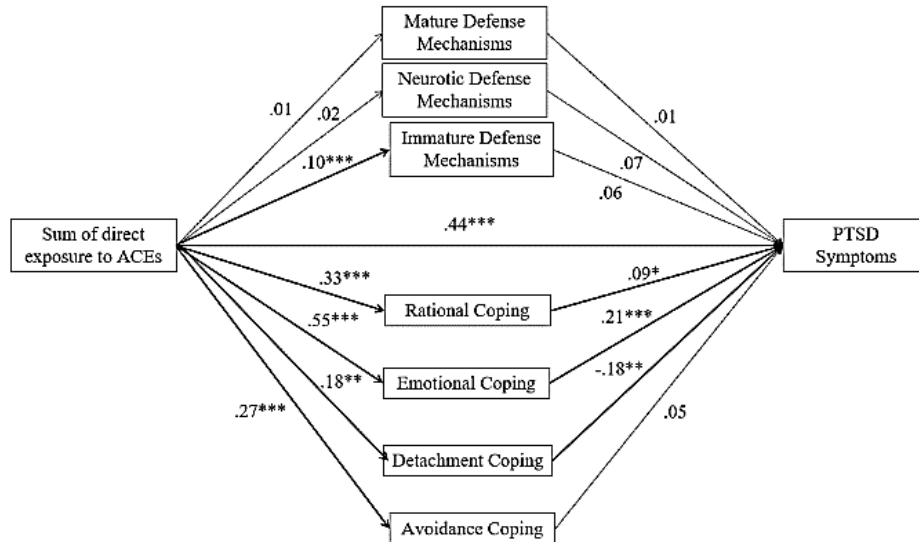

FIGURE 1. A multiple mediational model for PTSD symptoms by defense styles and coping styles. Rectangles indicate measured variables. Standardized maximum likelihood parameters are used. Unidirectional arrows depict hypothesized directional links. Bold estimates are statistically significant and dashed lines are nonsignificant. Unstandardized regression coefficients are presented. *p <.05, ***p <.01, ***p <.001.

TABLE 6. Bootstrapped point estimate for direct and indirect effects and 95% confidence intervals for predicting PTSD and DSO symptoms by sums of exposure to adverse childhood experiences through defense mechanisms levels and coping styles dimensions.

	Estimates of standardized regression weights	Estimates of unstandardized regression weights	BCa 95% CI (lower, upper)	p
PTSD symptoms				
Direct effect of exposure to ACEs	.30	.44	(.34, .54)	.001
Indirect effect via mature defense mechanisms	.04	.02	(-.26, .30)	.28
Indirect effect via neurotic defense mechanisms	.04	.02	(-.02, .06)	.26
Indirect effect via immature defense mechanisms	.06	.24	(-.09, .57)	.16
Indirect effect via rational coping	.17	.33	(.19, .47)	.001
Indirect effect via emotional coping	.31	.55	(.42, .68)	.001
Indirect effect via detachment coping	-.13	-.17	(-.27, -.07)	.01
Indirect effect via avoidance coping	.07	.05	(-.02, .12)	.14
DSO symptoms				
Direct effect of exposure to ACEs	.24	.33	(.25, .41)	.001
Indirect effect via mature defense mechanisms	-.02	-.04	(-.26, .18)	.70
Indirect effect via neurotic defense mechanisms	.04	.02	(-.02, .06)	.26
Indirect effect via immature defense mechanisms	.26	.44	(.17, .71)	.001
Indirect effect via rational coping	.04	.03	(-.03, .09)	.39
Indirect effect via emotional coping	,45	.35	(.30, .40)	.001
Indirect effect via detachment coping	-.08	-.10	(-.19, -.01)	.04
Indirect effect via avoidance coping	.02	.02	(-.03, .07)	.57

Note. ACEs = Adverse childhood experiences; PTSD = Post-traumatic stress disorder; DSO = Disturbances in self-organization; BCa = bias corrected and accelerated; CI = confidence intervals; Confidence intervals that do not include 0 (null association) are significant.

rational coping (b = .33, p <.001, 95% CI, .19, .47), emotional coping (b = .55, p <.001, 95% CI, .42, .68) and detachment coping (b = -.17, p <.01, 95% CI, -.07, -.27) to PTSD symptoms were significant. Higher levels of exposure to ACEs were associated with higher levels of both rational coping and emotional coping, which were associated with higher levels of PTSD symptoms. Higher levels of exposure to ACEs were associated with higher levels of detachment coping, which were associated with lower levels of PTSD symptoms.

The model that tested the direct paths from exposure to ACEs to DSO symptoms, and indirect paths through defense mechanisms and coping styles

showed a good fit to the observed data ($\chi 2$ (1) =.15, p = .70; NFI= 1.0; CFI =1.0; TLI = 1.0; RMSEA =.01; SMSR =.01). Unstandardized coefficients and bootstrap solutions are presented in Table 6, and unstandardized results are presented in Figure 2. The direct paths from exposure to ACEs to DSO symptoms (b = .33, p <.001, 95% CI, .25, .41) were significant. Higher levels of exposure to ACEs were associated with higher levels of DSO symptoms. The indirect effects from exposure to ACEs through immature defense mechanisms (b = .44, p <.001, 95% CI, .17, .71), emotional coping (b = .35, p <.001, 95% CI, .30, .40) and detachment coping (b = -.10, p <.05, 95% CI, -.19, -.01) to DSO symptoms were
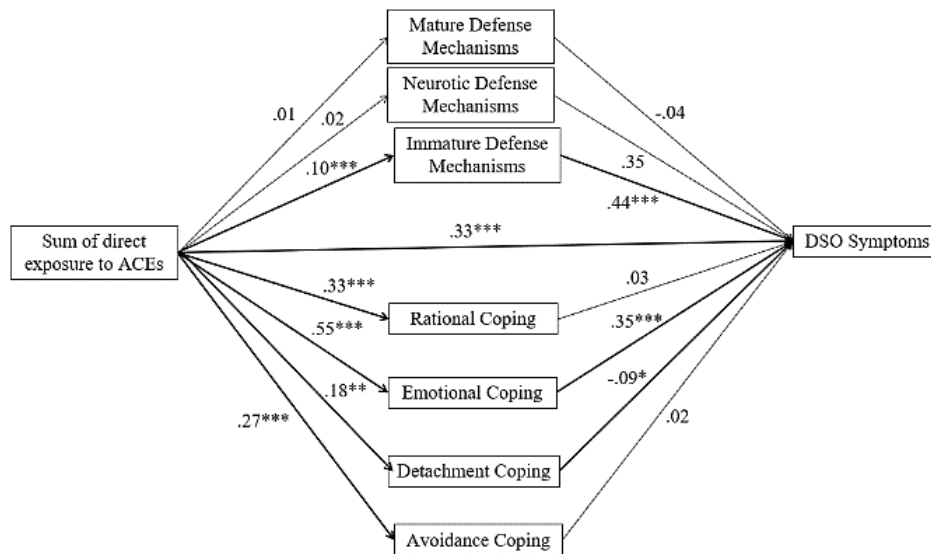

FIGURE 2. A multiple mediational model for DSO symptoms by defense styles and coping styles. Rectangles indicate measured variables. Standardized maximum likelihood parameters are used. Unidirectional arrows depict hypothesized directional links. Bold estimates are statistically significant and dashed lines are nonsignificant. Unstandardized regression coefficients are presented. *p <.05, ***p <.01, ***p <.001.
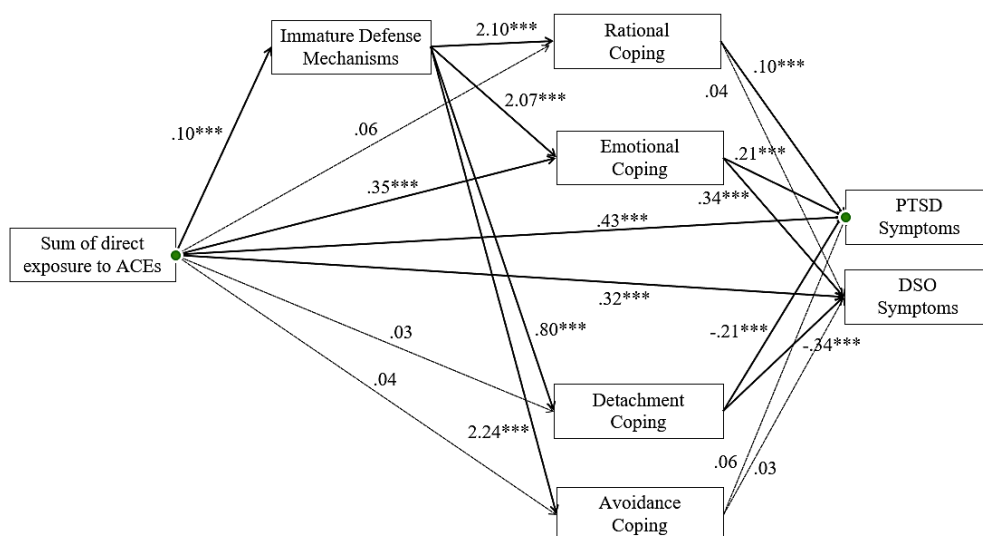

FIGURE 3. A serial mediational integrated model for PTSD symptoms and DSO symptoms by defense styles and coping styles. Rectangles indicate measured variables. Standardized maximum likelihood parameters are used. Unidirectional arrows depict hypothesized directional links. Bold estimates are statistically significant and dashed lines are nonsignificant. Unstandardized regression coefficients are presented. *p <.05, ***p <.01, ***p <.001.

significant. Higher levels of exposure to ACEs were associated with higher levels of both immature defense mechanisms and emotional coping, which were associated with higher levels of DSO symptoms. Higher levels of exposure to ACEs were associated with higher levels of detachment coping, which were associated with lower levels of DSO symptoms.

Analysis of serial mediation

Since both mature and neurotic defense mechanisms did not mediate the link between exposure to ACEs and PTSD and DSO symptoms, both defense mechanisms were not included in the two step mediation model (55). This model showed a good fit to the observed data ($\chi 2$ (2) = 4.56, p = .10; NFI=. 1.0; CFI =1.0; TLI = 98; RMSEA =.04; SMSR =.02). Unstandardized coefficients and bootstrap solutions are presented in Table 7, and unstandardized results are presented in Figure 3. The direct paths from exposure to ACEs to PTSD (b = .43, p <.05, 95% CI, .20, .66) and DSO symptoms (b = .32, p <.001, 95% CI, .24, .40) remained significant. Only the indirect effect from exposure to ACEs to both psychological symptoms through emotional coping was significant. The results indicated that exposure

to ACEs was significantly associated with higher levels of immature defense mechanisms, which were associated with higher levels of both rational and emotional coping, which in turn were associated with higher levels of both PTSD and DSO symptoms. It was also observed that exposure to ACEs was significantly associated with higher levels of immature defense mechanisms, which were associated with higher levels of detachment coping, which in turn were associated with lower levels of both PTSD and DSO symptoms.

Discussion

The results of the present study indicated that adolescents exposed to multiple types of ACEs had higher levels of immature defense mechanisms levels which were associated with higher levels of emotional coping, which were associated with higher PTSD and DSO symptoms severity. Higher exposure to multiple types of ACEs in adolescents with high levels of immature defense mechanisms were positively associated with rational coping, which were associated with PTSD symptoms severity. It was also observed that higher exposure to multiple types of ACEs in adolescents with higher use of immature defense mechanisms was associated

TABLE 7. Bootstrapped point estimate for direct and indirect effects and 95% confidence intervals for predicting PTSD and DSO symptoms by sums of exposure to adverse childhood experiences through immature defense mechanisms levels and coping styles

	Estimates of standardized regression weights	Estimates of unstandardized regression weights	BCa 95% CI (lower, upper)	p
PTSD symptoms				
Direct effect of exposure to ACEs	.29	.43	(.20, .66)	.02
Indirect effect via IDM	.10	.35	(.07, .63)	.02
Indirect effect via rational coping	.06	,12	(-.01, .25)	.08
Indirect effect via emotional coping	.26	.21	(.14, .28)	.001
Indirect effect via detachment coping	-.04	-.04	(-.12, .04)	.31
Indirect effect via avoidance coping	.02	.04	(-.09, .17)	.50
Indirect effect via IDM and rational coping	.43	2.10	(1.76, 2.44)	.001
Indirect effect via IDM and emotional coping	.41	1.97	(1.67, 2.27)	.001
Indirect effect via IDM and detachment coping	-.13	-.18	(-.29, -.07)	.01
Indirect effect via IDM and avoidance coping	.08	.06	(-.01, .13)	.07
DSO symptoms				
Direct effect of exposure to ACEs	.23	.32	(.24, .40)	.001
Indirect effect via IDM	.17	,58	(.34, .82)	.001
Indirect effect via rational coping	.04	.04	(-.01, .09)	.13
Indirect effect via emotional coping	.23	.34	(.29, .39)	.001
Indirect effect via detachment coping	.04	.04	(-.08, .16)	.18
Indirect effect via avoidance coping	.04	.03	(-.02, .08)	.25
Indirect effect via IDM and rational coping	.37	1.34	(1.11, 1.57)	.001
Indirect effect via IDM and emotional coping	.42	2.07	(1.77, 2.37)	.001
Indirect effect via IDM and detachment coping	-.10	-.10	(-.19, -.01)	.04
Indirect effect via IDM and avoidance coping	.02	.04	(-.02, .08)	.50

Note. ACEs = Adverse childhood experiences; PTSD = Post-traumatic stress disorder; DSO = Disturbances in self-organization; IDM = Immature defense mechanisms; BCa = bias corrected and accelerated; CI = confidence intervals; Confidence intervals that do not include 0 (null association) are significant.

with higher levels of detachment coping, which were associated with lower PTSD and DSO symptoms severity. Our hypotheses will be discussed in turn.

The current findings indicate that Faroese adolescents present high risk of exposure to multiple types of ACEs. Previous exposure to at least one ACE was reported by 90.4% of the participants and 85.9% reported exposure to more than one ACE. It seems that Faroese adolescents present a high risk of exposure to multiple ACEs (11). Probably, the context of the Faroe Islands is one in which the independence and autonomy of adolescents is encouraged, but also with reduced guidance from their parents, may contribute to this higher risk of exposure to multiple ACEs (11, 12).

Hypothesis 1
Our first hypothesis was fully supported. Higher exposure to multiple types of ACEs was associated with higher levels of PTSD and DSO symptoms. There was a stronger association between ACEs and PTSD symptoms compared to the association between the former variable with DSO symptoms. The most reported events (e.g., death of someone close, threats of violence) are usually isolated events which are more associated with the development of PTSD symptoms (58, 59). DSO symptoms tend to occur after longer and repetitive periods of exposure to ACEs (15, 16).

Hypothesis 2
Our second hypothesis was supported. Both the multiple and serial mediation analysis indicated that exposure to ACEs was indirectly related to PTSD and DSO symptoms through immature defense mechanisms. It could be proposed that exposure to multiple ACEs can lead to a process of regression to immature and survival-serving defenses among Faroese adolescents to cope with a context of adversity (34, 36), which increases the risk of both PTSD and DSO symptoms (60, 61). The intensified use of these defense styles may cause impairment in identity formation (60). However, regarding the association between use of immature defense mechanisms with PTSD symptoms seems to be influenced by the coping styles used by adolescents (28, 45).

Hypothesis 3
Our third hypothesis was partially supported. Exposure to ACEs was indirectly related to PTSD and DSO symptoms only through emotional coping, but exposure to ACEs was not indirectly related to PTSD and DSO symptoms through avoidance coping. Probably, adolescents who strongly attempt to cope with multiple adversity through acceptance or positive restructuring are at higher risk of psychological distress (24, 25). Conversely, it seems that the context of repeated adversity may not promote the use of avoidance coping as a coping method to deal with exposure to multiple ACEs.

It was also observed that exposure to ACEs was indirectly related to PTSD symptoms through rational coping, and exposure to ACEs was indirectly related to PTSD and DSO symptoms through detachment coping in the multiple mediation, but not in the serial mediation model. It seems that immature defense mechanisms underlie the indirect effect of both coping styles in the association between exposure to ACEs and both PTSD and DSO symptoms among Faroese adolescents (45, 62).

Hypothesis 4
Finally, our final hypothesis was partially supported. The current results partially replicate Zerach and Elklit's findings (28) on the sequential association between defense mechanisms and coping styles with psychological symptoms. It was found that higher exposure to ACEs was linked to higher levels of immature defense mechanisms, which were then associated with higher levels of emotional coping, and consequently higher levels of both PTSD and DSO symptoms. It was also observed that higher exposure to ACEs was linked to higher levels of immature defense mechanisms, which were then associated with higher levels of rational coping and lower levels of detachment coping, and consequently higher levels of PTSD symptoms.

Our results provide support for the joint action of defense mechanisms and coping styles in adjusting to multiple ACEs exposure among Faroese adolescents. Specifically, higher use of immature defense mechanisms was associated with higher use of emotional, rational and detachment coping to deal with the context of multiple exposure to ACEs (28, 45). These results indicate that coping styles are restricted or promoted by higher or lower use of underlying immature defense mechanisms (62). The present results also suggest that the pattern of typical responses to ACEs, active and passive response, may be related to higher or lower use of immature defense mechanisms which underlie higher or lower use of maladaptive coping among adolescents (45).

Moreover, it was observed that the joint action of immature defense mechanisms and emotional coping is not successful among adolescents living in a context of exposure to different types of ACEs such as Faroe Islands (27, 35). In adolescents with higher exposure to ACEs, the association between higher levels of both immature defense mechanisms and emotional coping was associated with higher levels of both PTSD and DSO symptoms (28). Additionally, the link between immature defense mechanisms and rational coping was associated with higher levels of

PTSD symptoms. Considering that rational coping is mainly adopted when individuals believe that the situation can be altered, in a context of exposure to multiple types of ACEs, often occurring unpredictably, it may not afford protection against psychological symptoms among Faroese adolescents (28).

However, it was found that the link between immature defense mechanisms and higher levels of detachment coping was associated with lower levels of PTSD. These findings suggest that the avoidance of emotions and/or thoughts may provide some protection against psychological distress among Faroese adolescents. It can be proposed that some adolescents may adopt adaptive detachment, but not dysfunctional detachment, to deal with exposure to multiple ACEs which may reduce the levels of psychological symptoms (63). On the other hand, the intensified use of disconnected coping may lead to the aggravation of other symptoms, such as depression and dissociation, rather than PTSD symptoms (64).

Limitations

Although our study supports some previous findings from the literature and provides new insight into the association between exposure to ACEs and DSO symptoms, some limitations need to be acknowledged. Methodological Limitations. 1. The report of exposure to ACEs was performed retrospective which can be biased by memory issues. 2. Assessment of direct exposure to ACEs did not account for the reoccurrence of specific events. 3. Only direct exposure to ACEs was analyzed in this study. Future studies should also evaluate the effect of indirect exposure to ACEs. Measurement Limitations. 1. Self-report measures were used to assess the study variables, which entails the risk of a reporting bias. 2. Exposure to ACEs, PTSD, and DSO symptoms were not assessed through validated measures. Future studies should use validated measure to assess those variables. 3. Defense mechanisms were assessed using a validated measure, but future studies should use measures that assess automatic and unconscious psychological processes. Generalizability. 1. It is not feasible to infer causality from serial mediation analysis due to the cross-sectional design. Future studies should try to analyze the hypotheses of the study using a longitudinal design. 2. The data were collected in 2012. Thus, there may have been changes in the level of exposure to adverse events suffered by adolescents associated with temporal changes in the context of exposure to ACEs in Faroese Islands. Additionally, it is recommended the replication of the mediation hypothesis among other groups of adolescents in different cultures, namely in African samples.

Implications

The present study contributes to the understanding of exposure to ACEs in an understudied population and provides new insights for clinical intervention. It also provides a foundation for implementing community-based initiatives in this country. Our results indicate that adolescence is a developmental period characterized by high risk of exposure to multiple types of ACEs, as well as the development of psychological symptoms characteristic of PTSD/CPTSD.

The close social network that characterizes the community in the Faroe Islands plays an important role in preventing exposure to multiple ACEs, as does the school community in providing some protection against this risk for adolescents. In clinical practice, clinicians working with adolescents should assess adolescents' entire trauma history which may require asking more direct questions regarding adolescents' traumatic experiences. Moreover, the current findings highlight the key role of immature defense mechanisms as a psychological mechanism involved in passive responses to negative experiences that are linked to psychological distress.

It is recommended that mental health professionals evaluate the prevalent use of primitive defense mechanisms, such as projection and denial, involving a regression to survival-serving defenses to deal with adverse contexts. This clinical procedure may help to identity adolescents at risk, as well as strong reliance on maladaptive coping tactics in a context of exposure to multiple ACEs. Thus, during therapy, clinicians should closely examine the associations between defense and coping styles as adaptive or non-adaptive responses to negative and adverse events. Within this developmental model, adaptive coping seems to be promoted or restricted by underlying immature defense mechanisms (62). Clinicians should intervene with the aim of reducing the use of primitive defensive mechanisms with the aim of reducing the use of non-adaptive coping styles among adolescents exposed to multiple types of ACEs.

Disclosures
The authors report no conflict of interest.

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