UNIVERSITY OF CRETE

SCHOOL OF SOCIAL SCIENCES

DEPARTMENT OF PSYCHOLOGY

Longitudinal associations between emotional and interpersonal difficulties in school-aged children

Doctoral Dissertation

Elli Spyropoulou

RETHYMNO 2023

Advisory Committee

Theodoros Giovazolias (supervisor)

Professor of Counselling Psychology
Department of Psychology, University of Crete

Angeliki Mouzaki (co-supervisor)

Associate Professor of Learning Disabilities
Department of Primary Education, University of Crete

Georgios Sideridis (co-supervisor)

Professor of Educational Psychology
Department of Primary Education, National and Kapodistrian University of Athens

Examination Committee

Theodoros Giovazolias (supervisor)

Professor of Counselling Psychology
Department of Psychology, University of Crete

Angeliki Mouzaki (co-supervisor)

Associate Professor of Learning Disabilities
Department of Primary Education, University of Crete

Georgios Sideridis (co-supervisor)

Professor of Educational Psychology
Department of Primary Education, National and Kapodistrian University of Athens

Elias Kourkoutas

Professor of Psychology with emphasis on children and adolescents' inclusion with special needs/disorders
Department of Primary Education, University of Crete

Christina Athanasiades

Associate Professor of Counselling Psychology: School and Career Counselling
School of Psychology, Faculty of Philosophy, Aristotle University of Thessaloniki

Stephanos Vassilopoulos

Professor of Mental Health Counselling
Department of Educational Sciences and Social Work, University of Patras

Evangelia Karagianni-Karagiannopoulou

Professor of Educational Psychology
Department of Psychology, University of Ioannina

Τριμελής Συμβουλευτική Επιτροπή

Θεόδωρος Γιοβαζολιάς (Επιβλέπων)

Καθηγητής Συμβουλευτικής Ψυχολογίας
Τμήμα Ψυχολογίας, Πανεπιστήμιο Κρήτης

Αγγελική Μουζάκη (Συν-επιβλέπων)

Αναπληρώτρια Καθηγήτρια στις Μαθησιακές Δυσκολίες
Παιδαγωγικό Τμήμα Δημοτικής Εκπαίδευσης, Πανεπιστήμιο Κρήτης

Γεώργιος Σιδερίδης (Συν-επιβλέπων)

Καθηγητής Παιδαγωγικής Ψυχολογίας
Παιδαγωγικό Τμήμα Δημοτικής Εκπαίδευσης, Εθνικόν και Καποδιστριακόν Πανεπιστήμιον Αθηνών

Επταμελής Εξεταστική Επιτροπή

Θεόδωρος Γιοβαζολιάς (Επιβλέπων)

Καθηγητής Συμβουλευτικής Ψυχολογίας
Τμήμα Ψυχολογίας, Πανεπιστήμιο Κρήτης

Αγγελική Μουζάκη (Συν-επιβλέπων)

Αναπληρώτρια Καθηγήτρια στις Μαθησιακές Δυσκολίες
Παιδαγωγικό Τμήμα Δημοτικής Εκπαίδευσης, Πανεπιστήμιο Κρήτης

Γεώργιος Σιδερίδης (Συν-επιβλέπων)

Καθηγητής Παιδαγωγικής Ψυχολογίας
Παιδαγωγικό Τμήμα Δημοτικής Εκπαίδευσης, Εθνικόν και Καποδιστριακόν Πανεπιστήμιον Αθηνών

Ηλίας Κουρκούτας

Καθηγητής Ψυχολογίας με έμφαση την Ένταξη Παιδιών και Εφήβων με ειδικές Εκπαιδευτικές Ανάγκες/Διαταραχές
Παιδαγωγικό Τμήμα Δημοτικής Εκπαίδευσης, Πανεπιστήμιο Κρήτης

Χριστίνα Αθανασιάδου

Αναπληρώτρια Καθηγήτρια Συμβουλευτικής Ψυχολογίας: Σχολική Συμβουλευτική και Συμβουλευτική Σταδιοδρομίας
Τμήμα Ψυχολογίας, Φιλοσοφική Σχολή, Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης

Στέφανος Βασιλόπουλος

Καθηγητής στη Συμβουλευτική Ψυχικής Υγείας
Τμήμα Επιστημών της Εκπαίδευσης και Κοινωνικής Εργασίας, Πανεπιστήμιο Πατρών

Ευαγγελία Καραγιάννη-Καραγιαννοπούλου

Καθηγήτρια Εκπαιδευτικής Ψυχολογίας
Τμήμα Ψυχολογίας, Πανεπιστήμιο Ιωαννίνων

Acknowledgements

I would like to thank my primary supervisor, Prof., Theodoros Giovazolias and the members of my supervisor committee for providing me with the opportunity to conduct this challenging study. I am also thankful to my family and friends for their unwavering support and belief in me throughout this research. Finally, I would like to express my gratitude to the participating schools who helped collect the data, to parents for granting permission and to students for their participation.

Contents

Abstract

Introduction

Early adolescence represents a critical period in human development that marks the emergence of a dramatic increase in both emotional and interpersonal difficulties. The bulk of studies exploring relations between depressive symptoms, rumination tendencies, and peer victimization experiences in young individuals have predominately focused on assessing rumination in the context of sad mood. Although there is available evidence suggesting anger coping deficits to be common in both depressed-prone individuals and victims of peer mistreatment, potential relationships between depressive symptoms, anger rumination tendencies and peer victimization are less clarified. The goal of the present research was threefold: (1) to investigate the factorial structure and psychometric properties of the Greek version of the Children's Anger Rumination Scale (CARS) (**Study 1**), (2) to explore the longitudinal bidirectional association between anger rumination and depressive symptoms in early adolescence, and to examine whether this relation differs by gender (**Study 2**), and (3) to extend Study 2 by assessing whether peer victimization mediates the prospective relationship from depressive symptoms to anger rumination, and to examine whether this relation differs by gender (**Study 3**).

Methods and Results

In **Study 1**, CARS's factorial structure and psychometric properties were examined using a convenience sample of 552 Greek children and early adolescents (M_{age} = 11.50 years; 53.6% girls). Particularly, factorial structure was explored by contrasting alternative representations of the instrument (one-factor and four-factor independent cluster models – confirmatory factor analysis [ICM – CFA], exploratory structural equation modelling [ESEM], bifactor-CFA and bifactor-ESEM). The hypothesized bifactor-ESEM solution, comprised by a general anger rumination factor and four specific factors (Angry Afterthoughts, Thoughts of Revenge, Angry Memories, and Understanding of Causes) showed the best fit to the data and revealed the unidimensionality of the CARS. Measurement invariance across gender (boys vs. girls) and age (children vs. preadolescents) in the level of latent

means showed no significant differences in anger rumination tendencies. CARS's internal consistency, one-month test-retest reliability as well as expected patterns of convergent and discriminant validity were also established. The predictive power of the instrument was also supported, as participants' rumination tendencies towards anger were found to explain both depressive symptoms and engagement in bullying behaviors. In **Study 2**, the bidirectional relationship between depressive symptoms and anger rumination was examined using a convenience longitudinal sample of 304 early adolescents (M_{age} = 10.80 years; 44.7% boys). A two-wave latent cross-lagged panel model (CLPM) indicated that depressive symptoms predicted increases in anger rumination one year later but not vice versa. Multi-group CFA analyses showed these relations to be consistent across boys and girls. Finally, in **Study 3,** a two-wave latent "half-longitudinal mediation" model was performed to test whether peer victimization mediates the prospective relationship between depressive symptoms and anger rumination. For the needs of the present study the same longitudinal sample (see Study 2) was used. Results indicated that peer victimization mediated the longitudinal relation from depressive symptoms to anger rumination one year later. Multi-group CFA analyses showed no significant gender-based moderation effects. However, boys with higher depressive symptoms were found to be more at risk than girls for endorsing anger rumination through peer victimization. Statistical analyses in all studies (Study 1-3) were conducted using IBM Statistical Package for the Social Science (SPSS) version 25.0 and the Mplus version 8.1. Oral consent was obtained from all participating students and written consent was obtained from their parents via enveloped letters.

Conclusion

The CARS is a developmentally appropriate and psychometrically sound instrument that conceptualizes anger rumination as a unidimensional construct among Greek young individuals. Anger rumination represents a maladaptive cognitive-emotion regulation strategy that seems to be preceded by earlier depressive symptoms in early adolescence. Targeting peer victimization could be a promising avenue to reduce anger rumination risk in youth depression. However, before developing any counselling interventions, further research is needed to explain whether and, if so, why boys with higher depressive symptoms may be more at risk for endorsing anger rumination over time through peer victimization.

Διαχρονικά μοντέλα σχέσεων συναισθηματικών και διαπροσωπικών δυσκολιών σε μαθητές σχολικής ηλικίας

Περίληψη

Εισαγωγή

Η πρώιμη εφηβεία συνιστά μια κρίσιμη περίοδο της ανθρώπινης ανάπτυξης κατά την οποία αυξάνονται ραγδαία τόσο οι συναισθηματικές όσο και οι διαπροσωπικές δυσκολίες των ατόμων. Πλήθος ερευνών έχει μελετήσει τη πιθανή σχέση μεταξύ καταθλιπτικών συμπτωμάτων, εμπειριών θυματοποίησης και ενός δυσλειτουργικού μηχανισμού ρύθμισης των συναισθημάτων, γνωστού ως μηρυκασμός. Παρά το γεγονός ότι τα προβλήματα διαχείρισης θυμού αποτελούν κοινό σύμπτωμα τόσο των εφήβων με συμπτώματα κατάθλιψης, όσο και αυτών που βιώνουν συμπεριφορές εκφοβισμού από τους συνομηλίκους, το ερευνητικό ενδιαφέρον παραμένει εστιασμένο στον μηρυκασμό της λύπης ως πιθανό παράγοντα συσχέτισης με τα καταθλιπτικά συμπτώματα και τη θυματοποίηση αντίστοιχα. Ο στόχος της παρούσας διατριβής ήταν ο εξής: (1) να ερευνήσει την παραγοντική δομή και την ψυχομετρική καταλληλότητα της ελληνικής εκδοχής της κλίμακας, Children's Anger Rumination Scale (CARS) (**Έρευνα 1**), (2) να μελετήσει τη διαχρονική αμφίδρομη σχέση μεταξύ του μηρυκασμού του θυμού και των καταθλιπτικών συμπτωμάτων στην πρώιμη εφηβεία, και να εξετάσει πιθανές διαφορές φύλου (**Έρευνα 2**), και (3) να επεκτείνει την Έρευνα 2 εξετάζοντας τη θυματοποίηση από τους συνομηλίκους ως πιθανό διαμεσολαβητικό παράγοντα στη διαχρονική σχέση μεταξύ των καταθλιπτικών συμπτωμάτων και του μηρυκασμού του θυμού, και να εξετάσει πιθανές διαφορές φύλου (**Έρευνα 3**).

Μέθοδοι και Αποτελέσματα

Στην **Έρευνα 1**, η παραγοντική δομή και η ψυχομετρική καταλληλότητα του εργαλείου CARS εξετάστηκαν σε ευκαιριακό δείγμα 552 Ελλήνων παιδιών και νεαρών εφήβων ($M_{\text{ηλικία}}$ = 11.50 χρόνια, 53.6% κορίτσια). Ειδικότερα, η παραγοντική δομή της κλίμακας διερευνήθηκε μέσω της σύγκρισης

εναλλακτικών παραγοντικών μοντέλων (μονοπαραγοντικό μοντέλο και μοντέλο των 4 συσχετιζόμενων παραγόντων με επιβεβαιωτική ανάλυση παραγόντων [CFA], διερευνητικό μοντέλο των 4 παραγόντων [ESEM], αμφιπαραγοντικό μοντέλο [bifactor-CFA], και αμφιπαραγοντικό διερευνητικό μοντέλο δομικών εξισώσεων [bifactor-ESEM]). Το αμφιπαραγοντικό διερευνητικό μοντέλο δομικών εξισώσεων αποτελούμενο από έναν γενικό παράγοντα μηρυκασμού του θυμού και τέσσερις ειδικούς παράγοντες (Μεταγενέστερες Σκέψεις Θυμού, Σκέψεις Εκδίκησης, Μνήμες Θυμού και Κατανόηση Αιτιών) έδειξε την καλύτερη προσαρμογή στα δεδομένα και επιβεβαίωσε τη μονοδιάστατη παραγοντική δομή της κλίμακας CARS. Η ισοδυναμία μέτρησης κατά φύλο (αγόρια vs κορίτσια) και ηλικία (παιδιά vs πρώιμοι έφηβοι) δεν έδειξε σημαντικές διαφορές σε επίπεδο λανθανόντων παραγόντων. Επιβεβαιώθηκαν επίσης η εσωτερική συνοχή του CARS, η αξιοπιστία του έναν μήνα μετά καθώς και η συγκλίνουσα και διακρίνουσα εγκυρότητά του. Ο μηρυκασμός του θυμού βρέθηκε επίσης να ερμηνεύει ποσοστό της διακύμανσης τόσο των καταθλιπτικών συμπτωμάτων όσο και της συμμετοχής σε συμπεριφορές εκφοβισμού, επιβεβαιώνοντας την προβλεπτική αξία της κλίμακας. Στην **Έρευνα 2**, η αμφίδρομη διαχρονική σχέση ανάμεσα στα καταθλιπτικά συμπτώματα και στον μηρυκασμό του θυμού εξετάστηκε σε ευκαιριακό διαχρονικό δείγμα 304 πρώιμων εφήβων ($M_{\text{ηλικία}}$ = 10.80 χρόνια, 44.7% αγόρια). Η εφαρμογή ενός μοντέλου παλινδρόμησης υστέρησης δύο χρονικών στιγμών με λανθάνουσες μεταβλητές (a two-wave latent cross-lagged panel model) έδειξε πως τα καταθλιπτικά συμπτώματα σχετίζονταν θετικά με τον μηρυκασμό του θυμού έναν χρόνο μετά κι όχι το αντίστροφο. Η επιβεβαιωτική ανάλυση παραγόντων πολλαπλών ομάδων (multi-group CFA analysis) έδειξε πως οι σχέσεις αυτές ίσχυαν το ίδιο τόσο στα αγόρια όσο και στα κορίτσια. Τέλος, στην **Έρευνα 3**, εφαρμόστηκε ένα ημι-διαχρονικό μοντέλο διαμεσολάβησης δύο χρονικών στιγμών με λανθάνουσες μεταβλητές (a two-wave latent half-longitudinal mediation model), προκειμένου να εξεταστεί ο πιθανός διαμεσολαβητικός ρόλος της θυματοποίησης από τους συνομηλίκους στη διαχρονική σχέση των καταθλιπτικών συμπτωμάτων και του μηρυκασμού του θυμού. Για τις ανάγκες της Έρευνας 3 χρησιμοποιήθηκε το ίδιο διαχρονικό δείγμα με την Έρευνα 2. Τα αποτελέσματα έδειξαν πως η θυματοποίηση από τους συνομηλίκους διαμεσολαβούσε στη διαχρονική σχέση των καταθλιπτικών συμπτωμάτων και του μηρυκασμού του θυμού. Η ρύθμιση του φύλου στη σχέση διαμεσολάβησης δεν επιβεβαιώθηκε στατιστικά. Παρόλα αυτά τα αγόρια με υψηλότερα επίπεδα καταθλιπτικών συμπτωμάτων βρέθηκαν να αντιμετωπίζουν μεγαλύτερο κίνδυνο μηρυκασμού του θυμού μέσω της θυματοποίησης από τους συνομηλίκους έναν χρόνο μετά. Οι στατιστικές αναλύσεις και στις τρεις

έρευνες πραγματοποιήθηκαν με το IBM Στατιστικό Πακέτο για τις Κοινωνικές Επιστήμες (SPSS) εκδοχή 25.0 και το Mplus εκδοχή 8.1. Η προφορική συγκατάθεση συμμετοχής εξασφαλίστηκε από όλους τους συμμετέχοντες. Το ίδιο εξασφαλίστηκε και η έγγραφη συγκατάθεση των γονέων τους μέσω γραμμάτων που στάλθηκαν σπίτι.

Συμπέρασμα

Το CARS συνιστά ένα αναπτυξιακά και ψυχομετρικά κατάλληλο εργαλείο μέτρησης το οποίο "συλλαμβάνει" τον μηρυκασμού του θυμού ως μονοδιάστατη έννοια ανάμεσα σε Έλληνες νεαρής ηλικίας. Ο μηρυκασμός του θυμού αποτελεί μια δυσλειτουργική γνωστικό-συναισθηματική στρατηγική ρύθμισης, η οποία φαίνεται να προβλέπεται από τα προγενέστερα επίπεδα καταθλιπτικών συμπτωμάτων στην πρώιμη εφηβεία. Παρεμβάσεις εστιασμένες στις εμπειρίες θυματοποίησης από τους συνομηλίκους είναι πιθανό να μειώσουν τον κίνδυνο μηρυκασμού του θυμού σε πρώιμους εφήβους με καταθλιπτικά συμπτώματα. Πριν τον σχεδιασμό οποιουδήποτε προγράμματος συμβουλευτικής παρέμβασης, κρίνεται αναγκαίο να εξεταστεί, εάν και για ποιο λόγο τα αγόρια με υψηλότερα επίπεδα καταθλιπτικών συμπτωμάτων είναι περισσότερο πιθανό συγκριτικά με τα κορίτσια να μηρυκάζουν σκέψεις θυμού διαχρονικά μέσω της θυματοποίησης.

1. General Introduction

Early adolescence (~11 to 14 years; Arnett, 2016) represents a transitive period in human development as it marks the crossroad between childhood and adolescence. Accumulative evidence suggests early adolescence to be a critical phase of life, characterized by both risks and opportunities. Regarding risks the profound biological, cognitive, psychological and social challenges that young individuals usually face seem to interfere with overall adjustment by paving the pathway to emotional and interpersonal difficulties (Brieant et al., 2018; Hampel & Peterman, 2005; Maciejewski et al., 2015). Particularly, youth's emerging ability for formal operational thought and semi-abstract thinking has been found to increase vulnerability to depressogenic self-discrepant thoughts (Gürcan-Yildirim & Gençöz, 2022). Prefrontal cortex, a brain area, implicated in executive functioning and self-regulation still undergoes maturation, limiting youth's inherent capacity to manage effectively negative emotions and behave instrumentally (Wante et al., 2017). In addition, the higher autonomy of young individuals reflected by the greater exposure to extra-familiar relationships, can increase risk for interpersonal stressors, including peer victimization (see Telzer et al., 2015). Regarding opportunities, early adolescence is a period of significant brain growth and plasticity which makes the acquisition of complex social and cognitive skills easy to be accomplished (Blum et al., 2014; Laube et al., 2020). In support of this notion, there is a bulk of evidence suggesting social-emotional intervention programs to be more effective in children/early adolescents as compared to older ones (see Yeager et al., 2018). Investing in early adolescence is, therefore, worthy at both research and intervention level (Lane et al., 2017).

1.2 Rumination

Rumination is thinking persistently and passively on the causes and consequences of distress symptoms (Nolen-Hoeksema, 1991). This emotion-focused strategy is usually activated when individuals perceive an inability to attain a goal or a desired outcome (e.g., Watkins, 2008). Rumination tendencies mark an increase in early adolescence (Hampel & Petermann, 2005), a period that also coincides with a sharp rise in depressive symptoms (e.g., Hankin et al., 2015) and peer victimization experiences (Hymel & Swearer, 2015). Evidence shows that compared to older

adolescents whose ruminatory coping style is more trait-like and habitual in nature, early adolescents still engage occasionally in rumination to cope with distress. Frequent ruminative thinking towards negative affect may, however, become gradually a mental habit (Hjartarson et al., 2021) with debilitating maladjustment outcomes (Abela & Hankin, 2011; Fredrick et al., 2022).

Being initially conceptualized as an inward-focused strategy towards sad mood (i.e., sadness rumination), rumination is also involved with high arousal negative affect states, such as anger (Law et al., 2021).

1.2.1 Anger Rumination

Anger rumination entails the propensity to dwell on personally meaningful anger-provoking events (Denson, 2013). It represents a dysfunctional cognitive-emotion process closely associated with sustained arousal, prolonged anger, and revengeful thinking (Sukhodolsky et al, 2001). Empirical findings regarding gender-based differences in anger rumination across adolescence have been mixed and inconsistent. Particularly, while some studies document similar levels of anger rumination across both boys and girls (Leigh et al., 2020; Li et al., 2021; Malamut & Salmivalli, 2021), others report this tendency to be higher among girls (Camacho et al., 2021), or boys (Harmon et al., 2019; Yang et al., 2021) respectively.

Literature suggests anger rumination to be initiated by a perceived discrepancy between one's desired state and one's actual state (see Denson, 2013). For instance, anger rumination in adolescence may be generated following peer victimization which represents a discrepancy between one's actual state of being peer mistreated and one's desired state of being peer accepted (see Denson, 2013). Actual vs. ideal self-discrepancies are reported to ensue feelings of anger and frustration, and, thus, activate the anger rumination process, until the discrepancy is resolved and distress is relieved (Roberts et al., 2013). Individuals may differ in the tendency to ruminate when angered. While some engage in a state rumination to cope with anger-eliciting events, other seem unable to disengage attention from an angry episode and how it happened. Habitual anger ruminators' inability to gain control over distressing thoughts usually depletes problem-focused coping and, thus, leads to decreases in overall adjustment and subjective well-being (e.g., Harmon et al., 2019). Frequent involvement in bullying perpetration/victimization (Camacho et al., 2021; Li et al., 2021), depression (Harmon et al., 2019),

binge eating (Wakeford et al., 2018) as well as endorsement of risky behaviors (Borders & Henneby, 2015) are only some of the common problems displayed by high on anger rumination youth.

Given that anger rumination is closely associated with a range of mental and behavioral disorders across adolescence, identifying anger rumination-related processes early in life, is of utmost importance for effective preventions and treatments.

1.2.2 Measurement of Anger Rumination

The effective identification of rumination tendencies early in life requires age-appropriate instruments. To our knowledge, the Children's Anger Rumination Scale (CARS) is the only validated instrument found in the literature for assessing children's rumination towards anger (Smith et al., 2016). The CARS was adapted from the Anger Rumination Scale (ARS; Sukhodolsky et al., 2001) to be developmentally appropriate and psychometrically sound in children and early adolescents (Smith et al., 2016). In ARS, anger rumination represents a multidimensional construct composed by the following dimensions: (a) Anger Afterthoughts (cognitive rehearsal of previous anger experiences), (b) Thoughts of Revenge (thoughts and fantasies of retaliation), (c) Angry Memories (thoughts about past anger events), and (d) Understanding of Causes (thoughts about the causes of an anger experience) (Sukhodolsky et al., 2001). These dimensions are thought to be construct relevant as they represent a sequence of interactive, yet distinct stages in the anger rumination process. Particularly, anger-eliciting memories (Angry Memories) may provoke individuals' reoccurring thoughts of anger experiences (Anger Afterthoughts) which, in turn, can foster the intensity and duration of negative affect and lead to counterfactual thinking related to action tendencies toward resolution (Understanding of Causes) or retaliation (Thoughts of Revenge) (Sukhodolsky et al., 2001).

The four-factor structure of the ARS has been established in different cross-cultural settings: Iran (Besharat, 2011), Hong Kong and Great Britain (Maxwell et al., 2005), Australia and Spain (Ramos-Cejudo et al., 2017), Colombia (Toro et al., 2020), France (Reynes et al., 2013), Turkey (Satici, 2014), Mexico (Ortega Andrade et al., 2017), and Spain (Uceda et al., 2016). Surprisingly, in case of CARS, literature findings regarding instruments' dimensionality have been scarce and mixed. Particularly, Smith et al. (2016) supported the four-factor structure of the CARS in two different studies performed with children and juvenile male offenders respectively. Inversely, Repper (2006) confirmed the one-

factor solution of the CARS when investigated the construct of anger rumination in childhood and its association with aggression.

Cross-cultural adaption of research instruments is important, as it enables comparisons of results across different studies, and ascertains the conceptual accuracy of the construct under study (see Borsa et al., 2012). To date, there is no psychometrically sound and valid instrument available in Greek language to evaluate children's tendency towards anger rumination. Literature suggests that theory-based multidimensional scales, such as CARS may correspond better to a bifactor-ESEM model (Morin et al., 2016). Particularly, bifactor-ESEM models provide researchers the opportunity to investigate two sources of "construct-relevant psychometric multidimensionality related to: (a) the hierarchical nature of the constructs being assessed and (b) the fallible nature of indicators which tend to include at least some degree of association with non-target constructs" (Morin et al., 2016, p. 134). As far as we know, whether CARS corresponds to a bifactor-ESEM solution has not been addressed in any published article yet.

1.3 Depressive Symptoms

Depression is one of the most common and serious emotional problems in youth (Stein & Fazel, 2015). Symptoms of depression are diverse and mutable, and may include sadness, irritability, anger, loss of interest, social withdrawal, and low self-esteem (Ogundele, 2018). A recent longitudinal population-based study performed with old children and young adolescents showed point-prevalence of depressive symptoms just under 10% and a one-year period prevalence of almost 3% (Juul et al., 2021). While prepubertal depression is usually equally represented by both boys and girls, between the ages of 10 and 15, girls are nearly twice more likely than boys to develop depression (Keenan & Hipwell, 2005). Youth depression symptomology is of high concern given its stability and related adverse outcomes (Fergusson & Woodward, 2002). For instance, experiences of depression in adolescence have been positively related with alcohol misuse (Marmorstein, 2009), obesity (Mannan et al., 2016), gambling problems (Lee et al., 2011), suicidal ideation in early adulthood (Dugas et al., 2012), as well as impairments in emotional and interpersonal functioning (Larsen et al., 2013; Morabito et al., 2022). Understanding depression is, therefore, important for effective preventions and treatments (Sunesson et al., 2021).

Anger coping deficits have long been associated with youth depression both concurrently and over time (Folk et al., 2014; Galaif et al., 2003; Goodwin, 2006; Zeman et al., 2002). For instance, self-reported poor ability to manage constructively anger was concurrently related with internalizing symptoms in a sample of 227 middle-school students (Zeman et al., 2002). Similarly, 6th to 10th graders with difficulties in disengaging from their angry feelings (i.e., through activity-oriented coping) were found to experience higher levels of depression (Goodwin, 2006). Maladaptive displays of anger were also reported to be prospectively related with depressive symptoms in both at-risk (Folk et al., 2014; Galaif et al., 2003) and in normative adolescents (Park et al., 2017).

Surprisingly, the vast majority of published research has been focused on sadness rumination (i.e., "repetitive thoughts concerning one's present distress and the circumstances surrounding the sadness"; Conway, 2000, p. 404) so as to understand adolescent depression (Krause et al., 2018; Spyropoulou & Giovazolias, 2022a). Anger rumination as an unconstructive emotion regulation strategy related to youth depression has been poorly explored (Harmon et al., 2019).

1.3.1 Anger Rumination and Depressive Symptoms

Anger rumination has been closely related with youth depression, with evidence being however scarce (Harmon et al., 2019). Most importantly, existing research has been cross-sectional in design and, thus, do not allow inferences regarding directionality of effects.

Longitudinal studies have indicated that maladaptive emotion regulation strategies may render adolescents vulnerable to later depressive symptoms (Abela & Hankin, 2011; Young et al., 2022). For instance, habitual rumination towards sad mood was found to be positively related with later increases in depressive symptoms among 382 adolescents (Abela & Hankin, 2011). In a similar vein, suppression of positive emotions was reported to predict subsequent anhedonia, a core affective facet of depression, in a sample of 228 Mexican adolescents (Young et al., 2022). Evidence, also, suggests that depressive symptoms may precipitate difficulties in managing effectively negative emotions (de Jonge-Heesen et al., 2021; Larsen et al., 2013; Spyropoulou & Giovazolias, 2022a). Particularly, in a longitudinal study performed with 1,341 secondary school students, elevated depressive symptoms were found to hinder adolescents' ability to reframe a negative event in a more positive way (de Jonge-Heesen et al., 2021). The positive effects of depressive symptoms on sadness rumination were supported in a two-wave

study with 302 early adolescents (Spyropoulou & Giovazolias, 2022a). Similarly, expressive suppression was found to be predicted by prior depressive symptoms in a sample of 1,753 youth (Larsen et al., 2013). Accordingly, literature shows that dysfunctional emotion regulation and depressive symptoms can be transactionally related and reinforcing in adolescence (Calvete et al., 2015). For instance, in a prospective study conducted with 1,000 adolescents, sadness rumination and depressive symptoms were found to be linked in a vicious cycle, whereby sadness rumination predicted increases in depressive symptoms, which in, turn, were associated with sadness rumination over time (Calvete et al., 2015).

Existing research has long underscored the need to clarify the temporal associations between anger rumination and depressive symptoms (du Pont et al., 2019). To date, this issue has not been addressed in any published article yet.

1.3.2 Anger Rumination as a Predictive Marker for Depressive Symptoms

The *vulnerability model* rooted in the Response Styles Theory proposed by Nolen-Hoeksema (1991) posits that frequent endorsement of rumination increases individuals' risk for later depressive symptoms. According to this model, anger rumination displays trait-like features that remain stable before, during, and after period of depressive symptoms (Caspi et al., 2005). Anger rumination as a potential precipitating factor for later youth depression symptomology has not been examined in any published article yet, but this might be expected. For instance, initial levels of anger rumination were found to be uniquely related with later increases in proneness to anger, a tendency known as irritability (Leigh et al., 2020). Youth irritability, usually manifested through raging outbursts and overreactions to stimuli, is an established precursor of later depression in young individuals (Dougherty et al., 2013). Indeed, evidence suggests that irritable youth are more likely to be peer victimized (Chen et al., 2022), which, may, in turn, increase their likelihood of experiencing depression (Sweeting et al., 2006). Alongside with irritability, cognitive bias is another mechanism that could explain the hypothesized relationship between anger rumination and later depression. Particularly, habitual anger rumination has been found to predict increases in individuals' hostile attribution bias, a processing style that entails interpretations of others' intentions as being negative and threatening (Wang et al., 2019). Youth with increased levels of hostile attribution bias are usually at risk for displaying maladjusted behavior,

which may pave the pathway to later depression. For instance, aggression is an established outcome of hostile attribution bias (Quan et al., 2019), and a strong predictive marker for depression over time (Blain-Arcaro & Vaillancourt, 2017).

1.3.3 Anger Rumination as an Outcome of Depressive Symptoms

The *scar model* posits that depressive symptoms precede and affect in a residual way multiple domains of human functioning, including cognitive ones (Lewinsohn et al., 1981). In line with this model anger rumination is perceived as an outcome rather than as a vulnerability factor for subsequent depressive symptoms. Depressive symptoms as a precipitating factor for later engagement in anger rumination have not been yet examined. However, there are several arguments to claim this statement. Particularly, there is ample of evidence suggesting that depressive symptoms are associated with increases in peer victimization over time (Kochel et al., 2012; Morabito et al., 2022; Tran et al., 2012). Being exposed to peer victimization is an aversive interpersonal experience that may create a discrepancy between one's own ideal self and one's own actual self respectively (Leeuwis et al., 2015). Ideal vs. actual self-discrepancies are emotional distressing, and may generate the anger rumination process in order to be resolved and distress is relieved (see Denson, 2013). In line with this notion, empirical findings have recently shown that frequent involvement in peer victimization increased engagement in anger rumination over time (Camacho et al., 2021; Li et al., 2021; Malamut & Salmivalli, 2021).

Impairments in executive functioning (EF) is another plausible mechanism in the hypothesized depressive symptoms-anger rumination link. EF refers to higher-level cognitive skills that enable goal-directed thoughts and behaviors (Nigg, 2017). Internalizing problems, including depression have been found to hinder the normal neuropsychological development of EF in youth (Brieant et al., 2020; Halse et al., 2022). Malfunctioning of EF may increase risk for anger rumination over time, by rendering individuals susceptible to stressful life experiences (Snyder & Hankin, 2016). For instance, poor inhibition control is a core EF deficit that can increase likelihood for peer rejection as it fosters adolescents' impulsivity, which peers may find annoying or unpleasant (Fanti & Kimonis, 2012). Peer rejection has been related to increases in interpersonal victimization over time (Godleski et al., 2015; Sentse et al., 2017). Closely associated to peer victimization, victims-justice sensitivity is an

established outcome of depression that could underlie the hypothesized depressive symptoms-anger rumination link. In a longitudinal study with 1,665 youth, depressive symptoms were associated with increases in victims-justice sensitivity (Bondü et al., 2017). Beliefs of being unjustly treated may reinforce dysfunctional affective and cognitive responses, including anger and rumination (Schmitt et al., 2010).

Another pathway through which depressive symptoms may lead to longitudinal increases in anger rumination across youth is social prescribed perfectionism (SPP), which refers to individuals' perceptions that others hold excessively high standards of them and the need to satisfy these standards (Damian et al., 2013). In a prospective study performed with 653 children, higher levels of depression symptomology were found to positively predict SPP over time (Asseraf & Vaillancourt, 2015). SPP appears to be closely associated with individuals' tendency to experience anger and engage in anger rumination (Besharat & Shahidi, 2010; Esfahani & Besharat, 2010).

1.3.4 The Role of Gender

Empirical findings suggest concurrent associations between anger symptoms and depression to be stronger for girls than for boys (Asgeirsdottir & Sigfusdottir, 2015). Possible gender differences in the hypothesized anger rumination – depressive symptoms link have not been yet examined. Evidence, however, suggests that this might occur. Particularly, girls usually engage in greater co-rumination (i.e., excessively talking with another person about distress symptoms) as compared to boys (Rose, 2002) which has been shown to increase later depression by fostering individual rumination (Stone & Gibb, 2015). Similarly, depressive symptoms may increase risk for co-rumination over time (Stone et al., 2011), and, thus, render girls susceptible to later individual anger rumination. Conversely, the greater tendency of boys toward distractive responses may attenuate the relations between anger rumination and depressive symptoms over time (Abela et al., 2004).

1.4 Peer Victimization

Peer victimization is a specific type of peer abuse in which an individual is repeatedly exposed to intentional hostile or unpleasant acts on the part of a person or a group (e.g., Hunter et al., 2007). Peer victimization emerges in various forms including direct verbal (e.g., verbal demotion) and/or physical mistreatment behaviors (e.g., pushing, kicking). It also entails covert or indirect acts of aggression (e.g., rumor spreading, slandering), wherein harm is caused by damaging victim's social status and/or relationships (De Los Reyes & Pristein, 2004). Despite variability in peer victimization forms, there is a bulk of evidence showing that adolescents who experience one form of victimization have increased odds of experiencing other forms of victimization simultaneously (see Cooley & Fite, 2016).

Peer victimization represents a pervasive problem among school aged children, usually equally reported by both girls and boys (Haraldstad et al., 2019). According to the latest OECD (2019) 22.7% of students perceive to be involved in peer bullying as victims at least a few times a month (as cited in Olivier et al., 2022). Empirical studies indicate an increase in stability of peer victimization as children grow older (e.g., Pouwels et al., 2016). Most importantly, being exposed to peer victimization is a stressful experience that compromises overall adjustment and subjective well-being (Hager & Leadbeater, 2016; Holt et al., 2018; van Geel et al., 2022). Identifying peer victimization-related processes is, therefore, important for effective preventions and treatments.

Depressive symptoms (Hawker & Boulton, 2000; Zwierzynska et al., 2013) and rumination tendencies (e.g., Monti et al., 2017) have long attracted scientific interest in understanding peer victimization across adolescence.

1.4.1 The Longitudinal Relationship between Depressive Symptoms, Peer Victimization, and Anger Rumination

The bulk of studies exploring relations between depressive symptoms, rumination tendencies, and interpersonal victimization have mainly focused on assessing rumination in the context of sad mood (Feinstein et al., 2014; Mathieson et al., 2014; Monti et al., 2017). While anger coping deficits are commonly found in both depressed-prone individuals and victims of peer bullying (Hanish et al., 2004; Zeman et al., 2002), potential relationships between depressive symptoms, anger rumination tendencies and peer victimization are understudied (Peets et al., 2022). In existing theoretical assumptions peer

victimization exerts a positive influence on later depressive symptoms by rendering youth vulnerable to anger-related rumination (Peets et al., 2022). Previous research, however, suggests that a different pattern of relations between these three constructs might exist. Particularly, empirically supported theoretical models have shown that depressive symptoms may increase youth risk for later peer victimization experiences (Kochel & Rafferty, 2020; Kochel et al., 2017; Morabito et al., 2022; Sentse et al., 2017; Spyropoulou & Giovazolias, 2022a; Tran et al., 2012). Accordingly, frequent exposure to peer victimization is an established precursor for later engagement in anger rumination (Li et al., 2021; Malamut & Salmivalli, 2021). Hence, there might be indirect pathways from early adolescent depressive symptoms to subsequent anger rumination through peer victimization. To date, peer victimization as a potential mediator between depressive symptoms and anger rumination has not been examined.

1.4.2 Depressive Symptoms as a Predictive Marker for Peer Victimization

The *interpersonal scar or symptoms-driven model* is rooted in scar theories of depression which state that depression may leave enduring effects, namely "scars' in several domains of human personality (see Wichers et al., 2010). In line with this model, empirical findings have shown that depression-related characteristics and behaviors may increase individuals' likelihood for aversive interpersonal experiences, including peer victimization (Kochel & Rafferty, 2020; Kochel et al., 2017; Morabito et al., 2022; Sentse et al., 2017; Spyropoulou & Giovazolias, 2022a; Tran et al., 2012). For instance, in a longitudinal study performed with 5,645 adolescents, baseline depressive symptoms were found to predict later involvement in victimization (Sentse et al., 2017). The predictive effects of depressive symptoms on peer victimization were also supported in a two wave-study, performed with 302 early adolescents (Spyropoulou & Giovazolias, 2022a). One mechanism that can explain why depressive symptoms may place young individuals at risk for experiencing peer victimization over time is executive functioning (EF). Particularly, depressive symptoms were reported to interfere with the normal neuropsychological development of EF in youth (Brieant et al., 2020; Halse et al., 2022). Poor inhibition control is a core EF deficit that may increase likelihood for peer victimization (Edalati et al., 2018). Literature shows that youth with difficulties in inhibiting impulsive responses are more likely to

be reactively aggressive, and, thus, socially rejected and peer victimized (Evans et al., 2015; Godleski et al., 2015).

Depressive symptoms may also increase risk for later peer victimization through cognitive distortions. There evidence suggesting that depressed young individuals may hold an entity theory of personality-the belief that socially relevant personality traits are fixed rather than malleable qualities (Seo et al., 2022). Believing that "people can't change" has shown to intensify biased perceptions of others' intentions as being hostile and threatening (Yeager et al., 2013). Youth with elevated hostile attribution bias are more likely to behave in a maladjusted way, which may provoke peer victimization experiences. For instance, reactive aggression is an established precursor of peer victimization (Frey & Strong, 2018) that appears to be fostered by hostile attribution bias (Gagnon & Rochat, 2017).

1.4.3 Peer Victimization as a Predictive Marker for Anger Rumination

Anger rumination has been established as an outcome of prior exposure to peer victimization experiences (Li et al., 2021; Malamut & Salmivalli, 2021). Particularly, high levels of peer victimization were reported to exert a positive influence on later anger rumination tendencies among 553 3rd to 4th graders (Malamut & Salmivalli, 2021). Similarly, perceived victimization by peers were associated with subsequent increases in anger rumination, in a sample of 2,152 junior middle school students (Li et al., 2021). According to the Control theory of rumination (Martin & Tesser, 1989) anger rumination may be activated to resolve perceived self-discrepancies and relieve related distress. For instance, evidence suggests that peer victimization may create a discrepancy between one's own high implicit self-esteem (ideal self; i.e., high goals of involvement with peers) and one's own explicit self-esteem (actual self; i.e., perceived or actual peer victimization) (Leeuwis et al., 2015). Accordingly, depressive symptoms have been found to predict loneliness (Matthews et al., 2022) which represents a discrepancy between one's ideal and one's perceived quality of social connectedness (see Luttenbacher et al., 2021). Perceived self-discrepancies in adolescence are particularly distressing as young individuals still lack the cognitive ability to incorporate incompatible self-attributes into a coherent self-theory (Harter, 2006 as cited in Ferguson et al., 2010). Particularly, ideal vs. actual self-discrepancies are reported to evoke feelings of anger and frustration (Makros & McCabe, 2001), which,

may, in turn, initiate the anger rumination process as a way of individuals to resolve the ideal/actual conflict and alleviate the discrepancy-related distress (see Denson, 2013).

1.4.4 The Role of Gender

Empirical findings regarding sex-based differences in the longitudinal relationship from depressive symptoms to peer victimization have been mixed. Particularly, in a sample of 8th to 9th graders, depressive symptoms were found to increase peer victimization for both boys and girls (Sentse et al., 2017). Similarly, the magnitude of the cross-lagged path from depressive symptoms to victimization did seem to differ across gender in 682 adolescents (Yu et al., 2018). Inversely, depressive symptoms predicted later peer victimization only among adolescent boys in a study performed with 3,459 youth (Lester et al., 2012). Accordingly, peer victimization experiences were reported to be related with subsequent anger rumination tendencies similarly for boys and girls (Camacho et al., 2021; Li et al., 2021). However, in a two-wave study conducted with 367 early adolescents, boys with greater levels of peer victimization were more likely than girls to endorse anger rumination over time (Spyropoulou & Giovazolias, 2022b).

1.5 Research Aims

The aim of the present research was threefold: to investigate the factorial structure and psychometric properties of the Greek version of the CARS instrument (Study 1), to test the longitudinal bidirectional relationship between anger rumination and depressive symptoms in Greek early adolescents, and to examine whether this relation differs by gender (Study 2), and to extend Study 2, by assessing whether depressive symptoms prospectively predict increases in anger rumination through peer victimization experiences, and to examine whether this relation differs by gender (Study 3). The studies that were conducted are presented in the next section following a brief description.

1.6. Studies Brief Description

Study 1

Spyropoulou, E., & Giovazolias, T. (2021). Investigating the Multidimensionality and Psychometric Properties of the Children's Anger Rumination Scale (CARS): A Bifactor Exploratory Structural Equation Modeling Framework. *Assessment*, *30*(3), 533-550. https://doi.org/10.1177/10731911211043569 (see Appendix A)

Introduction

Anger Rumination represents a maladaptive cognitive-emotional process that contributes negatively to psychosocial functioning. The Children's Anger Rumination Scale (CARS; see Appendix C) is a valid and reliable self-report instrument that targets children's tendency to engage in rumination towards anger. The CARS was adapted from the Anger Rumination Scale (ARS) to be developmentally appropriate and psychometrically sound in children and early adolescents. All but one studies conducted in different cross-cultural settings have confirmed the proposed four-factor structure of the ARS (Angry Afterthoughts, Angry Memories, Thoughts of Revenge, and Understanding of Causes). Surprisingly, in case of CARS's dimensionality, literature findings are scarce and mixed. The aim of the present study was to investigate the factorial structure and psychometric properties (e.g., measurement invariance) of the Greek version of the CARS.

Methods

Statistical analyses were performed with IBM Statistical Package for the Social Science (SPSS) version 25.0 and the Mplus version 8.1. Factorial structure was tested by contrasting alternative representations of the instrument: (one-factor and four-factor independent cluster models – confirmatory factor analysis [ICM – CFA], exploratory structural equation modelling [ESEM], bifactor-CFA and bifactor-ESEM) in 552 Greek children/early adolescents (M_{age} = 11.50 years; 53.6% girls), enrolled in 5 primary and 4 secondary public schools, all located in Heraklion of Crete (Greece). Measurement

invariance of the best fitted model across gender (boys vs. girls) and age group (children vs. preadolescents) was examined using multi-group analysis to ensure equivalence of meaning across these groups. Convergent and discriminant validity of the instrument in question were assessed by testing its relationship with the Big Five personality traits, namely Neuroticism, Energy/Extraversion, Intellect/Openess, Consciousness, and Agreeableness. Self-reported involvement in Bullying/Perpetration and experiences of Depressive Symptoms were also used to establish CARS's predictive validity. All types of validity were examined in a convenience subsample of 300 participants (M_{age} = 10.63 years; 51% girls). Oral consent was obtained from all participating students and written consent was received from their parents via enveloped letter.

Results

The hypothesized bifactor-ESEM solution, comprised by a general anger rumination factor and four specific factors (Angry Afterthoughts, Thoughts of Revenge, Angry Memories, and Understanding of Causes) fitted best to the data, and revealed the unitary dimensionality of the CARS. Measurement invariance across gender and age showed no significant differences in relation to anger rumination tendency in level of the latent means. Desirable patterns of convergent and discriminant validity were also found. Predictive validity of the CARS was also supported as participants' anger rumination propensity was found to explain both bullying behaviors and depressive symptoms.

Conclusions

The CARS is a developmentally appropriate and psychometrically sound questionnaire that conceptualizes anger rumination as a unidimensional construct among Greek children and early adolescents.

Study 2

Spyropoulou, E., & Giovazolias, T. (2022). Anger Rumination in Early Adolescence: Risk Factor or Outcome of Depressive Symptoms? A Prospective Study. *Journal of Youth and Adolescence, 51*, 1708-1719. https://doi.org/10.1007/s10964-022-01624-2 (see Appendix A)

Introduction

Anger rumination is a dysfunctional cognitive-emotional regulation strategy that bears negative adjustment outcomes. While there is evidence suggesting a close association between anger rumination and depressive symptoms in youth, the prospective relationship between these two constructs has not yet been clarified. Identifying how anger rumination and depressive symptoms may relate over time, and whether this relation varies by gender, is important at both prevention and treatment level. The present study examined the longitudinal relation between anger rumination and depressive symptoms, and explored whether this association differs by gender.

Methods

Statistical analyses were performed with IBM Statistical Package for the Social Science (SPSS) version 25.0 and the Mplus version 8.1. Participants (N = 304; M_{age} = 10.80 years; 44.7% boys), were recruited from 13 primary public schools, all located in Heraklion of Crete in Greece. Self-reported data were obtained at two-waves, spaced 1 year. Latent cross-lagged analyses were used to examine the bidirectional relationship between depressive symptoms and anger rumination. Multi-group analysis was performed to test gender-based moderation effects in the hypothesized relations. Oral consent was obtained from all participating students and written consent was received from their parents via enveloped letter.

Results

The hypothesized models fitted the data adequately. Cross-lagged analyses indicated that depressive symptoms increased engagement in anger rumination, 1 year later. Inversely, anger rumination was not

found to predict any changes in depressive symptoms, 1 year later. Based on multi-group analysis these patterns of relationships did not seem to vary by gender.

Conclusions

Depressive symptoms may be a potential risk factor for later engagement in anger rumination across early adolescence. Preventions and treatment efforts should primarily focus on early adolescents' depressive symptoms. However, timely targeting anger rumination tendencies is considered also important.

Study 3

Spyropoulou, E., & Giovazolias, T. (xx). Brief Report: Preliminary Evidence that Depressive Symptoms Foster Anger Rumination through Peer Victimization across Early Adolescence (in preparation for submission).

Introduction

Anger rumination is an unconstructive emotion-regulation strategy that appears to be predicted by depressive symptoms across early adolescence. However, underlying mechanisms that may account for this relationship have not yet been clarified. Identifying such mechanisms would inform prevention and treatment efforts. The goal of the present study was to examine peer victimization as a potential mediator in the prospective relationship from depressive symptoms to anger rumination. Gender-based differences in the hypothesized mediation model were also examined.

Methods

Statistical analyses were performed with IBM Statistical Package for the Social Science (SPSS) version 25.0 and the Mplus version 8.1. Participants (N =294; M_{age} = 10.53; 55.4% girls) were recruited from 13 public primary schools, all located in Heraklion of Crete (Greece). Self-reported data were obtained at two-waves, with 1 year time interval. A latent "half-longitudinal mediation" model with

structural equation modeling was used to test whether peer victimization mediates the prospective relationship from depressive symptoms to anger rumination. Multi-group analysis was performed to test gender-based moderation effects in the hypothesized mediation model. Oral consent was obtained from all participating students and written consent was received from their parents via enveloped letter.

Results

The hypothesized model fitted the data well. Peer victimization was found to mediate the prospective relationship from depressive symptoms to anger rumination. Gender-based moderation effects were not supported. However, boys with higher depressive symptoms were found to be more at risk than girls for being engaged in anger rumination one year later through peer victimization.

Conclusions

Depressive symptoms may be a potential risk factor for later anger rumination through peer victimization experiences. Intervening on peer victimization can be one approach to reduce anger rumination risk in youth depression. Nevertheless, before developing such interventions, further research is needed to clarify the longitudinal relationship between depressive symptoms, peer victimization, and anger rumination as well as to shed light on the greater tendency that boys with higher depressive symptoms may have towards anger rumination through peer victimization.

*All studies procedures were approved by the Institute of Educational Policy and the Greek Ministry of Education (No: Φ15/30515/40339/Δ1; see Appendix B)

2. Study 1

Investigating the Multidimensionality and Psychometric Properties of the Children's Anger Rumination Scale (CARS): A Bifactor Exploratory Structural Equation Modeling Framework

Abstract

Anger Rumination (AR) represents a maladaptive cognitive process that contributes negatively to psychosocial functioning. The purpose of the present study was to investigate the psychometric properties (e.g. factorial structure, measurement invariance, reliability) of the Children's Anger Rumination Scale (CARS). Factorial structure was tested by contrasting alternative model representations of the instrument (one-and four-factor ICM-CFA, ESEM, bifactor-CFA and bifactor-ESEM) in a convenience sample of 552 Greek students (M_{age}=11.50; 53.6% girls). The hypothesized bifactor-ESEM solution, composed by a general anger rumination factor and four specific factors (Angry Afterthoughts, Thoughts of Revenge, Angry Memories, and Understanding of Causes) provided the best fit to the data and revealed the unitary dimensionality of the CARS. Measurement invariance across gender and age in level of the latent means indicated no significant differences in relation to AR tendency. The CARS showed internal consistency, one-month test-retest reliability as well as desirable patterns of convergent and discriminant validity. The predictive power of the instrument was also supported as participants' AR propensity was found to explain both depressive symptoms and bullying behaviors. Overall our findings indicate that the CARS is a developmentally appropriate and psychometrically sound instrument that conceptualizes AR as an unidimensional construct among children and preadolescents.

Keywords

anger rumination, psychometric properties, CFA, bifactor ESEM models, bullying

2.1 Introduction

Rumination is a multifaceted, multidimensional construct that has been studied in relation to a variety of psychological and health outcomes (J.M. Smith & Alloy, 2009). According to the Response Styles Theory (Nolen-Hoeksema et al., 2008) rumination represents a maladaptive form of self-reflection that involves repetitively and passively dwelling on the causes and the consequences of distress symptoms. Literature suggests that this inward-focus, perseverative and harmful cognitive strategy not only fuels negative emotions (J. M. Smith & Alloy, 2009) but also amplifies a pessimistic and fatalistic way of thinking, thwarting individuals from goal attainment (Papageorgiou & Wells, 2004) and interpersonal problem solving (Watkins & Baracaia, 2002). High ruminators usually demonstrate an ineffectiveness to behave instrumentally as they tend to remain cognitively and emotionally fixated on a problem without taking actions to solve it actively (Nolen-Hoeksema et al., 2008). Rumination has been extensively identified as a transdiagnostic risk factor for several forms of psychopathology, including depression, anxiety, substance abuse and eating disorders (Hankin et al., 2016; Lyubomirsky et al., 2015). However, the majority of studies in the relevant literature have conceptualized and measured rumination as a response tendency to sad mood and affect (Hilt & Pollak, 2013). Consequently less is known about the role of other forms of rumination, such as anger rumination.

Anger rumination is regarded an unintentional and recurrent cognitive process that focuses one's attention on the causes and consequences of frustrating previous experiences (Sukhodolsky et al., 2001). It represents a dysfunctional emotional regulation strategy that unfolds after an anger-inducing experience (Sukhodolsky et al., 2001). It differs from hostile attribution bias, in which ambiguous or benign behaviors are interpreted as having hostile intent (Nasby et al., 1980). Individuals engaging habitually in anger rumination, seem to be trapped into a vicious cycle of emotional cascades including perseverative thinking, sustained affective arousal and prolonged anger (Denson et al., 2012; Offredi et al., 2016; Selby et al., 2008). Further, their reduced capacity to bridle the distressing thoughts has been found to contribute negatively to their overall functioning and subjective well-being (Selby et al., 2008; Takebe et al., 2016).

Evidence of a link between anger rumination and maladjustment outcomes is based primarily on studies conducted with adults (Besharat et al., 2013; Denson et al., 2011; Hennesy 2017; Martino et al.,

2015; Suhr & Nesbit, 2013). However, maladaptive strategies in coping with angry affect are also common among youth (Rohlf & Krahé, 2015). The few recent studies that expanded anger rumination research to children and adolescents have confirmed the integral role of the aforementioned cognitive response style in psychological dysfunctions including aggression and depression (Gilbert et al., 2005; Harmon et al., 2019; S. D. Smith et al., 2016; Patel et al., 2017; Peled & Moretti, 2007; Vasquez et al., 2012).

Bullying represents a multifaceted and intentional form of aggression that is characterized by the repeated exposure of one person to the physical and/or emotional mistreatment of a more powerful individual or group (see Hong et al., 2019). Zsila et al. (2018) in a study conducted with 1,500 adolescents and young adults found that anger rumination was a risk factor for perpetration among male past cyberbullying victims. Additionally, Caprara et al. (2007) in a longitudinal twenty-year study with school-aged children confirmed the predictive power of hostile rumination to aggression and violence. Similarly, Vasquez et al. (2012) found that anger rumination predicted significantly behaviors of displaced aggression (e.g. aggression towards innocent targets) which are prevalent in bullying (Archer et al., 2007) even after controlling for trait anger, trait hostility and trait irritability. Finally, S. D. Smith et al. (2016) confirmed the link between children's rumination towards anger and elevated levels of overt and relational aggression.

Alongside with aggression, depression represents one of the greatest and often devastating mental health problems that increases rapidly during the transition from childhood to adolescence (Hankin, 2015; McLaughlin & King, 2015). Adolescent depression portend a range of aversive consequences across the life-course, including poor psychosocial functioning, suicidality, physical and mental health problems (Maughan et al., 2013). The depressogenic qualities of rumination are well supported by cognitive models of depression (Beck et al., 1979; Nolen-Hoeksema et al., 1993). More specifically, deficiencies in coping effectively with anger have been found to result detrimentally in the onset and persistence of depression (Katsumata, 2015; Sahu et al., 2014; Young et al., 2019). Harmon et al. (2019) in a cross-sectional study conducted with 254 children found that rumination towards anger uniquely predicted depressive symptoms over and above sadness rumination. Similarly, the role of anger-focused rumination in depression, feelings of shame and entrapment thoughts was supported in a sample of 166 undergraduate students (Gilbert et al., 2005). Additionally, Patel et al. (2017) in a mixed

sample of 24 ASD (autistic spectrum disorder) and no ASD adolescents, found that anger rumination was associated with depressive symptoms even after controlling for autism symptom severity.

Findings suggest that rumination is formed in childhood (Schweizer et al., 2018) by the dynamic interaction of the family context (e.g. over-controlling parenting; Hilt et al., 2012) and personality traits (e.g. neuroticism; Broeren et al., 2011). Particularly, neuroticism defined as the temperamental disposition to experience negative emotions (e.g. sadness or anger) accompanied by heightened reactivity to stressors (Costa & McCrae, 1985; Widiger & Oltmanns, 2017) has been found to correlate positively with rumination towards anger (Mezulis et al., 2011; Sauer-Zavala et al., 2013). Mezulis et al. (2011) in a longitudinal study conducted with 301 youths found that mothers' reports of their child's negative emotionality at age 1 predicted their child's self-reported rumination at age 13. Furthermore, undergraduate students' retrospective childhood memories in regard to their tendency towards negative affect was associated with higher current levels of rumination towards anger (Sauer-Zavala et al., 2013).

It has been suggested that the rapid social, academic and biological changes (Blakemore & Milk, 2014) as well the emotional turmoil (Bailen et al., 2018) demonstrated in adolescence result in the dramatic increase and greater stability of rumination (Hampel & Peterman, 2005; Hankin, 2008). Furthermore, these factors seem to mark the onset of age differences in this cognitive strategy, as girls are more likely to ruminate than boys (Jose & Brown, 2008; Rood et al., 2009). Given that rumination is a risk factor for the onset and maintenance of a range of mental and behavioral disorders in youths (e.g. McLaughlin et al., 2014; Sütterlin et al., 2012) the early identification of ruminative processes is of utmost importance in order to prevent the stabilization of this maladaptive response style in later life stages (Baiocco et al., 2017). Thus, both childhood and early adolescence represent a crucial developmental period to study rumination as a mechanism of change for treatment and preventing interventions of later mental health issues (Harmon et al., 2019).

The effective identification of ruminative response styles early in life requires developmentally appropriate and valid measures. Given the profound interest of the research community in children's rumination towards sad mood (e.g. Bonifacci et al., 2020) there is a dearth of proposed age-appropriate assessment inventories (see Lo et al., 2017). However, rumination towards anger has only recently attracted the scientific interest as another worth of study cognitive vulnerability in youths. To our

knowledge, the Children's Anger Rumination Scale (CARS) is the only validated measure found in the literature for assessing children's ruminative response style towards anger (S. D. Smith et al., 2016).

The CARS (S.D. Smith et al., 2016) is a valid and reliable self-report questionnaire that targets children's tendency to engage in anger ruminative thoughts. It was adapted from the Anger Rumination Scale (ARS; Sukhodolsky et al., 2001) to be developmentally appropriate and psychometrically sound in children and early adolescents (S. D. Smith et al., 2016). The CARS consists of 9 items from the ARS that were remained exactly the same and 10 items that were linguistically modified in order to be comprehensible by younger respondents. In ARS, anger rumination represents a multidimensional construct conceptualized by the following dimensions: 1) Anger Afterthoughts (cognitive rehearsal of recent anger experiences), 2) Thoughts of Revenge (thoughts and ideas of retaliation), 3) Angry Memories (thoughts about past anger episodes), and 4) Understanding of Causes (thoughts about the causes of an anger experience). These dimensions are not considered conceptually independent. On the contrary they are construct relevant, representing a sequence of interactive, yet distinct stages in the anger rumination process. Thus, anger provoking memories (Angry Memories) may trigger individuals' reoccurring thoughts of anger episodes (Angry Afterthoughts) which in turn can amplify the intensity and duration of negative affect and lead to counterfactual thoughts associated with action tendencies towards resolution (Understanding of Causes) or retaliation (Thoughts of Revenge; Sukhodolsky et al., 2001). Counterfactual thinking (CFT) has been found to be a cross-cultural affective regulatory strategy (Gilovich et al., 2003) that emerges in early developmental stages (Nakamichi, 2019). More specifically, CFT refers to mental representations of hypothesized alternatives "what might have been" to occurred events, actions, or states (Epstude & Roese, 2008). In ARS/CARS, the "Understanding of Causes" dimension; interpreting in a meaningful way an angry episode; is supported to be a self-referent adaptive type of CFT that alleviates negative affectivity (Parikh et al., 2020) and facilitates behavioral change (Epstude & Roese, 2008). Conversely, the "Thoughts of Revenge" dimension represents an other-referent type of CFT because fantasies of retaliation imply blame that is deflected on others (Broomhall & Phillips, 2018). Vengeful thinking perpetuates feelings of hate and anger (Barber et al., 2005) and hinders subjective well-being (e.g. Gul & Rana, 2013) by acting as a barrier to forgiveness of others (Barber et al., 2005).

The dimensionality of the ARS has been examined in different cross-cultural settings: Iran (Besharat, 2011), Hong Kong, and Great Britain (Maxwell 2004; Maxwell et al., 2005), Australia and

Spain (Ramos-Cejudo et al., 2017), Colombia (Toro et al., 2020), France (Reynes et al., 2013), Turkey (Satici, 2014), Mexico (Ortega-Andrade et al., 2017), Spain (Uceda et al., 2016). All but one studies (Maxwell, 2004) have confirmed the hypothesized four-factor structure of the inventory proposed by Sukhodolsky et al. (2001). Unexpectedly in case of CARS, literature findings are scarce and provide mixed results regarding the instrument's dimensionality. More precisely, S. D. Smith et al. (2016) in two different studies conducted with children and juvenile male offenders, respectively, provided support for the four-factor structure of the CARS. Conversely, Repper (2006) investigating the construct of anger rumination in childhood and its relationship with aggression, pertained the one factor solution of the CARS.

The studies on dimensionality of ARS/CARS mainly employed CFA (e.g. Ramos-Cejudo et al., 2017) and, to a minimum extent, exploratory factor analysis (EFA; e.g. Maxwell, 2004). In the traditional independent clusters modeling confirmatory factor analysis (ICM-CFA) models the construct-relevant multidimensionality of instruments such as ARS/CARS (e.g., S. D. Smith et al., 2016; Sukhodolsky et al., 2001) is not taken into account both conceptually and statistically. Construct-relevant multidimensionality pertains to the fact that items of a measurement usually tap into more than one construct or source of true score variance (Morin et al., 2016). Thus, cross-loadings between items and construct-relevant nontarget factors are considered theoretically justifiable (Asparouhov & Muthén, 2009). Consequently, the expected existence of cross-loadings challenges the overrestrictive ICM-CFA approach (cross-loadings are fixed to zero) leading often to unsatisfactory model fit, and biased parameter estimates (e.g. substantially increased factor correlations) that could undermine the discriminant validity of the measurement scale (Marsh et al., 2014; Morin et al., 2017). Indeed, the inflated factor correlations that were detected in studies using the ICM-CFA approach, both in adult (e.g. Uceda et al., 2016) and children versions of the anger rumination scale (S. D. Smith et al., 2016) raise concerns related to issues of discriminant validity, and multicollinearity in the context of regression-based models (T. A. Schmitt et al., 2018). Conversely, the unrestricted estimation of cross-loadings in EFA measurement models is considered a more flexible investigation of complex indicator-factor structures (e.g. Asparouhov & Muthén, 2009) that does not result in such biased parameter estimates (Asparouhov et al., 2015). However, optimized linear combinations of variables created in EFA models could result in overfitting data (see Osborne et al., 2008) as well to an oversensitive model solution to random sample variations (Morin et al., 2016). On the other hand, the recently integration of

EFA with CFA into exploratory structural equation modelling (ESEM) allows researchers to incorporate the benefits from each technique into a single analytic framework (Asparouhov & Muthén, 2009). Nevertheless, the absence of hierarchically superior global factors in ESEM approach can possibly result in inflated estimates of cross-loadings (Morin et al., 2016). Literature suggests that theory-based multidimensional scales, such as CARS, often correspond to a bifactor measurement model with a general latent construct known as Global Factor - G Factor (e.g. anger rumination) alongside several conceptually related latent subdimensions knows as specificities - S-Factors (e.g. Angry Afterthoughts, Thoughts of Revenge) all used to explain the covariances among items (Myers et al., 2014). More specifically, the bifactor model tests whether the G-Factor exists as a unitary dimension underlying all items and coexists with S-Factors explaining the residual variance not accounted for by the G-Factor (Reise et al., 2010). However, the exclusion of cross-loadings between items and construct-relevant non-target factors in a CFA bifactor model can result in inflated estimates of the items' loadings on the G-Factor, and thus, in a mispecification regarding the true variance attributed to the G-Factor (Murray & Johnson, 2013). Finally, the recent incorporation of bifactor models with ESEM provides researchers with an opportunity to investigate two sources of "construct-relevant psychometric multidimensionality related to: a) the hierarchical nature of the constructs being assessed and b) the fallible nature of indicators which tend to include at least some degree of association with non-target constructs" (Morin et al., 2016, p. 134).

The present study

Anger-related problems (e.g. depression, bullying) are very common both in Greek youths (Giovazolias et al., 2017; Lazaratou et al., 2017; Papadaki & Giovazolias, 2015; Zacharopoulou et al.,, 2014) and in international samples (Hong et al., 2019; O' Neal et al., 2017; Özyurt, G. et al., 2021). Thus, early and valid identification of possible cognitive risk factors is more than imperative for a successful treatment.

The purpose of the present study was to explore Anger Rumination in Greek children/preadolescents through the validation of the CARS instrument. More specifically, the specific objectives were as follows:

1) to thoroughly examine the factorial structure of the Greek version of the CARS in Greek children/preadolescents by contrasting alternative representations of the instrument: (a) one factor ICM-CFA, four factor ICM-CFA and ESEM models; and (c) bifactor-CFA (B-CFA) and bifactor ESEM (B-ESEM) models (Morin et al., 2016). Based on the original theoretical framework suggesting an interactive and temporally orientated relationship between the four cognitive mechanisms involved in the anger rumination process (Sukhodolsky et al., 2001), it was expected that the B-ESEM model would provide the most adequate representation of CARS item responses. Nevertheless, model selection was not based solely on model fit indices but included a careful examination of parameter estimates (e.g., factor loadings, cross-loadings, and interfactor correlations) and the underlying theory as well (Morin et al., 2016). Furthermore, given the high tendency of bifactor models to overfit even random data (Bonifay et al., 2016), several psychometrically informative bifactor-derived statistics were also considered (Rodriguez et al., 2016).

2) to examine the measurement invariance of the CARS in order to evaluate if the measured construct has the same meaning across gender and age subgroups samples, regardless of group membership. Based on previous research findings, no gender (e.g. Rood et al., 2009) and age differences (e.g. Hankin, 2008) were expected.

3) to determine the psychometric properties (test-retest reliability, convergent, discriminant and predictive validity) of the CARS. Convergent and discriminant validity of the inventory in question were tested by assessing its relationship with the Big Five personality traits, namely Neuroticism (Emotional Instability), Energy/Extraversion, Intellect/Openess, Consciousness and Agreeableness. Particularly it was expected a positive correlation with Emotional Instability (Sukhodolsky et al., 2001) and a divergent minimal correlation with the other aforementioned personality traits (Oral & Arslan, 2017). The predictive validity of the CARS was assessed by examining the established predictive power of Anger Rumination to Bullying (Zsila et al., 2018) and Depression (Harmon et al., 2019).

2.2 Method

Participants

A sample of 552 native Greek students (80% participation rate), 10 to 13 years old (M_{age} = 11.50 years, *SD* = 1.11; 53.6% girls) participated in the present study. The sample was subdivided into

children (n = 293, age range = 10-11) and preadolescents (n = 259, age range = 12-13). The convenience sample was collected from 5 primary and 4 secondary public schools, all located in Heraklion of Crete (Greece). Specifically, 24.5% of the students were 5th graders, 25.4% were 6th graders, 25.6% were 7th graders and 24.5% were 8th graders. No differences were detected among schools (χ^2 = 5.14, degrees of freedom [df] = 8, p = .74) and school grades (χ^2 = 2.45, df = 3, p = .48) in terms of gender distribution. With regard to socioeconomic status, as defined by the parents' educational status (Aarø et al., 2009) approximately 4.8% of mothers and 2.8% of fathers had completed primary studies, 40.7% of mothers and 8.5% of fathers had completed secondary studies, 25% of mothers and 18.5% of fathers had attended or completed college whereas 29% of mothers and 16.9% of fathers had completed higher education.

Procedures

Permission by teachers and school principals as well as written parental consent and verbal child agreement were obtained prior to research. Data were collected in a group format, in which children were asked to complete a battery of self-report measures that assessed their thoughts and feelings. Participants were given detailed information regarding the anonymous, confidential, and voluntary nature of their participation and any doubts that arose were clearly explained. All participants (N =552) completed CARS, whereas a convenience subsample of 300 participants (M_{age} = 10.63, SD = 0.63; 51% girls) completed Children's Depression Inventory (CDI), Peer Experiences Questionnaire-Standard Version (PEQ-STDV), and Greek Big Five Questionnaire for Children-Short Form (GBFQ-C-SF), as described below. The two samples (initial vs. subsample) did not differ on gender (χ^2 = 1.82, df = 1, p = .18) and paternal educational status (χ^2 = 5.70, df = 3, p = .13), although mothers of subsample participants had achieved higher education (χ^2 = 11.41, df = 3, p <.05). After 1 month, which is the optimal recommended time for the analysis of test-retest reliability (Cea D' Ancona, 1996 as cited in Gómez-Ortiz et al., 2016), the CARS was re-administered to 19.7% (n = 59) of the subsample. All procedures were approved by the Institute of Educational Policy and the Greek Ministry of Education.

The CARS original items and instructions were translated to Greek by two independent experts, following Brislin (1970) recommendations. The translators met to elaborate and agree on a consensus version of the adapted scale (i.e. linguistically, conceptually and clarity). When in disagreement, an external specialist participated in the discussion to obtain consensus. This form was then back-

translated into English by another two independent translators who agreed on a common back-translated version. The final translated Greek scale was administered to the sample of this study.

Measures

Children's Anger Rumination Scale (S.D. Smith et al., 2016). The CARS is a 19-item self-report questionnaire of children's tendency to ruminate towards anger. As it has already been mentioned the instrument assesses four components of anger rumination: (a) Angry Afterthoughts (six items; e.g., "Memories of being angry pop up into my head before I fall asleep"); (b) Thoughts of Revenge (four items; e.g., "I have day dreams and fantasies that are violent"); (c) Angry Memories (five items; e.g., "I think a lot about other times when I was angry"); and (d) Understanding of Causes (four items; e.g., "I think about the reasons people treat me badly"; S. D. Smith et al., 2016). Participants are asked to rate the frequency of their ruminative response on a 4-point Likert-scale (1 = *almost never* to 4 = *almost always*). Consistent with previous findings CARS yielded satisfactory test-retest reliability of .74 (standard error [*SE*] = .06, $p < .001$).

Children's Depression Inventory (Giannakopoulos, et al., 2009; Kovacs, 1992). The CDI is a brief 27-item self-report questionnaire that assesses cognitive, affective and behavioral signs of depression in children and adolescents 7-17 years of age. Participants are asked to endorse on a 3-point Likert-scale (0 = *absence of symptoms* to 2 = *definite symptoms*) the statement that best describes their behavior or emotions with regard to a specific symptom of depression (e.g. "I' feel like crying every day"). The 26th suicidal ideation item ("I want to kill myself") was omitted at the request of the Institute of Educational Policy and the Greek Ministry of Education. The original five-factor structure (Negative Mood, Anhedonia, Ineffectiveness, Negative Self-esteem, and Interpersonal Difficulties) of the CDI (Kovacs, 1992) was not replicated in the subsample of 300 students. More specifically, even though the five-factor model yielded a reasonable fit to the data, WLSMV$\chi^2_{(289)} = 449.31$, $p < .001$; comparative fit index (CFI) = 0.92; Tucker-Lewis index (TLI) = 0.92; root mean square error of approximation (RMSEA) [90% confidence interval (CI)] = 0.04 [0.04, 0.05]) discriminant validity of the five corresponding constructs were not supported (r = 1.08-1.23, $p < .001$). Our findings were in line with previous studies (e.g. Garcia et al., 2008; Lee et al., 2012; Logan et al., 2013) supporting the one-factor structure of the instrument, WLSMV$\chi^2_{(299)} = 462.36$, $p < .001$; CFI = 0.92; TLI = 0.92; RMSEA 90%

CI = 0.04 [0.04, 0.05]; M_{λ} = 0.50). Internal consistency and reliability of the CDI has been well supported (e.g. Giannakopoulos, et al., 2009). In the present study internal consistency of the CDI was (ω = .82, *SD* = .02, 95% CI [0.78, 0.85].

Peer Experiences Questionnaire – Standard Version (Giovazolias et al., 2010; Vernberg et al., 1999). The PEQ-STDV is an 18- item self-report questionnaire of children's experiences in bullying behaviors. The PEQ-STDV consists of two subscales: The Victimization of Self (VS; nine items) subscale and the Victimization of Others (VO; nine items) subscale. Participants are asked to rate on a 5-point Likert-scale (1 = *never to* 5 = *a few times a week*) how often in the past 3 months the item content applied to them. The two-factor structure of the instrument, WLSMV$\chi^2_{(134)}$ = 239.16, $p < .001$; CFI = 0.96, TLI = 0.95; RMSEA [90% CI] = 0.05 [0.04, 0.06]) as well as the discriminant validity of the two subscales ($r = .73$, $p < .001$) were confirmed in the subsample of 300 students. The VO subscale that targets aggressive behavior towards another children (e.g., "I chased a teen like I was really trying to hurt him or her") was employed for the present research needs. The PEQ is a valid and reliable measure (e.g. Giovazolias et al., 2017). The internal consistency of the applied VO subscale was (ω = .84, *SE* = 0.04, 95% CI [0.76, 0.89]).

Greek Big Five Questionnaire for Children – Short Form (Barbaranelli et al., 2003; Markos and Kokkinos, 2017). The GBFQ-C-SF is a valid and reliable 30-item self-report instrument that assesses the five basic factors of personality in children, as young as 8 years, and adolescents. Each factor consists of six items; Energy/Extraversion (e.g., "I easily make friends"); Agreeableness (e.g., "I treat my peers with affection"); Neuroticism (e.g., "I am in a bad mood"); Intellect/Openness (e.g., "I like to read a book"); Conscientiousness (e.g., "I respect the rules and the order"). Participants are asked to rate on 5-point Likert scale (1 = *almost never* to 5 = *almost always*) how often the item content describes them. In line with previous studies (e.g. Markos & Kokkinos, 2017), the five-factor structure of the instrument, WLSMV$\chi^2_{(395)}$ = 670.13, $p < .001$; CFI = 0.93, TLI = 0.92; RMSEA [90% CI] = 0.05 [0.04, 0.05], as well as the discriminant validity of the five subscales (r = 0.2-0.8, $p < .001$) were confirmed in the subsample of 300 students. In the present study, internal consistency coefficients of the GBFQ-C-SF subscales were as follows: Energy/Extraversion (ω = .70, *SE* = 0.05, 95% CI [0.55, 0.74); Agreeableness (ω = .69, *SE* = 0.03, 95% CI [0.62, 0.74); Emotional instability (ω = .75, *SE* = 0.03, 95% CI [0.68, 0.79); Intellect/Openess (ω = .70, *SE* = 0.03, 95% CI [0.65, 0.74]; Conscientiousness (ω = .72, *SE* = 0.03, 95% CI [0.65, 0.77).

Data Analysis

Analyses were conducted using M*plus* 8.1 (Muthén & Muthén, 2017) and SPSS vs 25. In our data, assumptions of univariate skewness (0.30-2.14) and kurtosis (-0.10-3.80) were not met. Furthermore, Mardia's coefficients (Mardia, 1970) for multivariate skewness (Mardia's$_{skewness}$ = 14.44, *SD* = .60, $p <$ .001) and kurtosis (Mardia's$_{kurtosis}$ = 397.86, *SD* = 2.27, $p <$ .001) indicated deviation from multivariate normality. Since items were measured on a 4-point Likert scale, they were treated as ordinal rather than continuous indicators of the latent factors. Accordingly, the WLSMV (weighted least squares mean- and variance-adjusted) estimator was employed, as it outperforms traditional maximum likelihood for ordered-categorical indicators with five or less response categories (Finney & DiStefano, 2006). Missing values percentages for each of the assessed variables were trivial ranging from 1% to 5% and excluded from the analysis using pairwise deletion approach which is default in M*plus* when using the WLSMV estimator.

Following Morin et al. (2016), we successively assessed ICM-CFA, B-CFA, ESEM, and B-ESEM models. ESEM was conducted using oblique target rotation (Asparouhov & Muthén, 2009), while B-ESEM was estimated using bifactor orthogonal target rotation (Reise, 2012). In ICM-CFA and B-CFA models all cross-loadings were constrained to be exactly zero. In contrast, in ESEM and B-ESEM models all cross-loadings were "targeted" to be as close to zero as possible. In both B-CFA and B-ESEM, all items were allowed to load on a general anger rumination factor and on a specific a priori S-factor. In ESEM version items were allowed to cross-load, whereas they were not in the CFA version.

Measurement invariance of the best fitted model was tested across gender (boys vs. girls) and age group (children vs. preadolescents) to ensure equivalence of meaning across these groups (Putnick & Bornstein, 2016). The following sequential invariance testing strategy (Meredith, 1993) adapted for ordered-categorical indicators (Morin et al., 2013) was used: (a) configural invariance; (b) metric/weak invariance (invariance of the factor loadings); (c) scalar/strong invariance (loadings and thresholds); (d) strict invariance (loadings, thresholds and uniqueness); (e) invariance of the latent variances-covariances (loadings, thresholds, uniqueness and variances-covariances); (f) latent means invariance (loadings, thresholds, uniqueness, variances-covariances, and latent means). The size of all groups exceeded the generally recommended value of 200 observations for measurement invariance testing (Koh & Zumbo, 2008).

The fit of all models was assessed using the WLSMVχ^2, the CFI, the TLI, and the RMSEA and its 90% CI (Hu & Bentler, 1999). Traditional cutoff criteria with CFI and TLI values greater than 0.90 and 0.95 and RMSEA values lower than 0.08 and 0.06 were used to indicate adequate and excellent model fit, respectively. Model fit improvement as well measurement invariance across the nested models were evaluated using the M*plus* DIFFTEST option for WLSMV (MD$\Delta\chi^2$; Asparouhov & Muthén, 2006). Given that χ^2 and MD$\Delta\chi^2$ tend to be oversensitive to sample size, additional indices were used in tests of invariance (Chen, 2007): a CFI change of (ΔCFI) $\leq$ 0.010 or less accompanied by a change of RMSEA (ΔRMSEA) $\leq$ .015 or less between a model and the preceding one indicate to the more parsimonious model or that the measurement invariance hypothesis should not be rejected.

Construct replicability of the latent constructs was tested using H index with values (>.80) suggesting a well-defined latent variable (Hancock & Mueller, 2001). Composite reliability was measured using Omega (ω; McDonald, 1999) and Omega hierarchical (omegaH or ω_H) estimates. Both ω and omegaH are indicators of the degree to which the scale scores precisely measure the target construct. In contrast with ω which estimates the proportion of variance in the total and subscale scores attributed to all "modeled" source of common variance, omegaH assesses the proportion of variance in total score exclusively attributable to a single general latent factor, whereas omegaHS (ω_{HS}) estimate the unique variance of each subscale score after controlling for the variance associated with the general factor (Reise et al., 2013a). Nevertheless, high values of omegaH (>.80; Reise et al., 2013a) should not be confused with "unidimensionality" of the data as they: (a) just inform on the percentage of variance in a uni-weighted total score that can be attributed to a general factor and (b) are positively related to the number of items (Rodriguez et al., 2016). Given the aforementioned limitations of OmegaH, the explained common variance (ECV) and the percentage of uncontaminated correlation (PUC) were also used for a more straightforward and clear measure of degree of dimensionality (Reise et al., 2013b). According to Rodriguez et al. (2016) when ECV and PUC are above > .70, the common variance can be considered as essentially unidimensional.

Test-retest reliability (see measures) and validity of the CARS (convergent, divergent and predictive) were examined using SEM analysis technique; the GBFQ-C-SF was treated as a five-factor ICM-CFA model whereas all others measures under study were treated as unidimensional ICM-CFA models. Various rules of thumb have been advanced in the literature for interpreting effect sizes coefficients (e.g. Cohen, 1988; Hemphill, 2003). In the present study, we employed the widely known

guidelines proposed by Cohen (1988) for evaluating, correlation r (r <.30, small; .30 ≤ r <.50, medium; r >.50, large) and coefficient of determination (R^2) effect sizes (R^2 < 0.13, weak; 0.13 ≤ R^2 < 0.26, medium; R^2 ≥ 0.26, substantial). Point estimates were based on 1,000 bootstrapping samples and 95% CI were generated.

2.3 Results

CFA Versus Bifactor CFA Versus ESEM

Model fit indices and the standardized parameter estimates for all models are presented in Table 1. The one-factor ICM-CFA model showed a reasonable representation of the data based on the approximate fit indices (CFI = 0.96; TLI = 0.95; RMSEA [90% CI] = 0.06 [0.06, 0.07]). Results also indicated an internally consistent (ω = .91) and well-defined factor (H = .94); all loadings (λ = .33-.79, M_λ = 0.64) exceeded the recommended cutoff of |.32| proposed by Tabachnick and Fidell (2001). Similarly the four-factor ICM-CFA solution fitted the data acceptably [CFI = 0.96; TLI = 0.95; RMSEA [90% CI] = 0.07 [0.06-0.07]) yielding internally consistent and well-defined factors: Angry Afterthoughts (ω = .76; H = .85), Thoughts of Revenge (ω = .76; H = .81), Angry Memories (ω = .63; H = .75), Understanding of Causes (ω = .75; H = .83); items loaded strongly on their respective factors (λ = .37-.79, M_λ = .64). Based on the χ^2 difference test the four-factor ICM-CFA outperformed the one-factor ICM-CFA model, ΔWLSMV$\chi^2_{(6)}$ = 17.08, p < .05). Nevertheless, the aforementioned fit improvement was not replicated by the negligible observed changes in approximate fit indices (ΔCFI = 0.00; ΔRMSEA = 0.01). Most important, discriminant validity of the latent measures was not supported given that correlations (r = 0.92-1.00, p <.001; M_r = 0.96; see Table 2) were above the proposed cutoff of |.80| (Brown, 2015).

Table 1 Goodness-of-fit statistics and information criteria for the estimated models on the Children's Anger Rumination Scale

Model	WLSMV χ^2 (df)	CFI	TLI	RMSEA	90% CI	Comparison	ΔWLSMV χ^2 (df)	ΔCFI	ΔRMSEA
M1. CFA 1-factor first-order model	500.83* (152)	.96	.95	.06	.06-.07	-	-	-	-
M2. CFA 4-factor first-order model	488.82* (146)	.96	.95	.07	.06-.07	M2-M1	17.08* (6)	.00	.01
M3. CFA bifactor model	280.87* (133)	.98	.98	.05	.04-.05	M3-M2	204.73* (13)	.02	.02
M4. ESEM 4-factor first- order model	190.87* (101)	.99	.98	.04	.03-.05	M4-M3	99.17* (32)	.01	.01
M5. ESEM bifactor model	150.02* (86)	.99	.98	.04	.03-.05	M5-M4	42.00* (15)	.00	.00
Gender invariance									
Baseline Boys (n = 256)	134.77* (86)	.99	.97	.05	.03-.06	-	-	-	-
Baseline Girls (n = 296)	135.05* (86)	.99	.98	.04	.03-.06	-	-	-	-
M1. Configural	323.47* (196)	.98	.97	.05	.04-.06	-	-	-	-
M2. Weak (loadings)	348.33* (242)	.99	.98	.04	.03-.05	M2-M1	21.18 (46)	.00	.01
M3. Strong (loadings, thresholds)	378.06* (275)	.99	.98	.04	.03-.05	M3-M2	44.09 (33)	.00	.00
M4. Strict (loadings, thresholds, uniquenesses)	411.85* (294)	.99	.98	.04	.03-.05	M4-M3	29.23 (19)	.00	.00
M5. Latent variance-covariance	372.86* (309)	.99	.99	.03	.02-.04	M5-M4	23.87 (15)	.01	.01
M6. Latent means	**391.00* (314)**	**.99**	**.99**	**.03**	**.02-.04**	**M6-M5**	**11.97* (5)**	**.00**	**.00**
Age invariance									
Baseline children (n = 293)	122.35* (86)	.99	.98	.04	.02-.05	-	-	-	-
Baseline preadolescents (n = 259)	96.08* (86)	1.00	1.00	.02	.00-.04	-	-	-	-
M1. Configural	236.02* (196)	1.00	.99	.03	.01-.04	-	-	-	-
M2. Weak (loadings)	321.43* (242)	.99	.99	.03	.02-.04	M2-M1	93.28* (46)	.01	.00
M3. Strong (loadings, thresholds)	355.72* (275)	.99	.99	.03	.02-.04	M3-M2	30.15 (28)	.00	.00
M4. Strict (loadings, thresholds, uniquenesses)	366.19* (294)	.99	.99	.03	.02-.04	M3-M2	7.42 (19)	.00	.00
M5. Latent variance-covariance	355.62* (309)	.99	.99	.02	.01-.03	M5-M4	23.44 (15)	.00	.01
M6. Latent means	**348.45* (314)**	**1.00**	**1.00**	**.02**	**.00-.03**	**M6-M5**	**1.97 (5)**	**.01**	**.00**

Note. Bold entries indicate the final levels of invariance that were achieved

CFA confirmatory factor analysis; *ESEM* exploratory structural equation modeling; *WLSMV* weighted least squares mean- and variance-adjusted estimator; χ^2 chi-square; *df* degrees of freedom; *CFI* comparative fit index; *TLI* Tucker-Lewis index; *RMSEA* root-mean-square error of approximation; *90% CI* 90% confidence interval of the RMSEA; *ΔWLSMVχ^2* chi-square difference test based on the Mplus DIFFTEST function for WLSMV estimator, *ΔCFI* change in CFI value compared to the preceding model, *ΔRMSEA* change in the RMSEA value compared to the preceding model

*$p < .05$

The B-CFA model fitted the data better (CFI =0 .98; TLI = 0.98; RMSEA [90% CI] = 0.05 [0.04, 0.05]) and appeared to be superior compared with the four-factor ICM-CFA solution, $\Delta WLSMV\chi^2_{(13)} = 204.73$, $p < .05$; $\Delta CFI = 0.02$; $\Delta RMSEA = 0.02$). Furthermore, the anger rumination GF showed acceptable factor loadings ($\lambda = .32$-$.80$, $M_\lambda = .63$; H = .94) whereas the SFs were weakly defined: Angry Afterthoughts ($\lambda = .06$ to -.63, $M_\lambda = .01$; H = .44), Thoughts of Revenge ($\lambda = .00$ to .69, $M_\lambda =$ 0.32; H = .53), Angry Memories ($\lambda = .07$-$.84$, $M_\lambda = .27$; H = .72), Understanding of Causes ($\lambda =$ -.00-.91, $M_\lambda = .34$; H = .82). More specifically, the B-CFA model yielded a pattern of small, insignificant, or even divergent item loads on the hypothesized SFs (e.g., cars_7 on Angry Afterthoughts; $\beta = -.63$, $p <.001$). Further three items (cars_4, cars_1, cars_12) were found to tap more highly into their respective SF instead of the GF (see Table 3). Omega coefficient levels were generally satisfactory, whereas omega hierarchical values displayed high variability with a very high proportion of variance exclusively attributed to the anger rumination GF and a very small one to the SFs after controlling for the GF ($\omega =.95$; $\omega_H = .91$); Angry Afterthoughts ($\omega = .91$; $\omega_{HS} = .00$); Thoughts of Revenge ($\omega = .82$; $\omega_{HS} = .27$); Angry Memories ($\omega = .84$; $\omega_{HS} = .13$); Understanding of Causes ($\omega = .72$; $\omega_{HS} = .24$). Additionally, an ECV value of |.73| and a PUC value of |.78| suggested a similar pattern of item loadings between the GF and that possibly obtained from the one-factor ICM- CFA model. This suggestion was supported by the high correlation between the two sets of factor loadings ($r_{\lambda \text{one-factor CFA} - \text{GF B-CFA}} = .99$). Nevertheless, as it has already been mentioned, excluding cross-loadings in a B-CFA model could result to a misspecification regarding the true variance attributed to the GF (Murray & Johnson, 2013). Thus, we proceeded with the four-factor ESEM which yielded a very good representation of the data (CFI = 0.99; TLI = 0.98; RMSEA [90% CI] = 0.04 [0.03, 0.05]) but provided mixed results in regard to its fit improvement over the B-CFA model, $\Delta WLSMV\chi^2_{(32)} = 99.17$, $p < .05$; $\Delta CFI = .01$; $\Delta RMSEA = .01$. Furthermore, the four-factor ESEM model displayed reduced factor correlations ($r = 0.42$-0.60, $M_r = .52$; see Table 2) and a pattern of inflated target loadings, significant cross-loadings as well as items that tapped exclusively into nontarget factors. [e.g., cars_7 (Angry $\text{Afterthoughts}_{\textbf{target}} = -.01$; Thoughts of $\text{Revenge}_{\textbf{nontarget}} = .54$; Angry $\text{Memories}_{\textbf{nontarget}} = .32$)]. This loading pattern provided an extra statistical argument over the conceptual overlap of the four theoretically related anger rumination constructs as well as the existence of an unmodelled GF. Given that the selection of the best fitted model was not limited on model fit indices but included the

parameter estimates and the underlying theory as well (Morin et al., 2016), the ESEM approach was retained in the next step of analysis.

Table 2 Latent factor correlations for the 4-factor ICM-CFA and ESEM model

	AA	TR	AM	UOC
AA	-	.99***	.96***	.92***
TR	.55***	-	.97***	1.00***
AM	.56***	.60***	-	.95***
UOC	.43***	.42***	.56***	-

Note. CFA correlations are displayed above the diagonal and first-order ESEM correlations are displayed below the diagonal; *AA* angry afterthoughts*; TR* thoughts of revenge*; AM* angry memories*; UOC* understanding of causes
*** $p < .001$

ESEM Versus B-ESEM

The B-ESEM solution yielded the best overall model fit to the data (CFI = 0.99; TLI = 0.98; RMSEA [90% CI] = 0.04 [0.03, 0.05]). Based on the χ^2 difference, it outperformed the ESEM model (ΔWLSMVχ^2 = 42.00, *df* = 15, $p < .05$). Nevertheless the trivial changes in approximate fit indices (ΔCFI = 0.00; ΔRMSEA = 0.00) brought into question B-ESEM's fit superiority. The GF was well-defined (H = .94) by strong and significant item loadings (λ = .31-.80, M_λ = .63) but that was not accomplished by the majority of SFs: Angry Afterthoughts (H =.06; λ = -.06-.26, M_λ = .17), Thoughts of Revenge (H = .15; λ = -.07-.45, M_λ = .34), Angry Memories (H = .08; λ = .02-.52, M_λ = .23), Understanding of Causes (H = .22; λ = .00-.27, M_λ = .32). In contrast to the generally high levels of coefficient omegas only the GF displayed a high level proportion of variance: GF (ω =.91; ω_H = .91); Angry Afterthoughts (ω = .68; ω_{HS} = .04); Thoughts of Revenge (ω = .87; ω_{HS} = .13); Angry Memories (ω= .90; ω_{HS} = .07); Understanding of Causes (ω = .80, ω_{HS} = .17). Finally, an ECV value of |.81|, a PUC value of |.78| and the high correlated sets of loadings ($r_{\lambda \text{one-factor CFA-GF B-ESEM}}$ = .99) strongly supported the strength of the GF as a single common factor and consequently the unitary factorial structure of CARS. In other words, most items were strongly represented and explained by the anger rumination general construct and not by the specific subdimensions.

Table 3 Parameter estimates for the CFA and ESEM solutions of CARS

	CFA one-factor model	CFA four-factor model	Bifactor CFA		ESEM				Bifactor ESEM				
	(λ)[a]	SF (λ)[a]	AR (λ)	SF (λ)[a]	AA (λ)	TR (λ)	AM (λ)	UOC (λ)	AR (λ)	AA (λ)	TR (λ)	AM (λ)	UOC (λ)
AA													
cars_7	.72***	.72***	.77***	-.63***	**-.01**	.54***	.32***	.03	.70***	**-.06**	.30***	.16**	-.05
cars_8	.73***	.74***	.74***	.20**	**.50*****	.20**	.01	.24***	.73***	**.26*****	.03	-.10*	.04
cars_9	.76***	.77***	.77***	.07	**.46*****	.06	.37***	.03	.79***	**-.08**	-.12*	-.05	.00
cars_17	.69***	.69***	.69***	.22**	**.48*****	.09	.08	.21***	.69***	**.22*****	-.04	-.07	.06
cars_18	.79***	.79***	.80***	.06	**.27*****	.27***	.23***	.22***	.77***	**.16****	.09*	.09	.02
cars_19	.78***	.78***	.79***	.13**	**.32*****	.15**	.27***	.23***	.76***	**.25*****	.01	.12**	.02
TR													
cars_4	.71***	.79***	.66***	.69***	.11	**.76*****	.04	-.05	.69***	-.13*	**.45*****	-.09	-.06
cars_6	.49***	.54***	.49***	.00	.19**	**.05**	.30***	.05	.51***	-.14*	**-.07**	.03	.03
cars_13	.58***	.64***	.56***	.23**	.08	**.53*****	-.04	.17**	.53***	.28***	**.39*****	.08	-.00
cars_15	.71***	.79***	.67***	.39***	.12	**.78*****	.03	-.07	.69***	-.12	**.44*****	-.10	-.09*
AM													
cars_1	.55***	.56***	.51***	.84*	-.16*	-.16**	**.88*****	.08	.54***	-.07	-.15**	**.52*****	.02
cars_2	.53***	.55***	.52***	.18	-.10	.15*	**.42*****	.19**	.49***	.06	.08	**.32*****	.06
cars_3	.69***	.71***	.68***	.16	.35***	-.03	**.51*****	-.02	.70***	.01	-.13**	**.11**	-.05
cars_5	.76***	.79***	.76***	.11	.43***	.07	**.51*****	-.12*	.79***	-.10	-.10*	**.02**	-.09*
cars_14	.70***	.72***	.70***	.07	.12	.23***	**.23****	.30***	.67***	.10	.11*	**.14***	.14**
UOC													
cars_10	.68***	.75***	.69***	-.00	.42***	.22***	.09	**.11**	.69***	.08	.04	-.10*	**.00**
cars_11	.33***	.37***	.32***	.22*	-.15*	-.03	.24**	**.39*****	.31***	-.10	-.01	.21***	**.30*****
cars_12	.43***	.48***	.41***	.91**	.12	-.10*	-.05	**.67*****	.41***	.04	-.06	-.01	**.70*****
cars_16	.51***	.56***	.50***	.22*	.32***	-.08	.00	**.45*****	.50***	.15*	-.10	-.03	**.27*****

Note. Target factor loadings are in bold. *CFA* confirmatory factor analysis; *ESEM* exploratory structural equation modeling; *AR* general anger rumination factor; *AA* angry afterthoughts; *TR* thoughts of revenge; *AM* angry memories; *UOC* understanding of causes; *λ* standardized factor loadings; *SF* specific factors of the Children's Anger Rumination Scale

[a]Each item loaded on their respective factor, while cross-loadings were constrained to be zero

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

Measurement Invariance

Measurement invariance was tested across gender (boys vs. girls) and age groups (children vs. preadolescents) on the best fitted bifactor ESEM model, and the findings were displayed in the lower portion of Table 3. Configural invariance was successfully estimated in all groups, and then more stringent constraints were progressively imposed on the models. None of these invariance conditions caused model fit deterioration. The latent mean invariance for gender and age group respectively were supported based on the recommended cutoff guidelines (ΔCFI, ΔRMSEA). More specifically, the latent means invariance across gender revealed that-when the latent means of the girls were constrained to be zero for the purpose of identification - girls' anger rumination latent means did not significantly differentiated from boys. Similarly, no age significant differences were detected in anger rumination latent means.

B-ESEM or One-Factor ICM-CFA?

In the present study, B-ESEM provided the best fit to the multidimensional CARS data. Careful examination of various bifactor-derived statistics showed that most items were strongly represented and explained by the anger rumination general construct and not by the specific subdimensions. According to Reise et al. (2007), true BF models should not be used to account for residual (co)variance alone but applied when there are meaningful specificities constituting well-defined subfactors. In other words when subfactors are found to be insignificant then, "…researchers may conclude that a unidimensional model should be adequate as the effect of the multidimensional is too trivial to merit a multidimensional model." (Luo & Al-Harbi, 2016, p. 2, as cited in Decker, 2021). Given that our results justified the essential unidimensionality of the CARS without too much concern about structural parameter bias (Reise et al., 2013a) we proceeded with testing all types of CARS's validity on the one-factor ICM-CFA CARS's model.

Convergent and Discriminant Validity

Results showed that there was a significantly positive correlation between Anger Rumination and Neuroticism, $r = 0.52$, $SE = 0.05$, $p < .001$, 95% CI [0.41, 0.63). Conversely, there was a significantly but albeit weak negative correlation between Anger Rumination and Energy/Extraversion, $r = -0.18$, $SE = 0.05$, $p < .001$, 95% CI [- 0.27, -0.05), Conscientiousness, $r = -0.24$, $SE = 0.07$, $p < .001$, 95% CI [- 0.38, -0.09), Intellect/Openess, $r = -0.27$, $SE = 0.07$, $p < .001$, 95% CI [-0.39, -0.13) and Agreeableness, $r = -0.28$, $SE = 0.07$, $p < .001$, 95% CI [-0.41, -0.14). The overall fit of the model was acceptable, WLSMV$\chi^2_{(1112)} = 1584.69$, $p < .001$; CFI = 0.92; TLI = 0.92; RMSEA [90% CI] = 0.04 [0.03, 0.04]).

Predictive Validity

According to R^2 coefficient, anger rumination substantially predicted concurrent levels of depression ($b = .71$, $\beta = .58$, $SE = 0.05$, $p < .001$, CI [95%] = .45-.66; $R^2 = .33$). Results also indicated a weak but significant proportion of variance shared by ruminative tendency towards anger and bullying behaviors ($b = .37$, $\beta = .35$, $SE = .06$, $p < .001$, CI [95%] = .21-.48]; $R^2 = .12$). The overall model fit of the two cross-sectional SEM models was satisfactory; anger rumination → depression symptoms (WLSMV$\chi^2_{(944)}$= 1,269.28, $p < .001$; CFI =.94; TLI = .93; RMSEA [90% CI] = .03 [.03-.04]); anger rumination → bullying (WLSMV$\chi^2_{(349)}$= 473.71, $p < .001$; CFI = .97; TLI = .97; RMSEA [90% CI] = .034 [.03-.04]).

2.4 Discussion

Anger rumination represents a dysfunctional cognitive strategy, formed in childhood that is related to deleterious effects on individual's psychological health. Thus, the early identification and treatment of youth's tendency to dwell unintentionally on angry thoughts is of utmost importance to prevent the stabilization of this maladaptive response style in later life stages. To our knowledge, the CARS (S. D. Smith et al., 2016) is the first inventory adapted from the adult version (ARS) to be developmentally appropriate and psychometrically sound to target children's tendency to ruminate on angry thoughts. Similarly with ARS, anger rumination in CARS is conceptualized as a multidimensional construct that

comprised four dimensions – stages in the anger ruminative process: Angry Afterthoughts, Thoughts of Revenge, Angry Memories and Understanding of Causes. Previous studies on both versions of the instrument, mainly employed CFA and to a lesser extent EFA approaches and yielded mixed results regarding its unitary or four-faceted structure (Repper, 2006; S. D. Smith et al., 2016). As it was mentioned above, CFA is considered an overrestrictive approach that challenges construct-relevant multidimensional data leading often to biased parameter estimates (Morin et al., 2017). On the other hand, the EFA, even though more realistic and flexible in nature, is a data-driven approach that is recommended in cases when there is no supporting theory guiding the analysis (Pasquali, 2012 as cited in Bido et al., 2018).

The present study, acknowledging the multidimensionality of the CARS, is the first study that successively contrasted ICM-CFA, B-CFA, ESEM, and B-ESEM models (Morin et al., 2016) in order to contribute essentially to the existing literature regarding CARS factorial structure. Literature suggests that a "good fitting" model does not always imply an adequate model in terms of generalizability or predictive validity (T. A. Scmitt et al., 2018). Thus, model selection, as it has already been mentioned, did not include only model fit indices but also the careful examination of parameter estimates (e.g., factor loadings) and the underlying theory as well (Morin et al., 2016). Furthermore, given the high propensity of bifactor models to fit any possible data, even with nonsense response patterns (Reise et al., 2016), evaluations were made with caution (Bonifay et al., 2017; Decker, 2021) and several psychometrically informative bifactor-derived statistics were considered (Rodriguez et al. 2016).

Results showed that both ICM-CFA models provided good representation of the data as well as internally consistent and well-defined factors. Nevertheless, in case of the one-factor ICM-CFA solution, unidimensionality could not be reliably supported because the size of item loads on a single factor often represent a common rather than a systematic source of variance for each item (Reise et al., 2010). Furthermore, the discriminant validity of the anger ruminative dimensions in the four-factor ICM-CFA model was not accomplished as their interrelation exceeded the recommended cut-off of .80 (Brown, 2015). Particularly the inflated factor correlations found in the present study are consistent with previous findings (S. D. Smith et al., 2016) suggesting a high degree of overlap between subdimensions of the CARS as well as the "existence" of a single underlying higher order anger rumination factor. In order to judge whether CARS' s multidimensional item response data have a

strong general factor to justify a unidimensional measurement model, the B-CFA approach was employed (Reise et al., 2007). The B-CFA model yielded a better representation compared with the four-factor ICM-CFA model and a similar pattern of loadings between the G-factor and that obtained from the one-factor ICM-CFA model. Nevertheless, unidimensionality of the CARS could not be strongly supported based exclusively on the B-CFA model. According to Murray and Johnson (2013) excluding cross-loadings between items and construct-relevant non-target specific factors in a B-CFA model could inflate the variance of the GF. Additional support for the unitary factorial structure of the CARS was provided by the well-fitting ESEM model: the existence of cross-loadings suggested the conceptual overlap of the four theoretically related anger rumination constructs as well as the presence of an unmodelled GF. Finally, the best-fitting B-ESEM model justified the unidimensionality of the CARS because SFs did not retain their own specificity in addition to that accounted for by the G-factor, suggesting that they are ignorable nuisance dimensions adding no information to anger rumination GF. Our findings are congruent with the unidimensional CARS solution suggested by Repper (2006) and seem to contradict Sukhodolsky et al.'s (2001) theoretical framework in which anger rumination represents a dynamic emotional-cognitive process comprised of four interactive but distinct stages.

Similarly with previous findings (S. D. Smith et al., 2016), measurement invariance (e.g. invariance on the level of latent means) of the CARS across gender and age-groups was supported. As for gender differences, the similar rates of anger rumination displayed by boys and girls contradict previous studies suggesting that boys tend to ruminate more on angry thoughts relative to girls (Harmon et al., 2019; S. D. Smith et al., 2016). Partially consistent to our findings are the results obtained from two meta-analyses on youth gender differences in rumination (Rood et al., 2009; Tamres et al., 2002). More specifically, Rood et al. (2009) reported that the differences are quite small in childhood and become significant and larger in magnitude through adolescence. Additionally, in another meta-analysis on coping mechanisms, including rumination, results yielded a significantly trivial effect of gender on rumination, with females reporting higher ruminative levels (Tamres et al., 2002). Furthermore in line with previous studies suggesting adolescence as the life stage in which rumination increases in intensity and becomes more rigid (Hampel & Peterman, 2005; Hankin, 2008) no significant differences were detected between children and preadolescents regarding their tendency to ruminate on anger.

Given that our results justified the essential unidimensionality of the CARS without too much concern about structural parameter bias (Reise et al., 2013b) we proceeded with testing all types of

CARS's validity on the one-factor ICM-CFA CARS's model. To our knowledge, our study is the first that assessed the convergent and divergent validity of the CARS. Based on the guidelines proposed by Cohen (1988) both forms of validity were confirmed. Particularly, as it was expected Anger Rumination was found to be highly correlated with the personality trait of Neuroticism. This finding is in line with previous studies supporting the positive relationship between negative affectivity and anger ruminative response style (Mezulis et al., 2011; Sauer-Zavala et al., 2013; Sukhodolsky et al., 2001). Particularly, the anger rumination – neuroticism link has been attributed to both genetic and environmental factors. More precisely, du Pont et al. (2019) in a longitudinal study conducted with 439 same-sex twin pairs found that rumination and neuroticism share common genetic influences. Additionally, Sachs-Ericsson et al. (2014) in a study including 375 biological parent-offspring dyads supported that parental neuroticism contributes positively to the offsping's rumination by cultivating an environment that promotes dysfunctional coping strategies such as rumination. The pattern of negative and small correlations between anger rumination and the other personality traits, namely Energy/Extraversion, Intellect/Openess, Consciousness, and Agreeableness was also confirmed in previous researches (e.g., Fresnics & Borders, 2016; Oral & Arslan, 2017).

The substantial depressogenic role of rumination that was supported in the present study is consistent with previous findings underscoring the importance of assessing anger rumination in understanding youth's risk for depression (Gilbert et al., 2005; Harmon et al., 2019; Patel et al., 2017). A possible cognitive mechanism to explain anger rumination – depression link is *victim justice sensitivity*, a personality trait reflecting people's tendency to react emotionally to incidents of injustice for the self (M. Schmitt et al., 2010). Thus, individual's high propensity to ruminate on an angry experience may intensify pre-existing cognitive appraisals of being unfairly treated which in turn may lead to depression symptoms of worthlessness and helplessness (Bondü et al., 2017).

In consistency with our prediction, Anger Rumination seemed to have a positive weak, yet significant effect on bullying behaviors (Caprara et al., 2007; Zsila et al., 2018; Vasquez et al., 2012). One possible explanation could be attributed to the vengeful prolonged thinking that usually characterizes anger rumination. More specifically, according to the anger ruminative theory (Sukhodolsky et al., 2001), thoughts of retaliation represent a way for handling the high levels of emotional intensity caused by recycling angry thoughts. Indeed Sarićam (2017) in a cross-sectional study conducted with 318 secondary school students found that thoughts of revenge partially mediated

the link between victimization and bullying. In other words, the unsettling experience of victimization can generate a distorted cognitive-affective cycle of retaliation thoughts (Manasse & Ganem, 2009) which in turn may predispose individuals to behave aggressively in order to resolve them. Another explanation of the anger rumination-bullying link is provided by the Emotional Cascade Model (Selby et al., 2008). According to this model, negative affect initiated by an emotion-provoking event interacts with rumination processes resulting in an "emotional cascade". Consequently, individuals may engage in several dysregulated behaviors such as binge eating, self-injury, yelling and threatening in an effort to distract themselves and short-circuit this emotional cascade (Selby et al., 2009).

The present study contributes to existing literature in several ways. First, CARS's factorial structure was tested using both conventional and more recent and analytic techniques, such as the B-ESEM modeling approach in order to resolve some issues associated with instrument's latent structure. Second, to our knowledge it is the third study (Repper, 2006; S. D. Smith et al., 2016) that examined the psychometric properties of the CARS in children and adolescence. Third, reliability and validity of the instrument were examined using SEM analysis, which reduces the impact of measurement error. Finally, our results provide a strong empirical justification for the unidimensionality of the Anger Rumination construct.

Limitations and Recommendations

In the present research, a number of important limitations should be also acknowledged. First, given that our results were specific to a non-clinical sample of Greek students enrolled in public schools of Crete, generalization to the broader Greek youth population is difficult to be attained. Future research should include more representative samples (e.g., other geographic regions; private schools). Second, acknowledging the role that ethnicity plays in anger expression coping styles (Perry-Parrish et al., 2017; Pittman, 2011), it would be recommendable to assess the factorial structure of the CARS in different cultural settings in order to draw a more certain conclusion regarding the nature of anger rumination. Third, by relying exclusively on single-source (children/preadolescents) and single-method (self-report) data collection, concerns regarding response bias (e.g., Holmbeck et al., 2002) and common method bias (e.g., Podsakoff et al., 2003) are raised. A remedy for these types of bias could be to employ alternative multisource (e.g. parents, teachers) and multimethod assessment modalities (e.g., semi-structure interviews, rumination diary). For example, the diary methodology is becoming a

valuable tool in research on rumination (Riley et al., 2019) to gather information regarding children's angry rumination thoughts (e.g. intensity, specific content). Two relevant questions can be put forward in this context: (1) "What if this multisource and multimethod approach eventually provided evidence against the proposed unidimensional structure of CARS? and if so, (2) "Is there any clinical value to assessing distinct subdimensions of rumination (e.g. Angry Memories)?. The fact that our results did not yield any support over the distinctiveness of the four cognitive ruminatory mechanisms does not preclude future research from uncovering other underlying dimensions or clinical important features of rumination. Thus, there is evidence suggesting that each of the aforementioned subdimensions serves a distinct role in the anger rumination process, associated with different outcomes and treatments. For example, high levels of Angry Afterthoughts may indicate potential deficits in cognitive shifting, an executive function necessary for ameliorating negative emotions (Holder et al., 2020). Thus, implementing programs that teach adolescents adaptive emotion regulation strategies (e.g. distraction, cognitive reappraisal) would help them reduce negative thinking and affect (e.g. Volkaert et al., 2020). Furthermore, the "Forgiveness Therapy" has been found to help individuals release Angry Memories and Thoughts of Revenge (Baskin & Slaten, 2010) and thus, cope with difficulties in forgiving oneself and another (Barber et al., 2005). On the other hand, the depressogenic feelings of regret implied in high levels of self-referential CFT (Understanding of Causes) have been found to be treated effectively with the "Emotion-Focused Therapy" (Broomhall & Phillips, 2018). Finally, a longitudinal research design would be fruitful in uncovering the temporal stability of the CARS inventory and/or the bidirectional relationship between anger rumination, depression and bullying (e.g., a cross lagged panel model analysis).

Overall, our results suggest that the CARS is a reliable and valid instrument to assess children's and preadolescent's tendency to ruminate towards anger.

2.5 References

Aarø, L. E., Flisher, A. J., Kaaya, S., Onya, H., Namisi, F. S., & Wubs, A. (2009). Parental education as an indicator of socioeconomic status: Improving quality of data requiring consistency across measurement occasions. *Scandinavian Journal of Public Health, 37*(2), 16-27. https://doi.org/10.1177/1403494808086917

Archer, J., Ireland, J. L., & Power, C. L. (2007). Differences between bullies and victims, and men and women, on aggression-related variables among prisoners. *British Journal of Social Psychology*, *46*(2), 299-322. https://doi.org/10.1348/014466606X114083

Asparouhov, T., Bengt, M., & Morin, A. J. S. (2015). Bayesian structural equation modeling with cross-loadings and residual covariances: Comments on Stromeyer et al. *Journal of Management, 41*(6), 1561-1577. https://doi.org/10.1177/0149206315591075

Asparouhov, T., & Muthén, B. (2009). Exploratory structural equation modeling. *Structural Equation Modeling: A Multidisciplinary Journal, 16*(3), 397-438. https://doi.org/10.1080/10705510903008204

Asparouhov, T. & Muthén, B. (2006). Robust Chi Square Difference Testing with mean and variance adjusted test statistics. Mplus Web Notes: No. 10. May 26, 2006

Bailen, N. H., Green, L. M., & Thompson, R. J. (2018). Understanding Emotion in Adolescents: A Review of Emotional Frequency, Intensity, Instability, and Clarity. *Emotion Review*, *11*(1), 63-73. https://doi.org/10.1177/1754073918768878

Baiocco, R., Manzi, D., Lonigro, A., Petrocchi, N., Laghi, F., Ioverno, S., & Ottaviani, C. (2017). A Kid-Friendly Tool to Assess Rumination in Children and Early Adolescents: Relationships with Mother Psychopathology and Family Functioning. *Journal of Child and Family Studies, 26*(10), 2703-2715. https://doi.org/10.1007/s10826-017-0784-7

Barbaranelli, C., Caprara, G. V., Rabasca, A., & Pastorelli, C. (2003). A questionnaire for measuring the Big Five in late Childhood. *Personality and Individual Differences, 34*(4), 645-664. https://doi.org/10.1016/S0191-8869(02)00051-X

Barber, L., Maltby, J., & Macaskill, A. (2005). Angry memories and thoughts of revenge: The relationship between forgiveness and anger rumination. *Personality and Individual Differences, 39*, 253-262. https://doi.org/10.1016/j.paid.2005.01.006

Baskin, T. W., & Slaten, C. (2010). Forgiveness Therapy with Adolescents. *The Independent Practitioner*. https://www.researchgate.net/publication/282155885

Beck, A. T., Rush, J., Shaw, B., & Enemy, G. (1979). *Cognitive Therapy of Depression*. New York: Guildford Press.

Besharat, M. A. (2011). Factorial and cross-cultural validity of a Farsi version of the Anger Rumination Scale. *Psychological Reports, 108*, 317-328. https://doi.org/10.2466/02.08.09.PR0.108.1.317-328

Besharat, M. A., Nia, M. E., & Farahani, H. (2013). Anger and major depressive disorder: The mediating role of emotion regulation and anger rumination. *Asian Journal of Psychiatry*, *6*(1), 35-41. https://doi: 10.1016/j.ajp.2012.07.013

Bido, D., Mantovani, D. M. N., & Cohen, E. D. (2018). Destruction of measurement scale through exploratory factor analysis in production and operations research. *Gestão & Produção, 25*(2), 384-397. https://dx.doi.org/10.1590/0104-530X3391-16

Blakemore, S-J., & Mills, K. L. (2014). Is adolescence a sensitive period for sociocultural processing? *Annual review of psychology*, *65*, 187-207. https://doi.org/10.1146/annurev-psych-010213-115202

Bondü, R., Sahyazici-Knaak, F., & Esser, G. (2017). Long-Term Associations of Justice Sensitivity, Rejection Sensitivity, and Depressive Symptoms in Children and Adolescents. *Frontiers in Psychology, 8*, 1446. https://doi.org/10.3389/fpsyg.2017.01446

Bonifacci, P., Tobia, V., Marra, V., & Desideri, L., & Baiocco, R. (2020). Rumination and Emotional Profile in Children with Specific Learning Disorders and their Parents. *International Journal of Environmental Research and Public Health, 17*(2), 389. https://doi.org/10.3390/ijerph17020389

Bonifay, W., Lane, S. P., & Reise, S. P. (2017). Three concerns with applying a bifactor model as a structure of psychopathology. *Clinical Psychological Science*, *5*(1), 184-186. https://doi.org/10.1177/2167702616657069

Brislin, R. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology, 1*(3), 187–216. https://doi.org/10.1177/135910457000100301

Broeren, S., Muris, P., Bouwmeester, S., van der Heijden, K. B., & Abee, A. (2011). The Role of Repetitive Negative Thoughts in the Vulnerability for Emotional Problems in Non-Clinical Children. *Journal of child and family studies, 20*(2), 135-148. https://doi.org/10.1007/s10826-010-9380-9

Broomhall, A., & Phillips, W. (2018). Self-referent upward counterfactuals and depression: Examining regret as a mediator. *Cogent Psychology, 5*(1). https://doi.org/10.1080/23311908.2017.1416884

Brown, T. A. (2015). *Confirmatory Factor Analysis for Applied Research* (2nd ed.). New York: The Guilford Press.

Caprara, G. V., Paciello, M., Gerbino, M., & Gugini, C. (2007). Individual differences conducive to aggression and violence: Trajectories and correlates of irritability and hostile rumination through adolescence. *Aggressive behavior, 33*(4), 359-374. https://doi.org/10.1002/ab.20192

Chen, F. F. (2007). Sensitivity of Goodness of Fit Indexes to Lack of Measurement Invariance. *Structural Equation Modeling, 14*(3), 464-504. https://doi.org/10.1080/10705510701301834

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). New York: Routledge.

Costa, P. & McCrae, R. R. (1985). *The NEO personality inventory manual*. Odessa, FL: Psychological Assessment Resources.

Decker, S. L. (2021). Don't Use a Bifactor Model Unless You Believe the True Structure Is Bifactor. *Journal of Psychoeducational Assessment, 39*(1), 39-49. https://doi.org/10.1177/0734282920977718

Denson, T. F., Moulds, M. L., & Grisham, J. R. (2012). The effects of analytical rumination, reappraisal and distraction on anger experience. *Behavior Therapy, 43*, 355-364. https://doi.org/10.1016/j.beth.2011.08.001

Denson, T. F., Pedersen, W.C., Friese, M., Hahm, A., & Roberts, L. (2011). Understanding impulsive aggression: Angry Rumination and Reduced Self-Control Capacity Are Mechanisms Underlying the Provocation-Aggression Relationship. *Personality and Social Psychology Bulletin, 37*(6), 850-862. https://doi:10.1177/0146167211401420

Du Pont, A., Rhee, S. H., Corley, R. P., Hewitt, J. K., & Friedman, N. P. (2019). Are rumination and neuroticism genetically or environmentally distinct risk factors for psychopathology? *Journal of Abnormal Psychology, 128*(5), 385-396. https://doi.ogr/10.1037/abn0000430

Epstude, K., & Roese, N. J. (2008). The Functional Theory of Counterfactual Thinking. *Personality and Social Psychology Review, 12*(2), 168-192. https://doi.org/10.1177/1088868308316091

Finney, S. J., & DiStefano, C. (2006). Non-normal and categorical data in structural equation modeling. In G. R. Hancock & R. O. Mueller (Eds.), *Structural equation modeling: A second course* (pp. 269-314). Greenwich, CT: Information Age.

Fresnics, A. & Borders, A. (2016). Anger Rumination Mediates the Unique Associations Between Self-Compassion and Anger and Aggression. *Mindfulness, 8*(3). https://doi.org/10.1007/s12671-016-0629-2

Garcia, L. F., Aluja, A., & Barrio, V. (2008). Testing the Hierarchical Structure of the Children's Depression Inventory: A Multigroup Analysis. *Assessment, 15*, 153-164. https://doi.org/10.1177/1073191107310310

Giannakopoulos, G., Kazantzi, M., Dimitrakaki, C., Tsiantis, J., Kolaitis, G., & Tountas, Y. (2009). Screening for Children's Depression Symptoms in Greece: The Use of the Children's Depression Inventory in a Nation-Wide School-Based Sample. *European child & adolescent psychiatry, 18*(8), 485-492. https://doi.org/10.1007/s00787-009-0005-z

Gilbert, P., Cheung, M., Irons, C., & McEwan, K. (2005). An Exploration into Depression-Focused and Anger-Focused Rumination in Relation to Depression in a Student Population. *Behavioral and Cognitive Psychotherapy, 33*, 273-283. https://doi.org/10.1017/S1352465804002048

Gilovich, T., Wang, R. X., Regan, D., & Nishina, S. (2003). Regrets of action and inaction across cultures. *Journal of Cross-Cultural Psychology, 34*(1), 61-71. https://doi.org/10.1177/0022022102239155

Giovazolias, T., Karagiannopoulou, E., & Mitsopoulou, E. (2017). Can the Factor Structure of Defense Style Questionnaire (DSM-40) Contribute to Our Understanding of Parental Acceptance/Rejection, Bullying, Victimization and Perceived Well-Being in Greek Early Adolescents? *European Journal of Psychology, 13*(2), 269-285. https://doi.org/10.5964/ejop.v13i2.1090

Giovazolias, T., Kourkoutas, E., Mitsopoulou, E., & Georgiadi, M. (2010). The relationship between perceived school climate and the prevalence of bullying behavior in Greek schools: Implications for preventive inclusive strategies. *Procedia Social and Behavioral Sciences, 5*, 2208-2215. https://doi.org/10.1016/j.sbspro.2010.07.437

Gómez-Ortiz, O., Romera, E. M., Ortega-Ruiz, R., Cabello, R., & Fernández-Berrocal, P. (2016). Analysis of Emotion Regulation in Spanish Adolescents: Validation of the Emotion Regulation Questionnaire. *Frontiers in Psychology*, *6*(1969). https://doi.org/10.3389/fpsyg.2015.01959

Gul, M., & Rana, S. (2013). Manifestation of Forgiveness, Subjective Well Being and Quality of Life. *Journal of Behavioral Sciences, 23*(2). https://www.researchgate.net/publication/261833846

Hampel, P., & Petermann, F. (2005). Age and Gender Effects on Coping in Children and Adolescents. *Journal of Youth and Adolescence*, *34*, 73-83. https://doi.org/10.1007/s10964-005-3207-9

Hancock, G. R., & Mueller, R. O. (2001). Rethinking construct reliability within latent variable systems. In R. Cudeck, S. du Toit, & D. Sörbom (Eds.), Structural equation modeling: Present and future-a festschrift in honor of Karl Joreskog. Lincolnwood, IL: Scientific Software International.

Hankin, B. L. (2015). Depression from childhood through adolescence: Risk mechanisms across multiple systems and levels of analysis. *Current Opinion in Psychology, 4*, 13-20. https://doi.org/10.1016/j.copsyc.2015.01.003

Hankin, B. L. (2008). Rumination and depression in adolescence: investigating symptom specificity in a multiwave prospective study. *Journal of clinical and adolescent psychology, 37*(4), 701-713. https://doi.org/10.1080/15374410802359627

Hankin, B. L., Snyder, H. R., & Gulley, L. D. (2016). Cognitive risks in developmental psychopathology. In D. Cicchetti (Ed.), Developmental psychopathology: *Maladaptation and psychopathology* (pp. 312-385). John Wiley & Sons, Inc.

Harmon, S. L., Stephens, H. F., Repper, K. K., Driscoll, K. A., & Kistner, J. A. (2019). Children's Rumination to Sadness and Anger: Implications for the Development of Depression and Aggression. *Journal of clinical and adolescent psychology, 48*(4), 622-632. https://doi:10.1080/15374416.2017.1359788

Hemphill, J. F. (2003). Interpreting the Magnitude of Correlation Coefficients. *American Psychologist.* https://doi:10.1037/0003-066X.58.1.78

Hennessy, D. A. (2017). The role of anger rumination in the frustration-aggression link. In J. F. A. Cruz & R. M. C. Sofia (Eds.), *Psychology of emotions, motivations and actions*. *Anger and anxiety: Predictors, coping strategies, and health effects* (pp. 201-215). Nova Science Publishers.

Hilt, L. M., Armostrong, J. M., & Essex, M. J. (2012). Early Family Context and Development of Adolescent Ruminative Style: Moderation by Temperament. *Cognition & emotion, 26*(5), 916-926. https://doi.org/10.1080/02699931.2011.621932

Hilt, L. M. & Pollak, S. D. (2013). Characterizing the Ruminative Process in Young Adolescents. *Journal of Clinical Child & Adolescent Psychology, 42*(4), 519-530. https://doi:10.1080/15374416.2013.764825

Holder, L. J., Prasad, A., Han, J., Torok, M., & Wong, Q. J. J. (2020). Shifting as a key executive function underlying cognitive restructuring for individuals with elevated social anxiety. Psychology and Psychotherapy: *Theory, Research and Practice*. https://doi.org/10.1111/papt.12301

Holmbeck, G. N., Li, S. T., Schurman, J. V., Friedman, D., & Coakley, R. M. (2002). Collecting and Managing Multisource and Multimethod Data in Studies of Pediatric Populations. *Journal of Pediatric Psychology*, *27*(1), 5-18. https://doi.org/10.1093/jpepsy/27.1.5

Hong, J. S., Espelage, D. L., & Rose, C. A. (2019). Bullying, Peer Victimization, and Child and Adolescent Health: An Introduction to the Special Issue. *Journal of Child and Family Studies, 28*, 2329-2334. https://doi:.org/10.1007/s10826-019-01502-9

Hu, L.t. & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1-55. https://doi.org/10.1080/10705519909540118

Jose, P. E. & Brown, I. (2008). When does the Gender Difference in Rumination Begin? Gender and Age Differences in the Use of Rumination by Adolescents. *Journal of Youth and Adolescence, 37*(2), 180-192. https://doi.org/10.1007/s10964-006-9166-y

Katsumata, Y. (2015). The effects of self-anger on rumination and on mental health. *Shinrigaku Kenkyu: The Japanese Journal of Psychology, 86*(4), 313-322. https://doi.org/10.4992/jjpsy.86.14049

Koh, K., & Zumbo, B. D. (2008). Multi-Group Confirmatory Factor Analysis for Testing Measurment Invariance in Mixed Item Format Data. *Journal of modern applied statistical methods: JMASM, 7*(2), 471-477. https://doi.org/10.22237/jmasm/1225512660

Kovacs, M. (1992). The Children's Depression Inventory (CDI) manual North Tanawanda. New York, NY: Multi-Health Systems. [Google Scholar]

Lazaratou, H., Kalogerakis, Z., Economou, M., & Xenitidis, K. (2017). Socioeconomic crisis and aggressive behavior of Greek adolescents. *International Journal of Social Psychiatry, 63*(6), 488-491. https://doi.org/10.1177/0020764017719737

Lee, Y-S., Krishnan, A., & Park, Y. S. (2012). Psychometric Properties of the Children's Depression Inventory: An Item Response Theory Analysis Across Age in a Nonclinical, Longitudinal, Adolescent Sample. *Measurement and Evaluation in Counseling and Development, 45*(2). https://doi.org/10.1177/0748175611428329

Lo, B. C. Y., Zhao, Y., Ho, Y. C., & Au, T. K. (2017). Psychometric properties of the Children's Response Styles Questionnaire in a Hong Kong Chinese community sample. *Health and Quality of Life Outcomes, 15*(198). https://doi.org/10.1186/s12955-017-0774-x

Logan, D. E., Claar, R. L., Guite, J. W., Kashikar-Zuck, S., Lynch-Jordan, A., Palermo, J. M., Wilson, A. C., & Zhou, C. (2013). Factor structure of the Children's Depression Inventory in a multisite sample of children and adolescents with chronic pain. *The Journal of Pain, 14*(7), 689-698. https://doi.org/10.1016/j.pain.2013.01.777

Lyubomirsky, S., Layous, K., Chancellor, J., & Nelson, S. K. (2015). Thinking about rumination: The scholarly contributions and intellectual legacy of Susan Nolen-Hoeksema. *Annual Review of Clinical Psychology, 11*, 1-22. https://doi.org/10.1146/annurev-clinpsy-032814-112733

Manasse, M. E., & Ganem, N. M. (2009). Victimization as a cause of delinquency: The role of depression and gender. *Journal of Criminal Justice, 37*, 371–378. https://doi.org/10.1016/j.jcrimjus.2009.06.004

Mardia, K. V. (1970). Measures of multivariate skewness and kurtosis with applications. *Biometrica, 57*(3), 519-530. https://doi.org/10.2307/2334770

Markos, A., Kokkinos, C. M. (2017). Development of a short form of the Greek Big Five Questionnaire for Children (GBFQ-C-SF): Validation among preadolescents. *Personality and Individual Differences, 112*, 12-17. https://doi.org/10.1016/j.paid.2017.02.045

Marsh, H. W., Morin, A. J. S., Parker, P. D., & Kaur, G. (2014). Exploratory structural equation modeling: an integration of the best features of exploratory and confirmatory factor analysis. *Annual Review of Clinical Psychology, 10*, 85–110. https://doi.org/10.1146/annurev-clinpsy-032813-153700

Martino, F., Caselli, G., Berardi, D., Fiore, F., Marino, E., Mencetti, M., Prunetti, E., Ruggiero, G. M., Sasdelli, A., Selby, E., Sassaroli, S. (2015). Anger rumination and aggressive behaviour in borderline personality disorder. *Personality and mental health, 9*(4), 277-287. https://doi: 10.1002/pmh.1310

Maughan, B., Collishaw, S., & Stringaris, A. (2013). Depression in Childhood and Adolescence. *Journal of the Canadian Academy of Child and Adolescent Psychiatry, 22*(1), 35-40.

Maxwell, J. P. (2004). Anger rumination: an antecedent of athlete aggression? *Psychology of Sport and Exercise, 5*(3), 279-289. https://doi.org/10.1016/S1469-0292(03)00007-4

Maxwell, J. P., Sukhodolsky, D., Chow, C. F. C., & Wong, F. C. (2005). Anger rumination in Hong Kong and Great Britain: Validation of the scale and a cross-cultural comparison. *Personality and Individual Differences, 39*(6), 1147-1157. https://doi.org/10.1016/j.paid.2005.03.022

McDonald, R. P. (1999). *Test theory: A unified treatment*. Lawrence Eribaum Associates Publishers.

McLaughlin, K. A., & King, K. (2015). Developmental Trajectories of Anxiety and Depression in Early Adolescence. *Journal of Abnormal Child Psychology, 43*(2), 311-323. https://doi.org/10.1007/s10802-014-9898-1

McLaughlin, K. A., Wisco, B. E., Aldao, A., & Hilt, L. M. (2014). Rumination as a Transdiagnostic Factor Underlying Transitions Between Internalizing Symptoms and Aggressive Behavior in Early Adolescents. *Journal of Abnormal Psychology, 123*(1), 13-23. https://doi.org/10.1037/a0035358

Meredith, W. (1993). Measurement invariance, factor analysis and factorial invariance. *Psychometrica, 58*(4), 525-543. https://doi.org/10.1007/BF02294825

Mezulis, A. H., Priess, H. A., & Hyde, J. S. (2011). Rumination Mediates the Relationship Between Infant Temperament and Adolescent Depressive Symptoms. *Depression Research and Treatment*. https://doi.org/10.1155/2011/487873

Morin, A. J. S., Arens, A. K., & Marsh, H. W. (2016). A bifactor exploratory structural equation modeling framework for the identification of distinct sources of construct-relevant psychometric multidimensionality. *Structural Equation Modeling: A Multidisciplinary Journal*, *23*(1), 116-139. https://doi.org/10.1080/10705511.2014.961800

Morin, A. J. S., Bourdias, J.-S., Marsh, H. W., McInerney, D. M., Dagenais-Desmarais, V., Madore, I., & Litalien, D. (2017). Complementary variable- and person-centered approaches to the dimensionality of psychometric constructs: Application to Psychological Wellbeing at Work. *Journal of Business and Psychology*, *32*, 395-419. https://doi.org/10.1007/s10869-016-9448-7

Morin, A. J. S., Marsh, H. W., & Nagengast, B. (2013). Exploratory structural equation modeling. In G. R. Hancock & R. O. Mueller (Eds.), *Quantitative methods in education and the behavioral sciences: issues, research, and teaching. Structural equation modeling: A second course* (pp. 395-436). IAP Information Age Publishing.

Murray, A. L., & Johnson, W. (2013). The limitations of model fit in comparing the bi-factor versus higher-order models of human cognitive ability structure. *Intelligence, 41*(5). https://doi.org/10.1016/j.intell.2013.06.004

Muthén, L. K., & Muthén, B. O. (2017). Mplus: Statistical Analysis with Latent Variables: User's Guide (Version 8). Los Angeles, CA: Authors.

Myers, N. D., Martin, J., Ntoumanis, N., Celimli, S., & Bartholomew, K. J. (2014). Exploratory Bifactor Analysis in Sport, Exercise, and Performance Psychology: A Substantive-Methodological Synergy. *Sport Exercise and Performance Psychology*, *3*, 258-272. https://doi.org/10.1037/spy0000015

Nakamichi, K. (2019). Young children's counterfactual thinking: Triggered by the negative emotions of others. *Journal of experimental child psychology, 187*. https://doi.org/10.1016/j.jecp.2019.06.012

Nasby, W., Hayden, B., & DePaulo, B. M. (1980). Attributional bias among aggressive boys to interpret unambiguous social stimuli as displays of hostility. *Journal of Abnormal Psychology, 89*(3), 459-468. https://doi.org/10.1037/0021-843X.89.3.459

Nolen-Hoeksema, S., Morrow, J., Fredrickson, B. L. (1993). Response styles and the duration of episodes of depressed mood. *Journal of Abnormal Psychology, 102*(1), 20-28. https://doi.org/10.1037/0021-843X.102.1.20

Nolen-Hoeksema, S. Wisco, B. & Lyubomirsky, S. (2008). Rethinking rumination. *Perspectives on Psychological Science, 3*(5), 400-424. https://doi.org/10.1111/j.1745-6924.2008.00088.x

Offredi, A., Caselli, G., Manfredi, C., Ruggiero, G. M., Sassaroli, S., Liuzzo, P., & Rovetto, F. (2016). Effects of anger rumination on different scenarios of anger: An experimental investigation. *The American Journal of Psychology, 129*(4), 381-390. https://doi.org/10.5406/amerjpsyc.129.4.0381

O' Neal, C. R., Weston, L., He, X., Huang, K-Y., Pine, D. S., Kamboukos, D., & Brotman, L. M. (2017). Change in depression across adolescence: The role of early anger socialization and child anger. *Journal of Adolescence, 59*, 1-7. https://doi.org/10.1016/j.adolescence.2017.05.011

Oral, T. & Arslan, C. (2017). The Investigation of University Students's Forgiveness Levels in Terms of Self-compassion, Rumination and Personality Traits. *Universal Journal of Educational Research, 5*(9), 1447-1456. https://doi.org/10.13189/ujer.2017.050902

Ortega-Andrade, N. O., Alcázar-Olán, R., Matías, O. M., Rivera-Guerrero, A.., & Domínguez-Espinosa, A. (2017). Anger Rumination Scale: Validation in Mexico. *The Spanish Journal of Psychology, 20*(e1), 1-9. https://doi.org/10.1017/sjp.2016.105

Osborne, J. W., Costello, A. B., & Kellow, J. T. (2008). Best Practices in Exploratory Factor Analysis. In J. W. Osborne (Ed.), *Best Practices in Quantitative Methods* (pp. 205-213). Thousand Oaks, CA: Sage Publishing.

Özyurt, G., Öztürk, Y., Onat, M., Mutlu, C., & Akay, A. (2021). Attachment, emotion regulation and anger expression in adolescent depression: Did comorbid anxiety disorder not have a role? *Current Psychology, 40*, 751-760. https://doi.org/10.1007/s12144-018-9985-5

Papadaki, E. & Giovazolias, T. (2015). The protective role of father acceptance in the relationship between maternal rejection and bullying: A moderated-mediation model. *Journal of Child and Family Studies, 24*(2), 330-340. https://doi.org/10.1007/s10826-013-9839-6

Papageorgiou, C., & Wells, A. (2004). Nature, functions, and beliefs about depressive rumination. In C. Papageorgiou & A. Wells (Eds.), *Depressive rumination: Nature, theory and treatment* (pp. 3-20). Chichester: Wiley.

Parikh, N., LaBar, K. S., & De Brigard, F. (2020). Phenomenology of counterfactual thinking is dampened in anxious individuals. *Cognition and Emotion*, *34*(8), 1737-1745.https://doi.org/10.1080/02699931.2020.1802230

Patel S., Day T. N., Jones, N., & Mazefsky, C. A. (2017). Association between anger rumination and autism symptom severity, depression symptoms, aggression, and general dysregulation in adolescents with autism spectrum disorder. *Autism, 21*(2), 181-189. https://doi.org/10.1177/1362361316633566

Peled, M. & Moretti, M. M. (2007). Rumination on Anger and Sadness in Adolescence: Fueling of Fury and Deepening of Despair. *Journal of Clinical Child & Adolescent Psychology, 36*(1), 66-75. https://doi:10.1080/15374410709336569

Perry-Parrish, C., Webb, L., Zeman, J., Spencer, S., Malone, C., Borowski, S., Reynolds, E., Hankinson, J., Specht, M., & Ostrander, R. (2017). Anger Regulation and Social Acceptance in Early Adolescence: Associations With Gender and Ethnicity. *Journal of Early Adolescence*, *37*(4), 475-501. https://doi.org/10.1177/0272431615611255

Pittman, C. T. (2011). Getting Mad But Ending Up Sad: The Mental Health Consequences for African Americans Using Anger to Cope With Racism. *Journal of Black Studies, 42*(7), 1106-1124. https://doi.org/10.1177/0021934711401737

Podsakoff, P. M., MacKenzie, S. B., Lee, J-Y., & Podsakoff, N. P. (2003). Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies. *Journal of Applied Psychology, 88*(5), 879-903. https://doi.org/10.1037/0021-9010.88.5.879

Putnick, D. L. & Bornstein, M. H. (2016). Measurement Invariance Conventions and Reporting: The State of the Art and Future Directions for Psychological Research. *Developmental Review, 41*, 71-90. https://doi.org/10.1016/j.dr.2016.06.004

Ramos-Cejudo, J., Saiguero, J. M., Kannis-Dymand, L., García-Sancho, E., & Love, S. (2017). Anger rumination in Australia and Spain: Validation of the Anger Rumination Scale. *Australian Journal of Psychology, 69*(4). https://doi.org/10.1111/ajpy.12154

Reise, S. P. (2012). The rediscovery of bifactor measurement models. *Multivariate Behavioral Research, 47*(5), 667-696. https://doi.org/10.1080/00273171.2012.715555

Reise, S. P., Bonifay, W. E., & Haviland, M. G. (2013a). Scoring and modeling psychological measures in the presence of multidimensionality. *Journal of Personality Assessment, 95*, 129-140. https://doi.org/10.1080/00223891.2012.725437

Reise, S. P., Kim, D. S., Mansolf, M., & Widaman, K. F. (2016). Is the Bifactor Model a Better Model or Is It Just Better at Modeling Implausible Responses? Application of Iteratively Reweighted Least Squares to the Rosenberg Self-Esteem Scale. *Multivariate behavioral research, 51*(6), 818-838. https://doi:10.1080/00273171.2016.1243461

Reise, S. P., Moore, T. M., & Haviland, M. G. (2010). Bifactor Models and Rotations: Exploring the Extent to which Multidimensional Data Yield Univocal Scale Scores. *Journal of Personality Assessment, 92*(6), 544-559. https://doi.org/10.1080/00223891.2010.496477

Reise, S. P., Morizot, J., & Hays, R. D. (2007). The role of the bifactor model in resolving dimensionality issues in health outcomes measures. *Quality of Life Research, 16*(1), 19-31. https://doi.org/10.1007/s11136-007-9183-7

Reise, S. P., Scheines, R., Widaman, K. F., & Havidand, M. G. (2013b). Multidimensionality and Structural Coefficient Bias in Structural Equation Modeling: A Bifactor Perspective. *Educational and Psychological Measurement, 73*(1), 5-26. https://doi.org/10.1177/0013164412449831

Repper, K. K. (2006). *The relationship between anger rumination and aggression in childhood*. Unpublished doctoral dissertation, Florida State University, Tallahassee. [Google Scholar]

Reynes, E., Berthouze-Aranda, H. E., Guilet-Descas, E., Chabaud, P., & Deflandre, A. (2013). French validation of the Anger Rumination Scale (ARS). *The Brain, 39*(5), 339-346. https://doi.org/10.1016/j.encep.2012.11.006

Riley, K. E., Park, C. L., & Laurenceau, J-P. (2019). A Daily Diary Study of Rumination and Health Behaviors: Modeling Moderators and Mediators. *Annals of Behavioral Medicine, 53*(8), 743-755. https://doi.org/10.1093/abm/kay081

Rodriguez, A., Reise, S. P., & Haviland, M. G. (2016). Evaluating Bifactor Models: Calculating and Interpreting Statistical Indices. *Psychological Methods, 21*(2), 137-150. https://dx.doi.org/10.1037/met0000045

Rohlf, H. L. & Krahé, B. (2015). Assessing anger regulation in middle childhood: Development and validation of a behavioral observation measure. *Frontiers in Psychology, 6*(453). https://doi:10.3389/fpsyg.2015.00453

Rood, L., Roelofs, J. Bogels, S. M., Nolen-Hoeksema, S., & Schouten, E. (2009). The influence of emotion-focused rumination and distraction on depressive symptoms in non-clinical youth: A meta-analytic review. *Clinical Psychology Review, 29*(7), 607-616. https://doi.org/10.1016/j.cpr.2009.07.001

Sachs-Ericsson, N., Selby, E. A., Hames, J. L., Joiner, T. E., Fingerman, K. L., Zarit, S. H., Birditt, K. S., & Hilt, L. M. (2014). Transmission of parental neuroticism to offspring's depression: The mediating role of rumination. *Personal Mental Health, 8*(4), 306-319. https://doi.org/10.1002/pmh.1268

Sahu, A., Gupta, P., & Chatterjee, B. (2014). Depression is More Than Just Sadness: A Case of Excessive Anger and Its Management in Depression. *Indian Journal of Psychological Medicine, 36*(1), 77-79. https://doi.org/10.4103/0253-7176.127259

Sarićam, H. (2017). Exploring revenge as a mediator between bullying and victimization in gifted and talented students. *Current Issues in Personality Psychology*. https://doi.org/10.5114/cipp.2018.72267

Satici, S. A. (2014). Anger Rumination Scale: Psychometric properties of the Turkish version. *Anatolian Journal of Psychiatry, 15*, 328-334. https://doi.org/10.5455/apd.42654

Sauer-Zavala, S. E., Geiger, P. J., & Baer, R. A. (2013). The Effect of Anger Rumination in the Relationship Between Borderline Personality Disorder Symptoms and Precursors. *Journal of Personality Disorders, 27*(4), 465-472. https://doi.org/10.1521/pedi_2013_27_098

Schmitt, M., Baumert, A., Gollwitzer, M. & Maes, J. (2010). The Justice Sensitivity Inventory: Factorial Validity, Location in the Personality Facet Space, Demographic Pattern, and Normative Data. *Social Justice Research, 23*(2), 211-238. https://doi.org/10.1007/s11211-010-0115-2

Schmitt, T. A., Sass, D. A., Chappelle, W., & Thompson, W. (2018). Selecting the "Best" Factor Structure and Moving Measurement Validation Forward: An Illustration. Journal of Personality Assessment. https://doi.org/10.1080/00223891.2018.1449116

Schweizer, T. H., Olino, Th. M., Dyson, M. W., Laptook, R. S., Klein, D. N. (2018). Developmental Origins of Rumination in Middle Childhood: The Roles of Early Temperament and Positive Parenting. *Journal of Clinical Child & Adolescent Psychology, 47*(1), 409-420. https://doi.org/10.1080/15374416.2017.1359787

Selby, E. A., Anestis, M. D., Bender, T. W., & Joiner, T. E. (2009). An Exploration of the Emotional Cascade Model in Borderline Personality Disorder. *Journal of Abnormal Psychology, 118*(2), 375-387. https://doi.org/10.1037/a0015711

Selby, E. A., Anestis, M. D., & Joiner, T. E. (2008). Understanding the relationship between emotional and behavioral dysregulation: Emotional Cascades. *Behavioral Research and Therapy, 46*, 593-611. https://doi.org/10.1016/j.brat.2008.02.002

Smith, J. M. & Alloy, L. B. (2009). A roadmap to rumination: A review of the definition, assessment, and conceptualization of this multifaceted construct. *Clinical Psychology Review*, *29*(2), 116-128. https://doi:10.1016/j.cpr.2008.10.003

Smith, S. D., Stephens, H. F., Repper, K., & Kistner, J. A. (2016). The relationship between anger rumination and aggression in typically developing children and high-risk adolescents. *Journal of Psychopathology and Behavioral Assessment, 38*(4), 515-527. https://doi.org/10.1007/s10862-016-9542-1

Suhr, K. A., & Nesbit, S. M. (2013). Dwelling on 'Road Rage': The effects of trait rumination on aggressive driving. *Transportation Research Part F: Traffic Psychology and Behaviour, 21*, 207-218. https://doi.org/10.1016/j.trf.2013.10.001

Sukhodolsky, D. G., Golub, A., & Cromwell, E. N. (2001). Development and validation of the anger rumination scale. *Personality and Individual Differences, 31*, 689-700. https://doi:10.1016/S0191-8869(00)00171-9

Sütterlin, S., Paap, M. C. S., Babic, S., Kübler, A., & Vögele, C. (2012). Rumination and Age: Some Things Get Better. *Journal of Aging Research*, 2012, 267327. https://doi.org/10.1155/2012/267327

Tabachnick, B. G., & Fidell, L. S. (2001). *Using Multivariate Statistics* (4th ed.). Needham Heights, MA: Allyn and Bacon.

Takebe, M., Takahashi, F., & Sato, H. (2016). Anger rumination as a risk factor for trait anger and anger-in: A longitudinal study. *Personality and Individual Differences, 101*, 451-455. https://doi:10.1016/j.paid.2016.06.038

Tamres, L., Janicki, D., & Helgeson, V. S. (2002). Sex Differences in Coping Behavior: A Meta-Analytic Review and an Examination of Relative Coping. *Personality and Social Psychology Review, 6*(1), 2-30. https://doi.org/10.1207/S15327957PSPR0601_1

Toro, R. A., García, J. G., & Zaldivar, F. (2020). Factorial Structure and Invariance Analysis of the Anger Rumination Scale ARS Spanish version. *Annals of psychology, 36*(3), *475-482*. https://doi.org/10.6018/analesps.394021

Uceda, I. M., Bleda, J. H. L., Nieto, M. Á. P., & Sukhodolsky, D. G., & Martínez, A. E. (2016). Psychometric properties of the Spanish adaption of the Anger Rumination Scale: Evidence of reliability and validity in the general population. *The Spanish Journal of Psychology, 19*. https://doi.org/10.1017/sjp.2016.17

Vasqeuz, E. A., Osman, S., & Wood, J. L. (2012). Rumination and the discplacement of aggression in United Kindom gang-affiliated youth. *Aggressive Behavior, 38*(1), 89-97. https://doi:10.1002/ab.20419

Vernberg, E. M., Jacobs, A. K., & Hershberger, S. L. (1999). Peer victimization and attitudes about violence during early adolescence. *Journal of Clinical Psychology, 28*, 386-395. https://doi.org/10.1207/S15374424jccp280311

Volkaert, B., Wante, L., Van Beveren, M-L., Vervoort, L., & Braet, C. (2020). Training Adaptive Emotion Regulation Skills in Early Adolescents: The Effects of Distraction, Acceptance, Cognitive Reappraisal, and Problem Solving. *Cognitive Therapy and Research, 44*, 678-696. https://doi.org/10.1007/s10608-019-10073-4

Watkins, E. & Baracaia, S. (2002). Rumination and social problem-solving in depression. *Behaviour Research and Therapy, 40*(10), 1179-89. https://doi:10.1016/s0005-7967(01)00098-5

Widiger, T. A., & Oltmanns, J. R. (2017). The general factor of psychopathology and personality. *Clinical Psychological Science, 5*(1), 182-183. https://doi.org/10.1177/2167702616657042

Young, K.S., Sandman, C.F., & Craske, M.G. (2019). Positive and Negative Emotion Regulation in Adolescence: Links to Anxiety and Depression. *Brain Sciences, 9*(4), 76. https://doi.org/10.3390/brainsci9040076

Zacharopoulou, V., Tsironi, M., Zyga, S., Gialama, F., Zacharopoulou, G., Grammatikopoulos, I., Avraam, N., & Prezerakos, P. (2014). Depressive Symptoms Among Adolescent Students in Greek High Schools. *Health psychology research, 2*(3). https://doi.org/10.4081/hpr.2014.1962

Zsila, Á., Urbán, R., Griffiths, M. D., & Demetrovics, Z. (2018). https://doi.org/10.1016/j.jecp.2019.06.012 Gender Differences in the Association Between Cyberbullying Victimization and Perpetration: The Role of Anger Rumination and Traditional Bullying Experiences. *International Journal of Mental Health and Addiction, 17*, 1252-1267. https://doi.org/10.1007/s11469-018-9893-9

3. Study 2

Anger Rumination in Early Adolescence: Risk Factor or Outcome of Depressive Symptoms? A Prospective Study

Abstract

Anger rumination is a maladaptive cognitive-emotional process associated with aversive adjustment outcomes. Despite of evidence showing a close relationship between anger rumination and depressive symptoms across adolescence, their longitudinal relationship is still unknown. The goal of the present study was to examine the bidirectional association between self-reported anger rumination and depressive symptoms at two waves, spaced 1-year. Participants were 304 early adolescents (44.7% boys; M_{age} = 10.80 years, *SD* = .16). Cross-lagged analyses showed that depressive symptoms predicted increases in anger rumination but not vice versa. These relationships were consistent across boys and girls. Overall, the findings suggest that depressive symptoms may be a potential risk factor for anger rumination in early adolescence. Implications for preventions and treatments are also discussed.

3.1 Introduction

Anger coping deficits have long been associated with internalizing problems in adolescence (Jackson et al., 2011). Surprisingly, the vast majority of published research still focuses on sadness rumination so as to explain youth depression (Krause et al., 2018). The few studies that have already examined anger rumination in relation to adolescents' depressive symptoms have been cross-sectional in design and, thus, do not allow for inferences regarding directions of effect (Harmon et al., 2019; Spyropoulou & Giovazolias, 2021). Empirically supported theoretical models have shown that impairments in regulating effectively negative emotions may place adolescents at risk for later increases in depressive symptoms (Abela & Hankin, 2011; Young et al., 2022). Evidence, however, suggest that depressive symptoms may precede increased used of unconstructive emotion regulation strategies (de Jong Heesen et al., 2021; Larsen et al., 2013). Accordingly, maladaptive emotion regulation strategies and depressive symptoms can be mutually reinforcing and bidirectional (Calvete et al., 2015). Existing research has long underscored the need to disentangle the temporal associations between anger rumination and depressive symptoms (du Pont et al., 2018). As far as we know, this issue has not been addressed in any published article yet. Early adolescence is a transitive developmental period that marks the emergence of both rumination and depression (Wagner et al., 2015). Increased levels of anger are also commonly reported by youth (Lök et al., 2018). Consequently, understanding how anger rumination and depressive symptoms are related over time, is important for effective preventions and treatments. The current study used a longitudinal design to examine the bidirectional relationship between anger rumination and depressive symptoms among Greek early adolescents.

Rumination refers to intrusive and repetitive thoughts that revolve around the causes, meanings, and consequences of distress symptoms (Nolen-Hoeksema et al., 2008). Being initially conceptualized as an inward-focus and unintentional response style towards sad mood, rumination is also involved with hyperactive mood states, such as anger (Sukhodolsky et al., 2001).

Anger rumination entails the propensity to perseverate on personally meaningful anger provoking events (Denson, 2013). It is an unconstructive cognitive-emotion regulation strategy, closely associated with prolonged anger, emotional arousal and revengeful thinking (Sukhodolsky et al., 2001). Anger rumination may be initiated when a person experiences a discrepancy between one's desired state and one's actual state (see Denson, 2013). For example, anger rumination in adolescence may occur

following peer victimization, which represents a discrepancy between one's current state of being harassed and one's desired state of being socially accepted. People may vary in the tendency to ruminate when angered (Sukhodolsky et al., 2001). While some engage in a state rumination until the discrepancy is resolved, other seem unable to stop thinking about the angry episode and how it happened. Literature suggests that frequent endorsement of rumination in response to negative affect may turn gradually this emotion-focused strategy into a mental habit, with deleterious effects (Hjartarson et al., 2021). Indeed, habitual ruminators' inability to shift attention away from distressing thoughts usually leads to decreases in social adjustment and subjective well-being by impairing problem solving and instrumental behavior (see Luca, 2019). Rumination tendencies mark an increase in early adolescence, a life period that also coincides with a sharp rise in depressive symptoms, particularly among females (Wagner et al., 2015). Depressive symptoms are a common mental health problem with negative and lasting effects on individuals' psychological, physical, and emotional functioning (Clayborne et al., 2019). A recent longitudinal population-based study in old children and young adolescents reported point-prevalence of depressive symptoms just under 10% and a 12-month period prevalence of almost 3% (Juul et al., 2021). Early adolescents' vulnerability to depressive symptoms is usually attributed to important social, physical, cognitive and neurobiological changes that occur during this transitive developmental phase of life (Steinberg, 2005). For example, the emerging ability for formal operational thought and semi-abstract thinking increases risk for depressogenic self-discrepant thoughts (see Stevens et al., 2014). Furthermore, prefrontal cortex (PFC), a brain area, implicated in executive cognitive functioning and self-regulation, is still underdeveloped, rendering young people susceptible to emotional and behavioral problems (Wagner et al., 2015). Understanding depression-related processes is important in ameliorating the persistence or severity of depressive symptoms as well as in reducing risk for subsequent depression later in life (Johnson et al., 2018). Emotion regulation difficulties have long been underscored as a potential risk factor and/or as an outcome of depression (Calvete et al., 2015).

Anger Rumination as a Risk Factor for Depressive Symptoms

The vulnerability model rooted in the Response Styles Theory states that habitual ruminative thinking places individuals at risk for increases in depressive symptoms over time (Nolen-Hoeksema,

1991). According to this model, anger rumination is regarded as a stable trait (i.e., construct's interindividual stability is maintained over time) that persists before, during, and after periods of depressive symptoms (Caspi et al., 2005). Whether anger rumination precedes and positively predicts depressive symptoms in youth has not been yet examined. However, this might be expected as maladaptive emotion regulation strategies have long been found to increase adolescents' susceptibility to depression. For example, suppression of positive emotions was associated with later increases in anhedonia, a core affective facet of depression, among 228 Mexican adolescents (Young et al., 2022). Similarly, frequent endorsement of sadness rumination in 382 adolescents (11-15 years) was related with a greater likelihood of experiencing later depressive symptoms (Abela & Hankin, 2011). Based on literature findings there are several factors that could account for the hypothesized anger rumination – depression link. In a longitudinal study conducted with 165 early adolescents, baseline anger rumination was uniquely associated with subsequent increases in proneness to anger, a tendency known as irritability (Leigh et al., 2020). Youth irritability, usually manifested through temper outbursts, may increase risk for later depression by rendering individuals vulnerable to aversive interpersonal experiences (Vidal-Ribas & Stringaris, 2021). In support of this notion, previous work has shown symptoms of irritability to be a strong predictor of peer victimization (Chen et al., 2021). Alongside with irritability, cognitive distortions represent another mechanism that might explain why anger rumination may increase likelihood of later depressive symptoms. Recently, it was reported that frequent endorsement of anger rumination positively predicts subsequent increases in individuals' hostile attribution bias, a processing style that involves negative interpretations of others' intentions (Hébert et al., 2021). This is expected as prolonged allocation of one's own attention to causes and consequences of a provoking event reduces likelihood to reappraise by considering alternative explanations of the situation (Lyubomirsky et al., 2015). Interpreting others' intentions as hostile may, in turn, activate dysfunctional behaviors (e.g. aggression, withdrawal) that generate depressogenic interpersonal stressors (Calvete et al., 2015). Indeed, findings have shown that youth with increased levels of hostile attribution bias may be less accepted and more likely to become targets of peer bullying (Kokkinos & Voulgaridou, 2016). In a similar vein, the high levels of threat sensitivity that angry individuals tend to display usually indicate biased attributions of uncontrollability (Gardner & Moore, 2014), an established precursor of depression (Sanjuán & Magallares, 2009).

Anger Rumination as an Outcome of Depressive Symptoms

The scar model states that depressive symptoms precede and affect in a negative way central domains of human functioning, including cognitive ones (Lewinsohn et al., 1981). In line with this model anger rumination is conceptualized as a consequence rather than as a vulnerability factor for later depressive symptoms. Whether depressive symptoms precipitate anger rumination is still unexplored. However, there are several arguments to claim this statement. For example, in studies examining the bidirectional relationship between depressive symptoms and unconstructive emotion regulation strategies, depressive symptoms emerged as a risk factor and not as a consequence of adolescents' difficulty to regulate effectively emotions (de Jong-Heesen et al., 2021; Larsen et al., 2013). Anger rumination as a scarring effect of depressive symptoms may also be accounted for by several underlying mechanisms. One such is peer victimization which has recently been established as a potential precursor of anger rumination in adolescence (Camacho et al., 2021). Evidence suggest that depressed-prone adolescents usually display behaviors (e.g., passivity) that elicit experiences of rejection and harassment by the peer group (Kochel et al., 2012). These aversive experiences may generate actual versus ideal-self discrepancies, which, in turn, may activate anger rumination in order to be resolved. For example, revengeful thinking, inherently embedded in the anger rumination process, seems to help victims of bullying alleviate feelings of frustration and gain a pseudo-control by virtually punishing the aggressor (Goldner et al., 2019).

Deficits in executive functioning (EF) represent another mechanism that could also explain why depressive symptoms might lead to anger rumination. EF refers to higher order cognitive processes that enable goal-directed behavior by regulating thoughts and actions (Nigg, 2017). Recently, it was reported that higher initial levels of internalizing symptoms in early adolescence negatively predict EF over time (Brieant et al., 2020). Problems in EF may foster anger rumination tendencies by rendering individuals vulnerable to dependent life stressors (Snyder & Hankin, 2016). For example, low inhibition control is a core EF deficit that increases risk for peer victimization as it intensifies individuals' engagement in impulsive behaviors (e.g., interrupting others) that peers may find disruptive and annoying (see Fanti & Kimonis, 2012). Closely related to peer victimization, victims-justice sensitivity is an empirically supported outcome of depression that could also explain the hypothesized reinforcing role of depressive symptoms on anger rumination (Bondü et al., 2017). That

is because individuals with high perceptions of being unfairly treated or being taken advantage of, usually engage in maladaptive affective and coping responses, including anger and rumination (Schmitt et al., 2010).

The Role of Gender

Regarding gender-based differences, research findings have shown concurrent associations between anger symptoms and depression to be stronger for girls than for boys (Asgeirdottir & Sigfusdottir, 2014). Whether the hypothesized anger rumination-depression link differs by sex has not been yet examined. However, evidence suggest that this might be expected. For example, the greater co-rumination (i.e., discussing problems and focusing on distress symptoms) that girls usually display compared to boys seems to exert a positive influence on levels of depression by increasing individual rumination (Stone & Gibb, 2015). In other words, girls' higher propensity to talk over with a friend about the causes and consequences of anger-provoking events may predispose them to more individual rumination, and thus, greater experiences of depressive symptoms. Similarly, depressive symptoms may intensify co-rumination, and, thus, increase girls' susceptibility to later anger rumination (Stone et al., 2010). Inversely, boys seem to endorse more distractive responses which may buffer the relations between anger rumination and depression over time (Abela et al., 2004). Overall, existing findings suggest that the hypothesized mutual anger rumination-depression link might be stronger for girls.

Current Study

Despite of evidence showing a close relationship between anger rumination and depressive symptoms across adolescence, their longitudinal relationship is still unknown. The goal of the present study was to examine the bidirectional association between anger rumination and depressive symptoms in early adolescence and to investigate how this association differs by sex. Drawing on past research, it was expected to find evidence for a longitudinal bidirectional relationship between anger rumination and depressive symptoms. The mutual anger rumination-depressive symptoms link was also expected to be stronger for girls than for boys.

3.2 Methods

Procedure and Participants

Participants were recruited from 13 primary public schools, all located in Heraklion of Crete. Oral permission by school principals and teachers were obtained prior to research. An enveloped letter, including written detailed information about the study, parental consent form as well as a short demographic questionnaire (e.g., mother education) were sent to all parents of 5th graders in participating schools. Students with signed parental permission were thoroughly informed regarding the anonymous, confidential, voluntary, and no compensatory nature of their participation. Those who orally agreed to participate were given a unique personal code and, then, were gathered in a classroom during a class period (~45 min.) to complete two paper-and-pencil brief self-report measures. Two randomized versions of the A and B questionnaires were used to reduce the common method bias (Podsakoff et al., 2003). Data were collected two times, Time 1 (T1) and Time 2 (T2) respectively (~ 8 weeks after the start of the fall semester) with 1 year time interval.

The convenience sample at T1 comprised 369 students (consent rate = 82%; M_{age} = 10.60, *SD* = 0.18; 45.8% boys). Absenteeism and validity checks reduced the initial sample to 304 participants (M_{age} = 10.80 years, *SD* = 0.16; 44.7% boys) at T1 (attrition rate = 17.6%) which was considered satisfactory enough (> 200) for proceeding with structural equation modeling (SEM; Kline, 2016). Students who participated at both temporal occasions did not significantly differ from those who responded only at first occasion neither in demographic variables [gender, $\chi^2(1) = 0.79$, $p = 0.38$; mother education, $\chi^2(5) = 6.66$, $p = 0.25$; father education, $\chi^2(5) = 2.56$, $p = 0.77$] nor in the study variables [anger rumination, $t(347) = 1.46$, $p = 0.15$; depressive symptoms, $t(360) = 0.66$, $p = 0.51$]. Thus, results did not seem to be influenced by any systematic drop out.

Measures

Anger rumination

Anger rumination (AR) was assessed with the Children's Anger Rumination Scale (CARS; Smith et al., 2016; Spyropoulou & Giovazolias, 2021). CARS is a reliable and valid 19-item self-report instrument that assesses children's tendency to ruminate in response to anger (i.e., "I think a lot about

times when I was angry"). Participants responses are rated on a 4-point Likert-scale, ranging from 1(almost never) to 4 (almost always). The CARS was adapted from the Anger Rumination Scale (ARS; Sukhodolsky et al., 2001) to be developmentally appropriate and psychometrically sound in children and early adolescents (Smith et al., 2016). CARS's psychometric properties and unidimensional factorial structure were recently supported in 552 Greek students (Spyropoulou & Giovazolias, 2021). In the present study, internal consistency of the CARS was (T1, ω = 0.90, *SE* = 0.10, [95%CI] = [0.88, 0.92], α = 0.90; T2, ω = 0.92, *SE* = 0.01, [95%CI] = [0.90, 0.94], α = 0.92).

Depressive symptoms

Depressive symptoms (DS) were assessed with the Children's Depression Inventory (CDI; Kovacs, 1992; Giannakopoulos et al., 2009). CDI is a 27-item self-report questionnaire that targets cognitive, affective and behavioral signs of depression in children and adolescents 7-17 years of age (i.e., "I feel like crying every day"). Participants responses are rated on a 3-point Likert-scale, ranging from 0 (absence of symptoms) to 2 (definite symptoms). The 26th suicidal ideation item ("I want to kill myself") was omitted in request of the Institute of Educational Policy and the Greek Ministry of Education. In line with previous studies (Lee et al., 2012) the one-factorial structure of the CDI was marginally confirmed, $\chi^2_{(293)}$ = 415.56, CFI = 0..90, TLI = 0.90, RMSEA[90%CI] = 0.04[0.03, 0.05]. Internal consistency of the CDI was (T1, ω = 0.84, *SE* = 0.02, [95%CI] = [0.81, 0.86], α = 0.84; T2, ω = 0.85, *SE* = 0.02, [95%CI] = [0.82, 0.87], α = 0.84).

Control and moderator variables

Gender was self-reported by the participants. It was coded as "0 = boys" and "1 = girls".

Analysis Plan

Statistical analyses were conducted using IBM Statistical Package for the Social Science (SPSS) version 25.0 and the Mplus version 8.1. Univariate skewness (T1, AR = 0.91; DS = 0.40; T2, AR = 1.10; DS = 0.63) and kurtosis (T1, AR = 0.65; DS = 0.41; T2, AR = 0.92; DS = 0.57) were under the

recommended ranges of +/- 2 and +/- 10 (Kline, 2011). Validity of study's conclusions did not seem to be obviously threaten by common-method bias, as the Harman's one-factor test indicated a first common factor with variance of 17.85%, which was less than 40% of the critical criteria (Podsakoff et al., 2003). Associations between variables were tested with Pearson correlations (r = 0.10 to 0.29, small; r = 0.30 to 0.50, medium; r > 0.50, large; Cohen, 1988). Gender mean differences on all study variables across T1/T2 were assessed with independent samples t tests. Cohen's d effect sizes (d = 0.20, small; d = 0.50, medium; d = 0.80, large) were also reported (Cohen, 1988). Latent structural equation modeling (SEM) was performed to partial out the biasing effect of measurement error, leading to more valid values (Ledgerwood & Shrout, 2011); 0.10% of the data were missing for AR (T1/T2) and 0.30% of the data were missing for DS (T1/T2). Little's MCAR test was significant, $\chi^2(3189) = 3397.20$, $p < 0.01$, but the normed chi-square (χ^2/df) was low (3,397/3189 = 1.07), implying a small violation of the MCAR assumption (missing completely at random data). Multivariate normality, T1 (skewness = 61.39; kurtosis = 68.38, $p < 0.001$); T2 (skewness = 86.40, kurtosis = 88.60, $p < 0.001$) (Mardia, 1970) was also not accomplished. Therefore, Full Information Maximum Likelihood (FIML) with Robust standard errors (MLR; Satorra & Bentler, 2001) was applied. The unidimensional structure of the study measures in conjunction with the multi-item latent factors indicated the beneficial parceling procedure (Matsugana, 2008). The nineteen items of the CARS and the twenty-six items of the CDI were randomly assigned to three parcel each (T1/T2), following the random parceling process (Matsugana, 2008). Using Confirmatory Factor Analysis (CFA) a two-factor model being represented by the two distinct constructs (AR and DS) was systematically compared (T1/T2) to a single-factor model (all indicators loaded on a single factor) to evaluate if the parcels indicators measured the latent constructs as intended as well as to further detect any possible estimation bias; the two latent factors were allowed to freely covary. Constructs' convergent validity would be established with Average Variance Extracted (AVE) item-parcels' values being equal or greater than 0.50 and lower than Composite Reliabilities (CR). Accordingly, constructs' discriminant validity would be accomplished with factor correlations lower |.80| (Brown, 2015) and the square root values of AVE (√AVE) being higher than the r between latent factors (Fornell & Larcker, 1981). Multi-group CFA was employed to test measurement invariance of the two-factor model across both time and gender; a model in which factor loadings were constrained to be equal across both time and gender was compared with the baseline model in which factor loadings were freely estimated across both time and gender (Newson,

2015). Reciprocal associations between AR and DS were tested using a two-wave latent cross-lagged model (CLPM) design, which estimates the amount and strength of the longitudinal effect of one investigated construct on another (cross-lagged effects) by taking into account within time associations (cross-sectional correlations) as well as across-time stability (autoregressive effects) (Cole & Maxwell, 2003). Gender was also included as control variable in the longitudinal model tested; both latent variables were regressed on gender at both times of measurement. Significant differences between the cross-lagged beta weights would be established a chi-square difference test ($\Delta\chi^2 < 0.05$) between the constrained model (both paths were set to be equal) and the unconstrained model (both paths were freely estimated). Finally, possible gender differences in associations tested were examined using multi-group CFA. A baseline model in which only factor loadings of the measurement part were set to be equal for boys and girls was compared with a constrained model in which cross-sectional correlations (ART1→ DST1; ART2→DST2), autoregressive paths (ART1 → ART2; DST1→DST2) and cross-lagged paths (ART1 → DST2; DST1→ART2) were also set to be equal for both groups. Significant moderation would be supported with a significant chi-square difference test ($\Delta\chi^2 < 0.05$) between the constrained and the baseline model. In that case follow-up models would be employed to further probe which path(s) or association(s) differed by gender. Particularly, a model in which each path or association would be separately freed would be compared with the constrained model to test for significant moderation of the individual path or association.

In general, model fit was assessed based on the standard conventions (comparative fit index, CFI ≥ 0.90; Tucker-Lewis index, TLI ≥ 0.90; root mean square error of approximation, RMSEA ≤ 0.08; Kline, 2016). Measurement invariance across both time and gender would be supported with a $\Delta\chi^2 >$ 0.05 (i.e., the model constraints do not worsen the model fit; Satorra & Bentler, 2001) and the criterion of ΔCFI, ΔTLI, and ΔRMSE ≤ 0.01 (Chen, 2007). For multi-group analysis the general rule of thumb of 100 participants in each group (Kline, 2016) was accomplished (boys = 136; girls = 168). Alongside with the most widely used Cronbach's alpha (α), measures' internal consistency was assessed using omega (ω) coefficient (McDonald, 1999) which seems to outperform *α* under violations of tau-equivalence (Trizano-Hermosilla & Alvarado, 2016). Respondents were nested within 13 schools. Thus, the type is COMPLEX procedure in Mplus was applied to control for the negative possible impact of nestedness of the data within schools.

3.3 Results

Preliminary Analyses

Descriptive statistics

Correlations, means, and standard deviations for all study variables are presented in Table 1. All correlations were significant and moderate to strong for both boys and girls. The observed mean level of AR was significantly higher among girls than boys only in T2 (T1, $t_{(296)} = -1.36$, $p = 0.18$, $d = -0.16$; T2, $t_{(298)} = -3.50$, $p < 0.01$, $d = -0.41$). Significantly higher levels of DS were also found among girls at both times of measurement (T1, $t_{(284)} = -3.44$, $p < 0.01$, $d = -0.41$; T2, $t_{(284)} = -2.41$, $p < 0.05$, $d = -0.29$).

Table 1 Correlations for Girls (Above the Diagonal) and Boys (Below the Diagonal) and Descriptives of Study Variables.

Variable	AR (T1)	AR (T2)	DS (T1)	DS (T2)
AR (T1)	-	0.44**	0.47**	0.34**
AR (T2)	0.48**	-	0.40**	0.61**
DS (T1)	0.53**	0.44**	-	0.56**
DS (T2)	0.45**	0.66**	0.58**	-
$\overline{X}$	1.97	1.86	0.63	0.58
SD	0.56	.58	0.24	0.24

Note. AR = Anger Rumination, *DS* = Depressive Symptoms, *T1* = Time 1, *T2* = Time 2.
**p <.01

Factorial structure and longitudinal invariance across gender

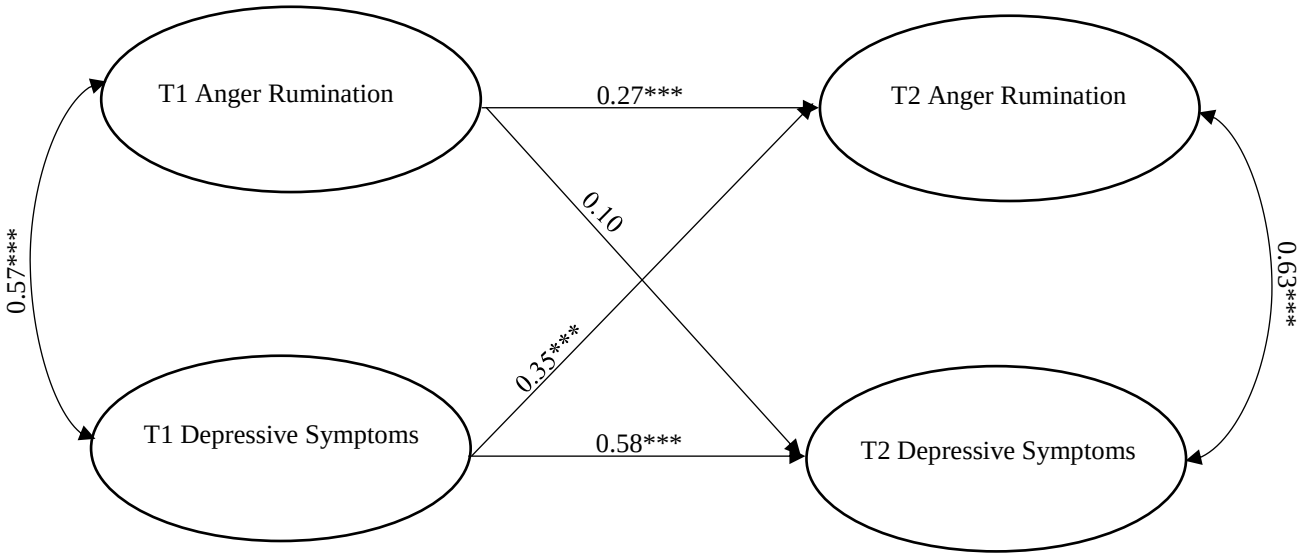
Measurement properties of the hypothesized model (factorial structure and invariance across both time and gender) were tested using CFAs. The hypothesized two-factor model provided the best fit to the data (T1, $\chi^2_{(8)} = 22.68$, CFI = 0.98, TLI = 0.96, RMSEA [90%CI] = 0.08[0.04, 0.12]); T2, $\chi^2_{(8)} = 9.24$, CFI = 1.00, TLI = 1.00, RMSEA [90%CI] = 0.02[0.00, 0.07]) and outperformed the one-factor

model at both time points (T1, $\chi^2_{(9)}$= 221.52, CFI = 0.71, TLI = 0.51, RMSEA [90%CI] = 0.28 [0.25, 0.31]; T2, $\chi^2_{(9)}$= 128.98, CFI = 0.87, TLI = 0.79, RMSEA [90%CI] = 0.21 [0.18, 0.24]. Based on Fornell and Larcker (1981) criterion (AVE ≥ 0.50; AVE < CR) convergent validity of the latent constructs was established both at T1 (AR_{AVE} = 0.78 < AR_{CR} = 0.92; DS_{AVE} = 0.58 < DS_{CR} = 0.82) and T2 (AR_{AVE} = 0.69 < AR_{CR} = 0.90; DS_{AVE} = 0.59 < DS_{CR} = 0.84). Similarly, constructs' discriminant validity was supported as both latent factor correlations (ART1↔ DST1 = 0.57; ART2 ↔ DST2 = 0.74, p < 0.001) were under the recommended cut off .|80| (Brown, 2015) and the √AVE values respectively ($ART1_{\sqrt{AVE}}$ = 0.82, $DST1_{\sqrt{AVE}}$ = 0.76 > r = 0.57) and ($ART2_{\sqrt{AVE}}$ = 0.83, $DST2_{\sqrt{AVE}}$ = 0.77 > r = 0.74). Measurement invariance of the two-factor model across time and gender was also established based on the ΔCFI, ΔTLI, and ΔRMSE ≤ 0.01 criterion. Baseline model, ($\chi^2_{(104)}$ = 147.87, CFI = 0.98, TLI = 0.98, RMSEA [90%CI] = 0.05[0.03, 0.07], constrained model ($\chi^2_{(106)}$ = 153.47, CFI = 0.98, TLI = 0.97, RMSEA [90%CI] = 0.05[0.03, 0.07]), ($\Delta\chi^2_{(2)}$ = 7.18, p < 0.05; ΔCFI, ΔTLI, and ΔRMSE ≤ 0.01). Based on results study's model measurement properties were satisfactory to proceed with examining the hypothesized constructs' relationships.

Reciprocal Relations and Gender Differences

Reciprocal associations between AR and DS were examined using a latent variable CLPM design and results are displayed in Figure 1. The longitudinal model fitted the data well, $\chi^2_{(54)}$= 88.51, CFI = 0.98, TLI = 0.97, RMSEA [90%CI] = 0.05 [0.03, 0.06]. Constructs' temporal stability was established, AR (β = 0.27, SE = 0.07, p < 0.001) and DS (β = 0.58, SE = 0.04, p < 0.001). Cross-sectional associations between AR and DS were significantly positive at both time points (T1, r = 0.57; T2, r = 0.63, p < 0.001). The cross path prediction from DS at T1 to AR at T2 was significant (β = 0.35, SE = 0.07, p < 0.001). In contrast, the cross path prediction from AR at T1 to DS at T2 was not significant (β = 0.10, SE = 0.08, p > 0.05). Gender as control variable (is not depicted for graphic simplicity) showed significant effect only on DST1 (β = 0.23, SE = 0.04, p < 0.001). The β's of the cross paths were significantly different to each other. The fit of the model constraining the two cross paths to be equal was significantly higher, $\chi^2_{(55)}$= 93.10, than the unconstrained model fit as indicated by the chi-square difference test, $\Delta\chi^2(1)$ = 6.43, p < 0.05. These results indicated that DS preceded and predicted increases in AR, one year later. In contrast, AR did not predict any increases in DS, one year later.

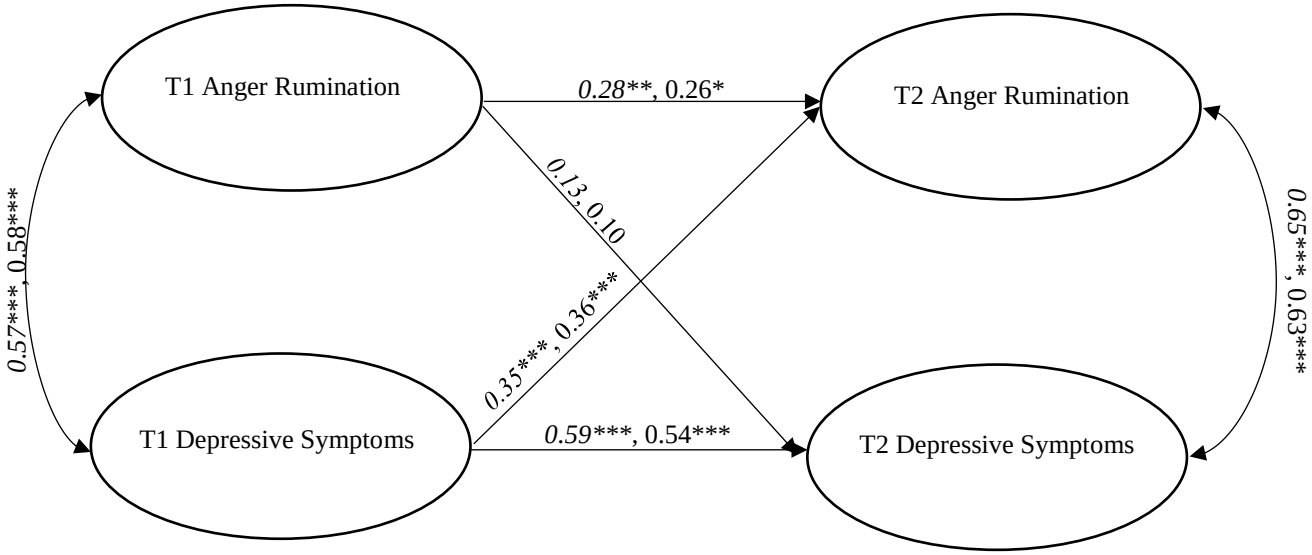
Fig.1



Cross-lagged model testing reciprocal relations between anger rumination and depressive symptoms. *Note*. Standardized values for cross-sectional relations and longitudinal relations. Gender as covariate is not depicted for graphic simplicity. ****p* <.001

Gender differences in both prospective paths and cross-sectional correlations were tested using multi-group CFA and results are shown in Figure 2. The baseline model had acceptable fit indices, $\chi^2_{(106)}$ = 152.17, CFI = 0.98, TLI = 0 97, RMSEA[90%CI] = 0.05[0.03, 0.07]. The constrained model fitted also the data well, $\chi^2_{(112)}$ = 153.48, CFI = 0.98, TLI = 0.97, RMSEA[90%CI] = 0.05[0.03, 0.07]). The chi-square difference test between these two models was not significant, $\Delta\chi^2_{(6)}$ = 2.81, p > 0.05, indicating that none of the cross-sectional and longitudinal associations differed by sex.

Fig. 2



Unconstrained gender moderation CLPM. *Note*. Standardized effects for boys are presented first and in italics; standardized effects for girls are presented second and in standard font. **p* <.05. ***p* < .01. ****p* <.001

Sensitivity Analysis

A set of sensitivity analyses examined the robustness of the results when using alternative approaches to handle missing data and code the nominal variables. Specifically, the results derived from the original analyses using FIML were compared with those obtained using listwise deletion of cases with missing data (N = 261). Multi-group analyses were also rerun with reverse coding (e.g., gender was coded 0 = girls, 1 = boys). In both cases, the results showed no meaningful changes regarding the direction or significance of the hypothesized paths or by sex.

3.4 Discussion

Cross-sectional relationships between anger rumination and depressive symptoms in adolescence have been supported (Harmon et al., 2019; Spyropoulou & Giovazolias, 2021). However, how anger rumination and depressive symptoms are related over time is still unexplored. It is important to address

this gap, as the topic has valuable implications for effective preventions and treatments. The present study used longitudinal data to examine the bidirectional relationship between anger rumination and depressive symptoms in a sample of Greek early adolescents. Moreover, to facilitate precise intervention, this study assessed possible gender differences in these relations. Overall, results suggested that depressive symptoms predicted increases in anger rumination but not vice versa, across both boys and girls.

As it was expected, early adolescents' depressive symptoms emerged as a potential risk factor for later engagement in anger rumination, even after controlling for prior levels of anger rumination and gender. These findings seem to advance the *scar* model (Lewinsohn et al., 1981) and previous studies suggesting that depressive symptoms precede and negatively predict the development of constructive coping skills or the ability to use them effectively. For example, elevated levels of depression were found to interfere with adolescents' cognitive reframing, involving positive and optimistic thinking and control (de Jong-Heesen et al., 2021). Similarly, early adolescents' increased engagement in expressive suppression emerged as an outcome and not as an antecedent of depressive symptomology (Larsen et al., 2013).

The temporal precedence of depressive symptoms over anger rumination supported herein, provides a necessary, but not sufficient, first step for claiming causality. Thus, because the observed effects could be accounted for by third underlying factors. One such factor is peer victimization, a well-recognized interpersonal stressor that has been found to act both as an outcome of adolescents' depressive symptoms (Kochel et al., 2012) and as a predictive marker of anger rumination (Camacho et al., 2021). Literature suggests that stressful life events, like being victimized, may generate anger-induced self-discrepancies between one's desired state (e.g., need for social acceptance) and actual state (e.g., being rejected), which, in turn, may activate rumination until the discrepancy is resolved (see Denson, 2013). For example, fantasies of retaliation, inherently embedded in the anger rumination process, seem to temporarily help victims of bullying down-regulate feelings of frustration and gain a sense of power by virtually punishing the aggressor (Goldner et al., 2019). Deficits in executive functioning represent another potential mechanism that might explain why depressive symptoms may predict increases in anger rumination tendencies in adolescence. Findings have shown that increased levels of depressive symptoms may impede young adolescents' ability for goal directed behavior by interfering with the healthy neurodevelopment, of higher-order executive function skills (Nigg, 2017).

Impairments in executive function skills may, in turn, foster anger rumination by rendering individuals vulnerable to dependent life stressors (Snyder & Hankin, 2016). Low inhibitory control deficits are supported to predispose adolescents to frequent peer victimization experiences (Fanti & Kimonis, 2012). Finally, empirical evidence suggest that depressive symptoms may increase young adolescents' victims-justice sensitivity, a tendency involving perceptions of being unfairly treated or being taken advantage of (Bondü et al., 2017). These biased perceptions have been found to generate maladaptive affective and coping responses, including anger and rumination (Schmitt et al., 2010).

Early adolescents' anger rumination did not emerge as a vulnerability factor for later depressive symptomology after accounting for prior levels of depressive symptoms and gender. This finding seems to contradict previous studies suggesting that higher levels of maladaptive emotion-regulation strategies predict increases in depressive symptoms over time. For example, suppression of positive emotions was found to predict later increases in anhedonia, a core affective facet of depression (Young et al., 2022). Similarly, frequent endorsement of sadness rumination was associated with a greater likelihood of experiencing later depressive symptoms (Abela & Hankin, 2011). The low temporal stability that anger rumination displayed in the present research ($\beta = 0.27$), does not seem to align with one central tenet of the vulnerability model; that is the high inter-individual stability of the proposed vulnerability factor (Caspi et al., 2005). Particularly, the current finding seems to advance prior notions suggesting that in early developmental stages rumination still displays more transitive and state-like features (Hankin, 2008). That is, compared to older adolescents whose ruminatory tendency is more habitual and trait-like, children and early adolescents tend to be occasionally engaged in this cognitive strategy to cope with distress (Hankin, 2008). Indeed, empirically supported evidence has shown high levels of temporal stability in anger rumination across middle adolescence (βs = 0.60- 0.62; Camacho et al., 2021). It seems that frequent endorsement of rumination in response to negative affect may gradually stabilize this emotion-focused strategy, turning it into a sustained mental-habit (Hjartarson et al., 2021). The fact that anger rumination in general did not predict greater depressive symptoms over time, does not preclude the possibility that ruminating about specific anger-provoking events would be more relevant. For example, perceived parental control in adolescence has been positively associated with anger regulation difficulties and depression as well (Cui et al., 2014).

Gender differences in the prospective relationships between anger rumination and depressive symptoms were not supported. Anger rumination emerged as an outcome of depression similarly for

both boys and girls. This finding is consistent with previous studies suggesting the scarring effects of depressive symptoms on emotion regulation strategies to be consistent across early adolescents' boys and girls (Larsen et al., 2013). Conversely, anger rumination was not found to predict the development of later depressive symptomology neither for boys or girls. Probably, gender-based differences in the anger rumination-depression link may emerge in later developmental stages, when rumination has become more habitual and trait- like. In line with this reasoning, anger has been found to be stronger associated with depressive symptoms in females compared to males, in cross-sectional (Asgeirsdottir & Sigfusdottir, 2014) and longitudinal studies conducting with older samples (Galaif et al., 2003).

Strengths, Limitations and Future Directions

The present study was the first to offer a preliminary insight into the reciprocal associations between anger rumination and depressive symptoms across early adolescence. All analyses were conducted with latent SEM to partial out the measurement error in the measured variables, and thus disentangle meaningful change (Ledgerwood & Shrout, 2011). Furthermore, the moderate longitudinal effects of depressive symptoms on anger rumination reported herein, seem to be the exception than the rule in longitudinal autoregressive cross-lagged studies, where small effect sizes are usually expected (Adachi & Willoughby, 2015).

Along with strengths, there are also some limitations that provide interesting directions for future research. It has been acknowledged that designs with two measurement waves provide in general little information about stability effects (Fraley & Roberts, 2005) as well as intra-individual and inter-individual changes in the level of variable over time (Ployhart & MacKenzie, 2015). Nevertheless, in the present study two-wave longitudinal data were examined, because as Henk and Castro-Schilo (2016, p. 180) stated: "To neglect two-wave data is to ignore the fact that any longitudinal investigation, there will inevitably be a time when only two waves of data have been collected. At that moment, researchers have a choice to stall until the remaining data are available, or to begin to identify trends in their data". Future studies with 3 or more measurement occasions data sets are recommended to employ more complex data-analytic approaches (e.g., bivariate autoregressive latent trajectory) and thus overcome methodological shortcomings related to two measurement waves (see Hounkpatin et al., 2018).

A second limitation concerns the use of only self-reports. Although common-method bias was not found to threaten our study's validity, social desirability bias related to self-reported data, may also have artificially masked true relations or produced spurious variable associations (Tan & Hall, 2005). Future studies would be strengthened by employing multi-informant (e.g., parent reports; De Los Reyes et al., 2015) and multi-method assessment modalities (e.g., semi-structure interviews; McTate & Leffler, 2017).

The temporal precedence of depressive symptoms over anger rumination provides a necessary, but not sufficient, first step for claiming causality. Future studies might benefit from identifying potential underlying mechanisms (e.g., peer victimization) to inform novel treatment targets. Also, the fact that anger rumination in general did not emerge as a vulnerability factor for later depression, does not preclude the possibility that rumination about specific anger-provoking events would be more relevant. In line with this argument, the ecological electronic diary method is a valuable tool in research on adolescents' emotions that could also be implemented in examining the specific content of youths' angry rumination thoughts (Metsäranta et al., 2019).

The 1-year time lag employed here has been proposed to contribute notably in the study of cross lagged effects in middle-aged students (Sweeting et al., 2006). However, a one such long-time interval may overlook meaningful short-term changes in constructs under study (see McGrath et al., 2012). Research designs examining short-term, multiwave longitudinal transactions between anger rumination and depressive symptoms are recommended.

Finally, the present study focused on a non-clinical and non-stratified sample, and thus, generalizations may be difficult to attain. Future research might address the hypotheses tested herein with clinical depressed early adolescents or with those scoring high on the depression inventories.

Implications for Treatments

The scarring effects of depressive symptoms on anger rumination imply that prevention and treatment programs should primarily focus on youths' depressive symptoms to reduce risk for later anger rumination. Cognitive behavioral therapy (CBT) is established as one of the most effective interventions in treating depression in adolescence. CBT's main target is to modify and change maladaptive cognitions and behaviors that constitute the core processes of depression (Idsoe et al.,

2019). An alternative and promising depression treatment approach is mindfulness meditation, as it helps individuals increase awareness and acceptance of their inner states (e.g., feelings, thoughts) and change the ways in which they relate to these states without judgment (for a review see Reangsing et al., 2021). Although anger rumination was not found to determine the development of later depressive symptoms in early adolescence, frequently ruminating towards distress may become gradually a habitual response, and thus a personality trait with later maladjustment outcomes. Consequently, timely targeting anger rumination tendency is considered important. For example, it has been recently supported the effectiveness of a five-session Mindfulness-Based Cognitive Therapy (MBCT) intervention in alleviating anger-related constructs and anger rumination in non-clinical adolescents (Tabeke & Sato, 2021).

Conclusion

Although there is available evidence suggesting a close relationship between anger rumination and depressive symptoms across adolescence, their longitudinal relationship had never been explored. Using a two-wave longitudinal design, the present study examined the bidirectional association between anger rumination and depressive symptoms in a sample of Greek early adolescents. Gender moderation effects were also tested. Results showed that earlier depressive symptoms increased chances for later engagement in anger rumination similarly for boys and girls. Conversely, anger rumination did not seem to predict any increases in depressive symptomology neither for boys or girls. Prevention and treatment efforts should focus on early adolescents' both depressive symptoms and anger rumination tendencies.

3.5 References

Abela, J. R. Z, & Hankin, B. L. (2011). Rumination as a vulnerability factor to depression during the transition from early to middle adolescence: A multiwave longitudinal study. *Journal of Abnormal Psychology, 120*(2), 259-271. https://doi.org/10.1037/a0022796

Abela, J.R.Z., Vanderbilt, E., & Rochon, A. (2004). A test of the integration of the responses styles and social support theories of depression in third and seventh grade children. *Journal of Social and Clinical Psychology, 23*(5), 653-674. https://doi.org/10.1521/jscp.23.5.653.50752

Adachi, P., Willoughby, T. (2015). Interpreting effect sizes when controlling for stability effects in longitudinal autoregressive models: Implications for psychological science. *European Journal of Developmental Psychology, 12*(1), 116-128. https://doi.org/10.1080/17405629.2014.963549

Asgeirsdottir, B. B., & Sigfusdottir, I. D. (2015). Gender differences in co-occurrence of depressive and anger symptoms among adolescents in five Nordic countries. *Scandinavian Journal of Public Health, 43*(2), 183-189. https://doi.org/10.1177/1403494814561817

Bondü, R., Sahyazici-Knaak, F., & Esser, G. (2017). Long-Term Associations of Justice Sensitivity, Rejection Sensitivity, and Depressive Symptoms in Children and Adolescents. *Frontiers in Psychology*. https://doi.org/10.3389/fpsyg.2017.01446

Brieant, A., King-Casas, B., & Kim-Spoon, J. (2020). Transactional relations between developmental trajectories of executive functioning and internalizing and externalizing symptomatology in adolescence. *Development and Psychopathology, 34*(1), 213-224. https://doi.org/10.1017/S0954579420001054

Brown, T. A. (2015). *Confirmatory factor analysis for applied research* (2nd ed.). The Guilford Press.

Calvete, E., Orue, I., & Hankin, B. L. (2015). Cross-Lagged Associations Among Ruminative Response Style, Stressors, and Depressive Symptoms in Adolescents. *Journal of Social & Clinical Psychology, 34*(3), 203-220. https://doi.org/10.1521/jscp.2015.34.3.203

Camacho, A., Ortega-Ruiz, R., & Romera, E. M. (2021). Longitudinal associations between cybervictimization, anger rumination, and cyberaggression. *Aggressive Behavior, 47*(3), 332-342. https://doi.org/10.1002/ab.21958

Caspi, A., Roberts, B. W., & Shiner, R. L. (2005). Personality development: stability and change. *Annual Review of Psychology, 56*, 453-484. https://doi.org/10.1146/annurev.psych.55.090902.141913

Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling, 14*(3), 464-504. https://doi.org/10.1080/10705510701301834

Chen, H-W. B., Gardner, E. S., Clarkson, T., Eaton, N. R., Wiggins, J. L., Leibenluft, E., & Jarcho, J. M. (2021). Bullying Perpetration and Victimization in Youth: Associations with Irritability and Anxiety. *Child Psychiatry & Human Development*. https://doi.org/10.1007/s10578-021-01192-9

Clayborne, Z. M., Varin, M., & Colman, I. (2019). Systematic Review and Meta-Analysis: Adolescent Depression and Long-Term Psychosocial Outcomes. *Journal of the American Academy of Child and Adolescent Psychiatry, 58*(1), 72-79. https://doi.org/10.1016/j.jaac.2018.07.896

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). Routledge. https://doi.org/10.4324/9780203771587

Cole, D. A., & Maxwell, S. E. (2003). Testing Mediational Models with Longitudinal Data: Questions and Tips in the Use of Structural Equation Modeling. *Journal of Abnormal Psychology, 112*(4), 558-577. https://doi.org/10.1037/0021-843X.112.4.558

Cui, L., Morris, A. S., Criss, M. M., Houltberg, B. J., & Silk, J. S. (2014). Parental Psychological Control and Adolescent Adjustment: The Role of Adolescent Emotion Regulation. *Parenting, science and practice, 14*(1), 47-67. https://doi.org/10.1080/15295192.2014.880018

Denson, T. F. (2013). The Multiple Systems Model of Angry Rumination. *Personality and Social Psychology Review, 17*(2), 103-123. https://doi.org/10.1177%2F1088868312467086

de Jonge-Heesen, K. W. J., Rasing, S. P. A., Vermulst, Ad. A., Tak, Y. R., Engels, R. C. M. E., & Creemers, D. H. M. (2021). Associations Between Coping Strategies and Depressive Symptoms in Adolescence: A Longitudinal Perspective. *The Journal of Early Adolescence, 41*(7), 1020-1054. https://doi.org/10.1177/0272431620978533

De Los Reyes, A., Augenstein, T. M., Wang, M., Thomas, S. A., Drabick, D. A. G., Burgers, D. E., & Rabinowitz, J. (2015). The validity of the multi-informant approach to assessing child and

adolescent mental health. *Psychological Bulletin, 141*(4), 858-900. https://doi.org/10.1037/a0038498

du Pont, A., Rhee, S. H., Corley, R. P., Hewitt, J. K., & Friedman, N. P. (2017). Rumination and Psychopathology: Are Anger and Depressive Rumination Differentially Associated With Internalizing and Externalizing Psychopathology? *Clinical Psychological Science, 6*(1), 18-31. https://doi.org/10.1177/2167702617720747

Fanti, K. A., & Kimonis, E. R. (2012). Bullying and Victimization: The Role of Conduct Problems and Psychopathic Traits. *Journal of Research on Adolescence, 22*(4), 617-631. https://doi.org/10.1111/j.1532-7795.2012.00809.x

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobserved variables and measurement error. *Journal of Marketing Research, 18*(1), 39-50. https://doi.org/10.1177/002224378101800104

Fraley, R. C., & Roberts, B. W. (2005). Patterns of Continuity: A Dynamic Model of Conceptualizing the Stability of Individual Differences in Psychological Constructs Across the Life Course. *Psychological Review, 112*(1), 60-74. https://doi.org/10.1037/0033-295X.112.1.60

Galaif, E. R., Sussman, S., Chou, C-P., & Wills, T. A. (2003). Longitudinal Relations Among Depression, Stress, and Coping in High Risk Youth. *Journal of Youth and Adolescence, 32*(4), 243-258. https://doi.org/10.1023/A:1023028809718

Gardner, F. L., Moore, Z. E. (2014). *Contextual anger regulation therapy. A mindfulness and acceptance-based approach*. Routledge. New York and London.

Giannakopoulos, G., Kazantzi, M., & Dimitrakaki, C., Tsiantis, J., Kolaitis, G., & Tountas, Y. (2009). Screening for children's depression symptoms in Greece: The use of the Children's Depression Inventory in a nation-wide school-based sample. *European Child & Adolescent Psychiatry, 18*(8), 485-492. https://doi.org/10.1007/s00787-009-0005-z

Goldner, L., Lev-Wiesel, R., & Simon, G. (2019). Revenge Fantasies After Experiencing Traumatic Events: Sex Differences. *Frontiers in Psychology*. https://doi.org/10.3389/fpsyg.2019.00886

Hankin, B. L. (2008). Stability of Cognitive Vulnerabilities to Depression: A Short-Term Prospective Multiwave Study. *Journal of Abnormal Psychology, 117*(2), 324-333. https://doi.org/10.1037/0021-843X.117.2.324

Harmon, S. L., Stephens, H. F., Repper, K. K., Driscoll, K. A., & Kistner, J. A. (2019). Children's Rumination to Sadness and Anger: Implications for the Development of Depression and Aggression. *Journal of Clinical Child & Adolescent Psychology, 48*(4), 622-632. https://doi.org/10.1080/15374416.2017.1359788

Hébert, M., Tremblay-Perreault, A., & Myre, G. (2021). The Interplay of Depression and Hostile Attributions in the Link Between PTSD Symptoms and Peer Victimization in Child Victims of Sexual Abuse. *Child Psychiatry & Human Development, 52*, 291-300. https://doi.org/10.1007/s10578-020-01011-7

Henk, C. M., & Castro-Schilo, L. (2016). Preliminary Detection of Relations Among Dynamic Processes With Two-Occasion Data. *Structural Equation Modeling: A Multidisciplinary Journal, 23*(2), 180-193. https://doi.org/10.1080/10705511.2015.1030022

Hjartarson, K. H., Snorrason, I., Bringmann, L. F., Ögmundsson, B. E., Ólafsson, R. P. (2021). Do daily mood fluctuations activate ruminative thoughts as a mental habit? Results from an ecological momentary assessment study. *Behaviour Research and Therapy, 140*. https://doi.org/10.1016/j.brat.2021.103832

Hounkpatin, H. O., Boyce, C. J., Dunn, G., & Wood, A. M. (2018). Modeling bivariate change in individual differences: Prospective associations between personality and life satisfaction. *Journal of Personality and Social Psychology, 115*(6), 12-29. https://doi.org/10.1037/pspp0000161

Jackson, J., Kuppens, P., Sheeber, L. B., & Allen, N. B. (2011). Expression of Anger in Depressed Adolescents: The Role of the Family Environment. *Journal of Abnormal Child Psychology, 39*, 463-474. https://doi.org/10.1007/s10802-010-9473-3

Johnson, D., Dupuis, G., Piche, J., Clayborne, Z., & Colman, I. (2018). Adult mental health outcomes of adolescent depression: A systematic review. *Depression and Anxiety, 35*(8), 700-716. https://doi.org/10.1002/da.22777

Juul, E.M.L., Hjemdal, O., & Aune, T. (2021). Prevalence of depressive symptoms among older children and young adolescents: a longitudinal population-based study. *Scandinavian Journal of Child and Adolescent Psychiatry and Psychology, 9*(1), 64-72. https://doi.org/10.21307/sjcapp-2021-008

Idsoe, T., Keles, S., Olseth, A. R., & Ogden, T. (2019). Cognitive behavioral treatment for depressed adolescents: results from a cluster randomized controlled trial of a group course. *BMC Psychiatry*, *19*(155). https://doi.org/10.1186/s12888-019-2134-3

Kline, R. B. (2011). *Principles and Practice of Structural Equation Modelling*. New York, NY: Guilford Press.

Kline, R. B. (2016). *Methodology in the Social Sciences: Principle and Practice of Structural Equation Modeling* (4th ed.). Guilford Press.

Kochel, K. P., Ladd, G. W., & Rudolph, K. D. (2012). Longitudinal Associations Among Youth Depressive Symptoms, Peer Victimization, and Low Peer Acceptance: An Interpersonal Process Perspective. *Child Development, 83*(2), 637-650. https://doi.org/10.1111/j.1467-8624.2011.01722.x

Kokkinos, C. M., & Voulgaridou, I. (2016). Relational Victimization, Callous-Unemotional Traits and Hostile Attribution Bias among Pre-Adolescents. *Journal of School Violence, 17*(1), 111-122. https://doi.org/10.1080/15388220.2016.1222500

Kovacs, M. (1992). *Children's Depression Inventory (CDI).* Toronto, ON: Multi-Health Systems Inc.

Krause, E., Vélez, C. E., Woo, R., Hoffmann, B., Freres, D. R., Abenavoli, R. M., & Gillham, J. E. (2018). Rumination, Depression, and Gender in Early Adolescence: A Longitudinal Study of a Bidirectional Model. *The Journal of Early Adolescence*, *38*(7), 923-946. https://doi.org/10.1177%2F0272431617704956

Larsen, J. K., Vermulst, Ad. A., Geenen, R., van Middendorp, H., English, T., Gross, J. J., Ha, T., Evers, C., & Engels, R. C. M. E. (2013). Emotion Regulation in Adolescence: A Prospective Study of Expressive Suppression and Depressive Symptoms. *The Journal of Early Adolescence*, *33*(2), 184-200. https://doi.org/10.1177/0272431611432712

Ledgerwood, A., & Shrout, P. E. (2011). The trade-off between accuracy and precision in latent variable models of mediation processes. *Journal of Personality and Social Psychology, 101*(6), 1174-1188. https://doi.org/10.1037/a0024776

Lee, Y-S., Krishnan, A., & Park, Y. S. (2012). Psychometric Properties of the Children's Depression Inventory. *Measurement and Evaluation in Counseling and Development, 45*(2), 84-100. https://doi.org/10.1177/0748175611428329

Leigh, E., Lee, A., Brown, H. M., Pisano, S., & Stringaris, A. (2020). A Prospective Study of Rumination and Irritability in Youth. *Journal of Abnormal Child Psychology, 48*(12), 1581-1589. https://doi.org/10.1007/s10802-020-00706-8

Lewinshon, P. M., Steinmetz, J. L., Larson, D. W., & Franklin, J. (1981). Depression-related cognitions: Antecedent or Consequence? *Journal of Abnormal Psychology, 90*(3), 213-219. https://doi.org/10.1037/0021-843X.90.3.213

Lök, N., Bademli, K., & Canbaz, M. (2018). The Effects of Anger Management Education on Adolescents' Manner of Displaying Anger and Self-Esteem: A Randomized Controlled Trial. *Archives of Psychiatry Nursing, 32*(1), 75-81. https://doi.org/10.1016/j.apnu.2017.10.010

Luca, M. (2019). Maladaptive Rumination as a Transdiagnostic Mediator of Vulnerability and Outcome in Psychopathology. *Journal of Clinical Medicine, 8*(3), 314. https://doi.org/10.3390/jcm8030314

Lyubomirsky, S., Layous, K., Chancellor, J., & Nelson, S. K. (2015). Thinking About Rumination: The Scholarly Contributions and Intellectual Legacy of Susan Nolen-Hoeksema. *Annual Review of Clinical Psychology, 11*, 1-22. https://doi.org/10.1146/annurev-clinpsy-032814-112733

Mardia, K. V. (1970). Measures of multivariate skewness and kurtosis with applications. *Biometrika, 57*(3), 519-530. https://doi.org/10.1093/biomet/57.3.519

Matsugana, M. (2008). Item Parceling in Structural Equation Modeling: A Primer. *Communication Methods & Measures, 2*(4), 260-293. https://doi.org/10.1080/19312450802458935

McDonald, R. P. (1999). *Test theory: A unified treatment*. Lawrence Erlbaum Associates Publishers.

McGrath, D. S., Sherry, S. B., Stewart, S. H., Mushquash, A. R., Allen, S. L., Nealis, L. J., & Sherry, D. L. (2012). Reciprocal relations between self-critical perfectionism and depressive symptoms: Evidence from a short-term, four-wave longitudinal study. *Canadian Journal of Behavioural Science*, *44*(3), 169-181. https://doi.org/10.1037/a0027764

McTate, E. A., & Leffler, J. M. (2017). Diagnosing disruptive mood dysregulation disorder: Integrating semi-structured and unstructured interviews. *Clinical Child Psychology and Psychiatry, 22*(2), 187-203. https://doi.org/10.1177/1359104516658190

Metsäranta, K., Kurki, M., Valimaki, M., & Anttila, M. (2019). How Do Adolescents Use Electronic Diaries? A Mixed-Methods Study Among Adolescents With Depressive Symptoms. *Journal of Medical Internet Research, 21*(2). https://doi.org/10.2196/11711

Newsom, J. T. (2015). *Longitudinal structural equation modeling: A comprehensive introduction*. New York, NY: Routledge.

Nigg, J. T. (2017). Annual Research Review: On the relations among self-regulation, self-control, executive functioning, effortful control, cognitive control, impulsivity, risk-taking, and inhibition for developmental psychopathology. *The Journal of Child Psychology and Psychiatry, 58*(4), 361-383. https://doi.org/10.1111/jcpp.12675

Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology, 100*(4), 569-582. https://doi.org/10.1037/0021-843X.100.4.569

Nolen-Hoeksema, S., Wisco, B. E., & Lyubomirsky, S. (2008). Rethinking Rumination. *Perspectives on Psychological Science, 3*(5), 400-424. https://doi.org/10.1111/j.1745-6924.2008.00088.x

Ployhart, R. E., & MacKenzie, W. I. Jr. (2015). Two waves of measurement do not a longitudinal study make. In C. E. Lance & R. J. Vandenberg (Eds.), *More statistical and methodological myths and urban legends* (pp. 85-99). Routledge/Taylor & Francis Group.

Podsakoff, P. M., MacKenzie, S. B., Lee, J-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*(5), 879-903. https://doi.org/10.1037/0021-9010.88.5.879

Reangsing, C., Punsuwun, S., & Schneider, J. K. (2021). Effects of mindfulness interventions on depressive symptoms in adolescents: A meta-analysis. *International Journal of Nursing Studies, 115*. https://doi.org/10.1016/j.ijnurstu.2020.103848

Sanjuán, P., & Magallares, A. (2009). A longitudinal study of the negative explanatory style and attributions of uncontrollability as predictors of depressive symptoms. *Personality and Individual Differences, 46*(7), 714-718. https://doi.org/10.1016/j.paid.2009.01.030

Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika, 66*(4), 507-514. https://doi.org/10.1007/BF02296192

Schmitt, M., Baumert, A., Gollwitzer, M., & Maes, J. (2010). The Justice Sensitivity Inventory: Factorial Validity, Location in the Personality Facet Space, Demographic Pattern, and Normative Data. *Social Justice Research, 23*, 211-238. https://doi.org/10.1007/s11211-010-0115-2

Smith, S. D., Stephens, H. F., Repper, K., & Kistner, J. A. (2016). The Relationship between Anger Rumination and Aggression in Typically Developing Children and High-Risk Adolescents. *Journal of Psychopathology and Behavioral Assessment, 38*, 515-527. https://doi.org/10.1007/s10862-016-9542-1

Snyder, H. R., & Hankin, B. L. (2016). Spiraling Out of Control: Stress Generation and Subsequent Rumination Mediate the Link Between Poorer Cognitive Control and Internalizing Psychopathology. *Clinical Psychological Science, 4*(6), 1047-1064. https://doi.org/10.1177/2167702616633157

Spyropoulou, E., & Giovazolias, T. (2021). Investigating the Multidimensionality and Psychometric Properties of the Children's Anger Rumination Scale (CARS): A Bifactor Exploratory Structural Equation Modeling Framework. *Assessment*. https://doi.org/10.1177/10731911211043569

Steinberg, L. (2005). Cognitive and affective development in adolescence. *Trends in Cognitive Sciences, 9*(2), 69-74. https://doi.org/10.1016/j.tics.2004.12.005

Stevens, E. N., Lovejoy, M. C., Pittman, L. D. (2014). Understanding the relationship between actual:ideal discrepancies and depression symptoms: A developmental examination. *Journal of Adolescence, 37*(5), 612-621. https://doi.org/10.1016/j.adolescence.2014.04.013

Stone, L. B., & Gibb, B. E. (2015). Brief report: Preliminary evidence that co-rumination fosters adolescents' depression risk by increasing rumination. *Journal of Adolescence*, *38*(1), 1-4. https://doi.org/10.1016/j.adolescence.2014.10.008

Stone, L. B., Uhrlass, D. J., & Gibb, B. E. (2010). Co-rumination and Lifetime History of Depressive Disorders in Children. *Journal of Clinical Child & Adolescent Psychology*, *39*(4), 597-602. https://doi.org/10.1080/15374416.2010.486323

Sukhodolsky, D., Golub, A., & Cromwell, E. N. (2001). Development and validation of the anger rumination scale. *Personality and Individual Differences*, *31*(5), 689-700. https://doi.org/10.1016/S0191-8869(00)00171-9

Sweeting, H., Young, R., West, P., & Der, G. (2006). Peer victimization and depression in early-mid adolescence: A longitudinal study. *British Journal of Educational Psychology*, *76*(3), 577-594. https://doi.org/10.1348/000709905X49890

Tabeke, M., & Sato, H. (2021). A mindfulness-based intervention for Japanese non-clinical adolescent anger: A pilot study. *Current Psychology*. https://doi.org/10.1007/s12144-021-01645-3

Tan, J. A., & Hall, R. J. (2005). The effects of social desirability bias on applied measures of goal orientation. *Personality and Individual Differences*, *38*(8), 1891-1902. https://doi.org/10.1016/j.paid.2004.11.015

Trizano-Hermosilla, I., & Alvarado, J. M. (2016). Best Alternatives to Cronbach's Alpha Reliability in Realistic Conditions: Congeneric and Asymmetrical Measurements. *Frontiers in Psychology*. https://doi.org/10.3389/fpsyg.2016.00769

Vidal-Ribas, P., & Stringaris, A. (2021). How and Why Are Irritability and Depression Linked? *Child and Adolescent Psychiatric Clinics of North America*, *30*(2), 401-414. https://doi.org/10.1016/j.chc.2020.10.009

Wagner, C. A., Alloy, L. B., & Abramson, L. Y. (2015). Trait Rumination, Depression, and Executive Functions in Early Adolescence. *Journal of Youth and Adolescence*, *44*(1), 18-36. https://doi.org/10.1007/s10964-014-0133-8

Young, G. R., Karnilowicz, H. R., Mauss, I. B., Hastings, P. D., Guyer, A. E., & Robins, R. W. (2022). Prospective associations between emotion regulation and depressive symptoms among Mexican-origin adolescents. *Emotion*, *22*(1), 129-141. https://doi.org/10.1037/emo0001060

4. Study 3

Preliminary Evidence that Depressive Symptoms Foster Anger Rumination through Peer Victimization across Early Adolescence

Abstract

Anger rumination is an unconstructive cognitive-emotion regulation process that bears negative adjustment outcomes. Literature suggests that depressive symptoms are associated with later increases in anger rumination across early adolescence. However, mechanisms that may account for this relationship are not yet clarified. The main aim of this study was to examine - peer victimization - as a potential mediator of the prospective relationship from depressive symptoms to anger rumination. Self-reported data were collected in two-waves, 1-year spaced. Participants were 294 Greek students (M_{age} =10.53 years, *SD* = .16; 55.4% girls). Results showed that peer victimization mediated the relationship from depressive symptoms to anger rumination. Multi-group analysis indicated that the mediation model tested was significant for boys, but not for girls. Implications for preventions and treatments are also reported.

Keywords: anger rumination, depressive symptoms, peer victimization, early adolescence, sex

4.1 Introduction

Anger rumination entails the propensity to perseverate on the causes and consequences of personally meaningful anger-provoking events (Denson, 2013). It represents a distinct form of ruminative thinking (Peled & Moretti, 2010), closely associated with sustained emotional arousal and prolonged anger (Sukhodolsky et al., 2001). Habitual anger rumination seems to impair problem solving and instrumental functioning and, thus, lead to decreases in psychosocial adjustment and subjective well-being (Sukhodolsky et al., 2001). Early adolescents are likely to engage in a more occasional and state-like ruminatory style as compared to older ones (Hankin, 2008). However, frequent endorsement of rumination towards angry affect may turn gradually this emotion-focused coping strategy into a trait-like mental habit (Hjartarson et al., 2021) with long-lasting aversive consequences, including aggression, risky behaviors, and substance use (Borders & Henneby, 2015; Horváth et al., 2022; Quan et al., 2021).

Cross-sectional studies indicating a positive relation between anger rumination and depressive symptoms in youth (Gilbert et al., 2005; Harmon et al., 2019) have often been interpreted as reflecting the impact of anger rumination on depressive symptoms. However, in a recent longitudinal study among early adolescents, depressive symptoms preceded increased use of anger rumination, whereas anger rumination did not predict any changes in depressive symptoms over time (Spyropoulou & Giovazolias, 2022a). The temporal precedence of depressive symptoms over anger rumination advances an emerging body of literature supporting the scarring effects of depression on young individuals' ability to regulate effectively emotions (e.g., Larsen et al., 2013). Moreover, it suggests that a unidirectional relationship between depressive symptoms and anger rumination might exist, and sheds light on a framework for understanding how these constructs may relate over time. To date, why depressive symptoms may be associated with later anger rumination across youth has not been yet clarified. Identifying mechanisms that may account for this relationship would assist in the design of effective interventions to decrease anger rumination risk in adolescent depression. Empirically supported theoretical models have shown that depressive symptoms may precede interpersonal disturbances, including peer victimization (e.g., Tran et al., 2012). Experiences of peer victimization have been also found to increase risk for later anger rumination (e.g., Camacho et al., 2021). In addition, being victimized was reported to mediate the longitudinal relationship between depressive symptoms and aggression (Yu et al., 2018), a well-established outcome of anger rumination (Quan et

al., 2021). Hence, there might be indirect pathways from early adolescent depressive symptoms to subsequent anger rumination through peer victimization.

Adolescent Depressive Symptoms and Subsequent Peer Victimization

Depressive symptoms represent a common mental health problem in youth, with global prevalence estimates reaching 34% (Shorey et al., 2022). Symptoms are diverse and mutable, and may include sadness, anger, irritability, and social withdrawal (Ogundele, 2018). Multiple aversive consequences have been related with adolescent depression, including increases in peer victimization (e.g., Kochel et al., 2012). Particularly, the *symptoms-driven* model, rooted in the scar hypothesis of depression (Lewinsohn et al., 1981) states that depression-linked characteristics and behaviors precede interpersonal disturbances, including peer victimization. For instance, empirical work has shown that depressed youth usually display higher levels of poor response inhibition as compared to non-depressed ones (Ajilchi & Nejati, 2017). Adolescents with low inhibitory control are more likely to be socially rejected and peer victimized (Edalati et al., 2018; Godleski et al, 2015), as they tend to behave in an impulsive way that peers may find annoying or unpleasant (Evans et al., 2015; Fanti & Kimonis, 2012). Depression-related maladjusted beliefs in the fixed rather malleable nature of human personality (i.e., people cannot change; Seo et al., 2021) may intensify perceptions of others' intentions as being negative and hostile (Yeager et al., 2013). Elevated hostile attributions can, then, pave the pathway to peer victimization by rendering depressed-prone young individuals vulnerable to maladjusted behaviors (e.g., reactive aggression; Frey & Strong, 2018; Kokkinos et al., 2017). However, youth with higher depressive symptoms are also likely to trigger peer victimization by displaying a passive behavioral style (e.g., withdrawal, fearfulness) that signals vulnerability to potential perpetrators (see Kochel et al., 2012).

Adolescent Peer Victimization and Later Anger Rumination

Peer victimization represents a persistent and widespread concern in school aged children, with prevalence rates up to 35% (Modecki et al., 2014). It is defined as a specific type of peer abuse in which a child is repeatedly exposed to negative actions on the part of one or more individuals (Hunter et al., 2007). Peer victimization emerges in both overt (e.g., hitting) and relational (e.g., social

exclusion) forms (De Los Reyes & Pristein, 2004). Youth who are peer victimized seem to be at greater risk for displaying later disruptions in emotion regulation, including heightened anger rumination (e.g., Li et al., 2021).

According to the elaborated Control Theory (Martin & Tesser, 1989) stressful life experiences, like being peer victimized can generate actual vs. ideal discrepancies, which may, in turn, activate the rumination process in order to be resolved and discrepancy-related distress is relieved. For instance, increased perceptions of loneliness in victims of bullying (Matthews et al., 2022) are likely to generate rumination as they represent a discrepancy between one's ideal and one's perceived quality of social connectedness (Luttenbacher et al., 2021). In a similar vein, damaged self-esteem is an established outcome of peer victimization that seems to be engendered by a discrepancy between one's implicit self-esteem (ideal self) and explicit self-esteem (actual self) (Leeuwis et al., 2015). Perceived self-discrepancies are reported to be particularly distressing in adolescence, as young individuals still lack the cognitive ability to incorporate efficiently conflicting self-attributes into a coherent self-theory (see Ferguson et al., 2010). Indeed, evidence suggests that actual vs. ideal self-discrepancies may evoke anger and frustration in adolescence (Makros & McCabe, 2001), which may increase likelihood for anger rumination (Dickson et al., 2019).

The Moderating Role of Gender

Previous findings regarding gender-based differences in the prospective relationship from depressive symptoms to peer victimization have been mixed. Particularly, in 8th to 9th graders, depressive symptoms were found to increase peer victimization for both boys and girls (Sentse et al., 2017). Similarly, the magnitude of the cross-lagged path from depressive symptoms to victimization did seem to differ across gender among 682 adolescents (Yu et al., 2018). In contrast, depressive symptoms predicted later peer victimization only among adolescent boys in a study with 3,459 youth (Lester et al., 2012). Accordingly, peer victimization experiences were reported to be associated with later anger rumination tendencies similarly for boys and girls (Camacho et al., 2021; Li et al., 2021). However, in a two-wave study with 367 early adolescents, boys with greater levels of peer victimization were found to be more at risk than girls for endorsing subsequent anger rumination (Spyropoulou & Giovazolias, 2022b).

The Current Study

The present study sought to examine whether peer victimization explains the depressive symptoms-anger rumination link. Particularly, the following three main hypotheses were examined: [H1] depressive symptoms positively predict peer victimization 1 year later; [H2] peer victimization positively predicts anger rumination 1 year later; and [H3] depressive symptoms positively predict anger rumination 1 year later through peer victimization. No gender moderation hypothesis in the mediation model was put forth, because of mixed findings in relevant research.

4.2 Methods

Participants and procedure

Participants were recruited using convenience sampling from public primary schools, all located in Heraklion of Crete in Greece. Of 405 incoming 5th graders, 383 parental consent forms were completed, with 367 granting permission. Students who verbally agreed to participate, completed a series of paper-and-pencil brief self-report instruments in a classroom during a class period (~45 min.). No compensate was given. Data were collected at two times, Time 1 (T1) and Time 2 (T2), 1-year spaced. An absenteeism rate of 17.7% (n = 65) at T2 and validity checks reduced the analyzed sample to 294 participants (M_{age} = 10.53 years, SD = 0.16; 55.4% girls) which was upper the recommended cutoff |200| for proceeding with structural equation modelling (SEM; Kline, 2016). All participants were Greek ethnicity and Greek-language speaking.

A logistic regression analysis showed that attrition was not significantly predicted neither by demographic variables, gender (OR = 1.28, p = 0.36, 95%CI = [0.75, 2.20]); father education (OR = 1.09, p = 0.41, 95%CI = [0.89, 1.33]); mother education (OR = 0.79, p = 0.07, 95%CI = [0.61, 1.02]) nor by the study variables, anger rumination (OR = 1.10, p = 0.70, 95%CI = [0.67, 1.83]); depressive symptoms (OR = 1.03, p = 0.20, 95%CI = [0.98, 1.08]), and peer victimization (OR = 1.04, p = 0.16, 95%CI = [0.99, 1.10]).

All procedures were approved by the Institute of Educational Policy and the Greek Ministry of Education.

Measures

Depressive symptoms

Depressive symptoms were measured with The Children's Depression Inventory (CDI; Kovacs, 1992; see Appendix C). The CDI is a reliable and valid 27-item self-report questionnaire that assesses cognitive, affective, and behavioral symptoms of depression in children. Participants are asked to endorse on a 3-point Likert-scale ranging from 0 (absence of symptoms) to 2 (definite symptoms) the statement that best describes their feelings over the past two weeks (i.e., "I feel like crying every day"). Psychometric properties of the CDI have been established in Greek samples (Giannakopoulos et al., 2009; Sokratous et al., 2017). In the present study the item that pertains to suicidal thoughts ("I want to kill myself") was omitted at the request of the Institute of Educational Policy and the Greek Ministry of Education. To correct sum depressive symptom scores for the missing item, the mean item score was multiplied by 27 (Tak et al., 2017). Total scores could range from 0 to 54, with higher scores indicating more severe levels of depressive symptomology. The CDI's internal consistency for this sample was (T1, $\alpha = 0.83$; T2, $\alpha = 0.83$).

Peer victimization

Peer victimization was measured with the Peer Experiences Questionnaire-Standard Version (PEQ-STDV; Vernberg et al., 1999; see Appendix C). The PEQ-STDV is a reliable and valid 18-item self-report questionnaire of children's experiences in overt, and relational bullying perpetration and victimization. Participants are requested to answer on a 5-point Likert scale ranging from 1 (never) to 5 (a few times a week) how often in the past three months the item content applied to them. The PEQ is comprised of two 9-items subscales: The Victimization of Self (VS) subscale and the Victimization of Other (VO) subscale. PEQ's validity and reliability have been established in Greek populations (Giovazolias et al., 2010). In the present study the VS subscale was used (i.e., "A student teased me in a very bad way"). Total scores could range from 9 to 45, with higher scores indicating more frequent experiences in bullying behaviors. The VS's internal consistency for this sample was (T1, $\alpha = 0.82$; T2, $\alpha = 0.78$).

Anger rumination

Anger rumination (AR) was measured with the Children's Anger Rumination Scale (CARS; Smith et al., 2016). The CARS is a reliable and valid 19-item self-report questionnaire of children's tendency to ruminate towards anger (i.e., "I think a lot about other times when I was angry"). The CARS was adapted from the Anger Rumination Scale (ARS; Sukhodolsky et al., 2001) to be developmentally appropriate and psychometrically sound in children and early adolescents (Smith et al., 2016). Items are answered on a 4-point Likert scale ranging from 1 (almost never) to 4 (almost always). The CARS's psychometric properties have been established in Greek populations (Spyropoulou & Giovazolias, 2021). Total scores could range from 19 to 76, with higher scores indicating more frequent engagement in anger rumination. The CARS's internal consistency for this sample was (T1, $\alpha = 0.89$; T2, $\alpha = 0.91$).

Control and moderator variables

Gender was self-reported and coded as "0 = boys" and "1 = girls".

Analysis Plan

Analyses were performed using IBM SPSS 25 and the Mplus version 8.1. Univariate (-3.29 < z-score < 3.29; $n = 5$) and multivariate outliers (Mahalanobis, $p < 0.001$; $n = 3$) were detected across (T1/T2) and treated by removal. Univariate skewness (T1, DS = 0.30; PV = 1.26; AR = 0.84; T2, DS = 0.55; PV = 1.41; AR = 1.10) and kurtosis (T1, DS = 0.14; PV = 0.92; AR = 0.48; T2, DS = 0.38; PV = 1.41; AR = 1.01) were under the recommended ranges of ± 2 and ± 10 (Kline, 2011). Validity of study's conclusions was not found to be obviously threaten by common-method bias, as the Harman's one-factor test indicated a first factor explaining 15.79% of the variance for all administrated questionnaires, which is less the critical criteria of 40% (Podsakoff et al., 2003). Variables' intercorrelations were tested using Pearson *r* (0.10 to 0.29, small; 0.30 to 0.50, medium; > 0.50, large; Cohen, 1988). Gender mean differences on study variables (T1/T2) were calculated with independent sample *t* tests. Cohen's d effect sizes ($d = 0.20$, small; $d = 0.50$, medium; $d = 0.80$, large) were also reported. Latent Structural Equation Modeling (SEM) was performed to partial out the biasing effect of

measurement error and establish more valid values (Ledgerwood & Shrout, 2011). Missing values were as follows, DS (T1 = 0.28%; T2 = 0.29%); AR (T1 = 0.13%; T2 = 0.07%); PV (T1 = 0.04%; T2 = 0.27%). Little's MCAR test was significant, $\chi^2_{(4047)}$ = 4,479.39, $p < .001$), but the normed chi-square (χ^2/df) was low (4,479.39/4047) = 1.11), implying missing at random data. Multivariate normality, T1 (skewness = 85.65; kurtosis = 150.04, $p < 0.001$); T2 (skewness = 67.91; kurtosis = 110.37, $p < 0.001$) was not supported. Therefore, Full information maximum likelihood (FIML) with Robust standard errors (MLR; Satorra & Bentler, 2001) was applied to handle missing data and departure from normality. Instead of using individual items, parcels were created using the random parceling procedure, so as to establish the observed indicators per latent factor (Matsugana, 2008). As compared to individual items, parcels are more likely to have higher reliability and to meet the assumptions of normality (Little et al., 2002). Following the recommended minimum of three or four parcels per factor (Marsh et al., 1998), the twenty-six items of the CDI, the six items of the PEQ and the nineteen items of the CARS were assigned to three parcels each (T1/T2). Confirmatory Factor Analysis (CFA) was initially employed to assess if the parcels indicators measured the latent constructs as intended as well as to further detect any possible estimation bias; a three-factor model being represented by the three study constructs (DS, PV, and AR) was systematically compared (T1/T2) to a single-factor model (all indicators loaded on a single factor). Constructs' convergent validity would be established with standardized factor loadings |λs| exceeding the recommended cut off |0.32| (Tabachnick & Fidell, 2001). Accordingly, latent factor correlations under |0.80| would support the discriminant validity of study constructs (Brown, 2015). Multi-group CFA was conducted to assess measurement invariance of the three-factor model across both time and gender; a baseline model in which factor loadings were freely estimated across both time and gender (metric/weak invariance) was systematically compared with a model in which factor loadings were constrained to be equal across both time and gender (Newsom, 2015). Metric invariance is regarded to be a minimal prerequisite for assessing autoregressive models (see Benbenishty et al., 2016). A "half-longitudinal mediation model" (Cole & Maxwell, 2003) was then performed to assess if the indirect pathway between DS and AR through PV was statistically supported. In the proposed two-wave mediation model the indirect pathway was as follows: DST1 predict PVT2 (path α = DST1 → PVT2) controlling for baseline PV (PVT1 → PVT2), and PVT1 predicts ART2 (β = PVT1 → ART2) controlling for baseline AR (ART1 → ART2). Significance of the indirect pathway was tested using bias-corrected bootstrapped 95% confidence

intervals, with 5,000 boostrap draws with Maximum-Likelihood estimation (ML); an indirect effect is significant if its 95% confidence intervals (CI) does not include the 0 value (Preacher & Hayes, 2008). Gender was treated as control variable; all latent factors were regressed on gender (T1/T2). Accordingly, multi-group CFA analysis was conducted (ML; bcbootstrap95%CI, N = 5000) to assess mediation effects across gender (loadings of the same items were constrained to be equal across time and gender whereas the error variances of the same items were allowed to freely covary). Mean-and variance-adjusted statistic (MLMV) and the MODEL TEST instruction (mediation effects for boys and girls were set to be equal to zero) were used to test the null hypothesis that there is no gender moderation in indirect effects.

In general, model fit was assessed with the standard conventions (comparative fit index, CFI ≥ 0.90; Tucker-Lewis index, TLI ≥ 0.90; root mean square error for approximation, RMSEA ≤ 0.08; Kline, 2016). Measurement invariance across both time and gender would be established; the model constraints do not worsen the model fit) with the criterion of ΔCFI, ΔTLI, and ΔRMSE ≤ 0.01 (Chen, 2007). For multi-group analysis the general rule of thumb of 100 participants in each group (Kline, 2016) was accomplished (boys = 131; girls = 163). Significant gender moderation would be supported with a significant Wald Test of $\chi^2 < 0.5$ with MODEL TEST instruction.

4.3 Results

Descriptive Statistics

Correlations, means, and standard deviations for all study variables are displayed in Table 1. All correlations were significant, small to large, and in the expected direction. The observed mean levels of DS were significantly higher among girls than boys at both times of measurement [T1, $t_{(276)} = -3.22$, $p < 0.01$, $d = -0.38$; T2, $t_{(275)} = -2.41$, $p < 0.05$, $d = -0.29$]. Significantly higher level of AR was also found among girls at T2 [T1, $t_{(286)} = -1.27$, $p = 0.20$, $d = -0.15$; T2, $t_{(288)} = -3.33$, $p < 0.001$, $d = -0.40$)]. No significant gender differences were indicated on the mean levels of PV at both times of measurement [T1, $t_{(291)} = -0.89$, $p = 0.37$, $d = -0.10$; T2, $t_{(286)} = -0.76$, $p = 0.45$, $d = -0.09$]. DS scores (total sample) ranged from 1.04 to 34.27 at T1, and from 1.04 to 35.31 at T2. At T1, the frequency of clinically relevant DS (CDI ≥ 19) in the total sample (N = 294) was 30.90%, since 91 participants (32 boys and 59 girls) scored 19 or above in the overall CDI. At T2, this frequency was 20.7%, since 61

participants (22 boys and 39 girls) scored 19 or above in the overall CDI. These frequencies are higher from those reported in studies with different samples. For instance, in a longitudinal research conducted with 1,341 adolescents (M_{age} = 14 years), 4.8 – 9.0% showed CDI scores ≥ 19 (Tak et al., 2017). A 10.25% with CDI ≥ 19 was also reported in a study with 439 children (M_{age} = 12.3 years) (Sokratous et al., 2017). Due to the anonymity of data collection, students with CDI scores ≥ 19, could not be referred to a medical health professional for a clinical diagnosis.

Table 1. Intercorrelations and Descriptive Statistics for Study Variables

Variable	DS (T1)	DS (T2)	PV (T1)	PV (T2)	AR (T1)	AR (T2)
DS (T1)	-					
DS (T2)	0.56**	-				
PV (T1)	0.41**	0.25**	-			
PV (T2)	0.36**	0.47**	0.35**	-		
AR (T1)	0.49**	0.35**	0.27**	0.20**	-	
AR (T2)	0.39**	0.61**	0.27**	0.45**	0.43**	-
M	16.89	15.36	14.44	13.32	37.01	34.91
SD	6.36	6.24	5.64	4.95	10.27	10.59

Note. *DS* depressive symptoms, *PV* peer victimization, *AR* anger rumination, *T1* time 1, *T2*, time 2
**$p < 0.01$

Factorial structure and longitudinal invariance across gender

Measurement properties of the hypothesized model (factorial structure and invariance across gender) were tested using CFAs. The hypothesized three-factor model provided the best fit to the data (T1, $\chi^2_{(24)} = 74.73$, CFI = 0.95, TLI = 0.92, RMSEA[90%] = 0.08[0.06, 0.11]; T2, $\chi^2_{(24)} = 31.99$, CFI = 0.99, TLI = 0.99, RMSEA[90%] = 0.03[0.00, 0.06]) and outperformed the one-factor model at both time points (T1, $\chi^2_{(27)} = 441.07$, CFI = 0.55, TLI = 0.40, RMSEA[90%] = 0.23[0.21, 0.25]; T2, $\chi^2_{(27)} = 320.51$, CFI = 0.73, TLI = 0.63, RMSEA[90%] = 0.19[0.17, 0.21]). Constructs' convergent validity was established as all |λs| exceeded |0.32| (Tabachnick & Fidell, 2001) both at T1 ($DS_{|\lambda s|}$ = 0.71 to 0.85; $PV_{|\lambda s|}$ = 0.71 to 0.83; $AR_{|\lambda s|}$ = 0.82 to 0.88) and T2 ($DS_{|\lambda s|}$ = 0.60 to 0.86; $PV_{|\lambda s|}$ = 0.74 to 0.81; $AR_{|\lambda s|}$ = 0.86 to 0.91). Similarly, constructs' discriminant validity was supported, T1 (DST1 ↔ PVT1 = 0.49; DST1 ↔ ART1 = 0.57; PVT1 ↔ ART1 = 0.30, $p < 0.001$); T2 (DST2 ↔ PVT2 = 0.57; DST2 ↔ ART2 = 0.72; PVT2 ↔ ART2 = 0.50, $p < 0.001$) as all latent factor correlations were under |0.80| (Brown, 2015). Measurement invariance of the three-factor model across time and gender was

accomplished based on the criterion of ΔCFI, ΔTLI, and ΔRMSEA ≤ 0.01 (Chen, 2007); baseline model, ($\chi^2_{(234)}$ = 292.12, CFI = 0.98, TLI = 0.97, RMSEA[90%] = 0.04[0.03, 0.06]), constrained model, ($\chi^2_{(255)}$ = 328.30, CFI = 0.97, TLI = 0.96, RMSEA[90%] = 0.04[0.03, 0.06]), (ΔCFI, ΔTLI, and ΔRMSEA ≤ 0.01).

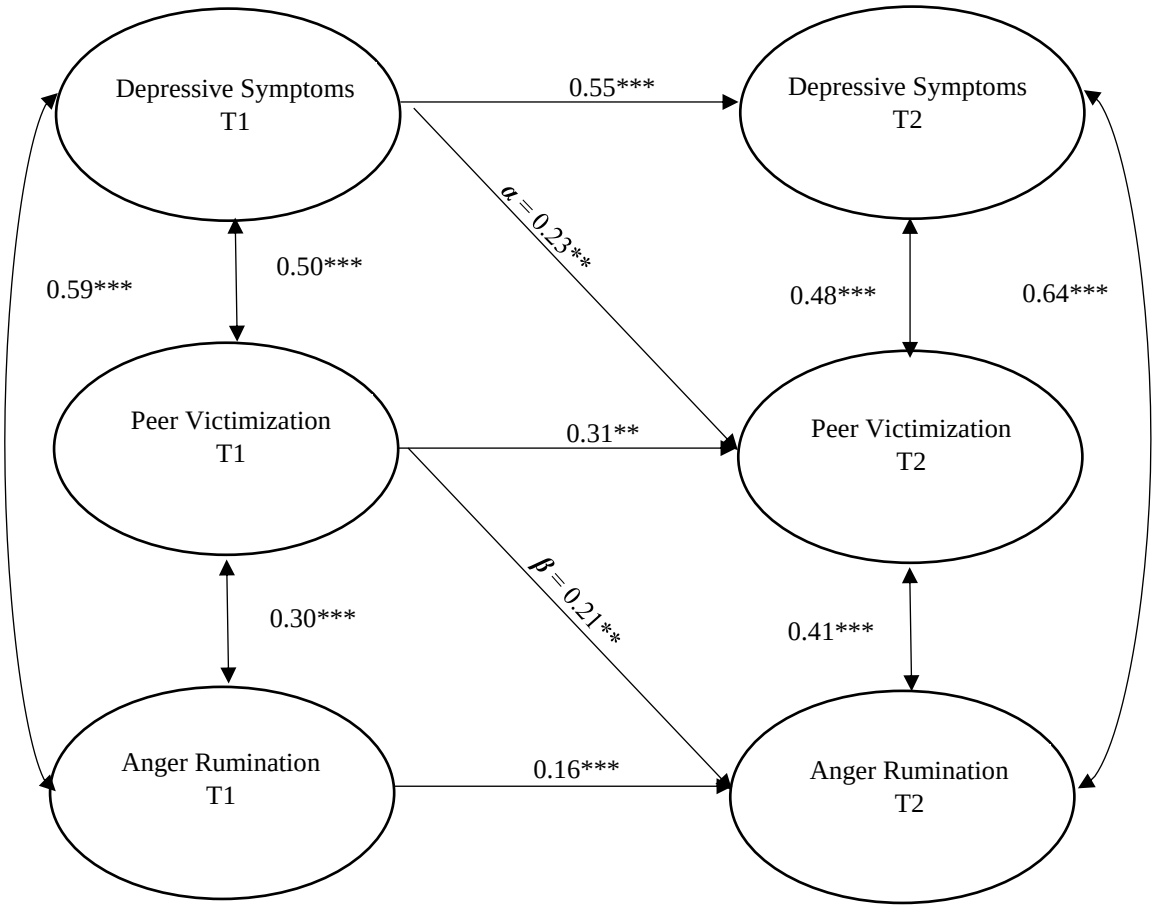
The "half-longitudinal mediation" model

The prospective relationship from depressive symptoms to anger rumination through peer victimization was examined using a "half-longitudinal mediation" model (Fig. 1). DST1 positively predicted PVT2 (α = 0.23, *SE* = 0.08, $p < 0.01$) and PVT1 positively predicted ART2 (β = 0.21, *SE* = 0.07, $p < 0.01$), after controlling for baseline PV and AR, concurrent associations between DS, PV, and AR, and gender. Constructs' temporal stability was established ($DS_{T1\rightarrow T2}$ = 0.55; $PV_{T1\rightarrow T2}$ = 0.31; $AR_{T1\rightarrow T2}$ = 0.16, $p < 0.001$). Concurrent associations between the study variables were also supported (*r*s = 0.30 to 0.64, $p < 0.001$). Gender as control variable (is not depicted for graphic simplicity) showed significant effects only on ART2 (β = 0.16, *SE* = 0.05, $p < 0.01$) and DST1 (β = 0.22, *SE* = 0.06, $p < 0.01$). Based on bootstrapping results the mediator of PV gave rise to a small, albeit significant indirect relationship between DST1 and ART2 ($\alpha\beta$ = 0.04, *SE* = 0.02; 95%CI = 0.01, 0.10). The half-longitudinal mediation model fitted the data well, $\chi^2_{(132)}$ = 216.21, CFI = 0.97, TLI = 0.96, RMSEA[90%] = 0.04[0.04, 0.06].

Gender Moderation Effects

Gender moderation effects were tested with multi-group CFA analyses (ML; bcbootstrap95%CI, N = 5000). Indirect effects was established only for boys (α = 0.28, *SE* = 0.13, $p < 0.001$; β = 0.33, *SE* = 0.08, $p < 0.001$; $\alpha\beta$ = 0.07; 95% CI = 0.01, 0.17) and not for girls (α = 0.19, *SE* = 0.11, p = 0.09, β = 0.10, *SE* = 0.11, p = 0.39; $\alpha\beta$ = 0.02, 95%CI = -0.02, 0.17). However, based on the Wald χ^2 test, the difference in the indirect effects was too small to claim statistical sex moderation, $\chi^2_{(1)}$ = 1.82, p = 0.18.

Fig. 1



Half-Longitudinal Mediation Model for Testing the Mediation Role of Peer Victimization between Depressive Symptoms at T1 and Anger Rumination at T2. *Note*. Oval boxes indicate latent variables. Factor loadings and gender (control variable) are omitted for graphic simplicity. Path coefficients are standardized. *T1* time 1, *T2* time 2.

4.4 Discussion

Anger rumination is an unconstructive cognitive-emotion regulation process that seems to be predicted by depressive symptoms across early adolescence. However, mechanisms that may account for this relationship have not been yet clarified. Identifying such mechanisms would inform the design of theory-based interventions to decrease anger rumination risk in depression. The present study used 2-wave longitudinal data to examine whether peer victimization mediates the depressive symptoms-anger rumination prospective link. To facilitate precise interventions, gender-based differences in the hypothesized mediation model were also assessed. Overall, results suggested that peer victimization mediated the association between depressive symptoms and subsequent anger rumination across early adolescence. Boys with higher depressive symptoms were found to be at greater risk than girls to engage in anger rumination through peer victimization over time.

As it was expected, the indirect effects of depressive symptoms on anger rumination through peer victimization were supported. That means that early adolescents with higher depressive symptoms are more likely to engage in anger rumination through peer victimization. The finding that depressive symptoms predict peer victimization over time seems to advance previous studies reporting associations between earlier depressive symptoms and subsequent peer victimization (e.g., Kochel et al., 2012). The mediation model also revealed that peer victimization experiences are associated with later increases in anger rumination tendencies, in support of prior work (e.g., Li et al., 2021).

Based on the symptoms-driven model, depression may increase risk for peer victimization by interfering with individuals' ability to engage functionally in interpersonal relationships. Indeed, youth with higher depressive symptoms are more likely to be marginalized and peer victimized as they tend to behave in a way that is less socially accepted (e.g., reactive aggression; Frey & Strong, 2018) or signals vulnerability (e.g., passivity) to potential perpetrators (see Kochel et al., 2012). According to the control theory, peer victimization may, in turn, generate the anger rumination process by creating actual vs. ideal self-discrepancies in those victimized. For instance, evidence suggests that peer victimization is likely to evoke loneliness (Matthews et al., 2022) which represents a discrepancy between one's actual levels and one's desired levels of interpersonal contact (see Archibald et al., 1995). Accordingly, peer victimization can damage youth's self-esteem by creating a dissonance between one's high implicit/ideal self-esteem (e.g., being socially accepted) and one's explicit/actual

self-esteem (e.g., being rejected and victimized) (Leeuwis et al., 2015). Actual vs. ideal self-discrepancies in adolescence are reported to increase anger and frustration (Makros & McGabe, 2001), and, thus initiate anger rumination until are resolved and emotional discomfort is reduced (see Denson, 2013; Dickson et al., 2019). In support of this notion, in a study with 617 students, findings revealed greater perceptions of emotional loneliness as well as higher levels of revenge desire among most peer-victimized youth (León-Moreno et al., 2019). Indeed, fantasies of revenge, inherently embedded in the anger rumination process seem to temporality help victims of bullying reduce negative feelings, restore self-esteem, and gain a sense of control by envisioning inflicting harm on the perpetrator (Goldner et al., 2019). However, frequent retaliation fantasizing may become a mental-habit that can increase individuals' likelihood of actually acting in the fantasized way. For instance, school violence has been associated with peer victimization experiences and revengeful thinking afterwards (see Yeager et al., 2011).

Boys with higher levels of depressive symptoms were found to be more at risk than girls to engage in future anger rumination through peer victimization. Particularly, in contrast with previous studies (Sentse et al., 2017; Yu et al., 2018) depressive symptoms were associated with later increases in peer victimization only for boys and not for girls. Similarly, relative to girls, boys seemed more likely to endorse anger rumination following peer victimization, as opposed to prior research findings (Camacho et al., 2021; Li et al., 2021). The greater likelihood of boys with elevated depressive symptoms for endorsing anger rumination through peer victimization could be attributed to the culturally grounded expectations for men's roles and behaviors. Based on evidence, men are generally socialized to be strong, with increased resilience and independence (see Sileo & Kershaw, 2020). In line with this notion, passivity is one depression-linked behavior that could render young boys more susceptible than girls to peer victimization as it may signals nonconformity to masculine norms. In a similar vein, boys who experience peer victimization may be more likely to engage in anger rumination as compared to girls, as masculinity norms expect from them to be less emotional expressive (see Sileo & Kershaw, 2020). Indeed, both masculinity and one's desire to be masculine were found to explain anger rumination-related repressed anger (Kinney et al., 2001; Sukhodolsky et al., 2001). Inversely, the lower likelihood of girls with higher depressive symptoms for endorsing anger rumination through peer victimization could be explained by the higher friendship quality that girls usually endorse (Foody et

al., 2019). Particularly, friendship quality is reported to protect from victimization (Schmidt & Bagwell, 2007) and anger regulation difficulties (von Salisch & Zeman, 2018).

Strengths, Limitations, and Future Directions

The present study was the first to provide evidence that depressive symptoms may increase risk for anger rumination through peer victimization. However, there are some limitations that should considered as they provide interesting directions for future research. Two waves of data provide in general little information about stability effects (Fraley & Roberts, 2005) as well as intra-individual (within-person) and inter-individual (between-person) changes in the level of variable over time (Ployhart & MacKenzie, 2015). Two-wave longitudinal data were assessed herein, because as Henk and Castro-Schilo (2016, p. 180) stated: "To neglect two-wave data is to ignore the fact that in any longitudinal investigation, there will inevitably be a time when only two waves of data have been collected. At that moment, researchers have a choice to stall until the remaining data are available, or to begin to identify trends in their data". Longitudinal mediation typically requires at least three separated and ordered time points of measurement (i.e., change in the mediator precedes change in the outcome; Selig & Preacher, 2009). However, the two-wave "half-longitudinal mediation" approach conducted here outperforms other modeling alternatives (e.g., Peets et al., 2021) in providing preliminary evidence about possible mediation effects with just two occasions (Cole & Maxwell, 2003). Thus because the time-interval between the predictor and the mediator (X and M), as well the time-interval between the mediator and the outcome (M and Y) are taken into account (Cole & Maxwell, 2003). Although complete mediation is rarely achieved in psychological research, the two-wave "half-longitudinal mediation" design does not allow researchers to test for complete mediation; the significance of the direct path *c* from X (DS) to Y (AR) cannot be directly estimated (Cole & Maxwell, 2003). Studies with 3 or more measurement data are recommended to employ more complex data-analytic approaches (e.g., latent growth curve models; Selig & Preacher, 2009) and, thus, overcome methodological shortcomings related to the two-wave longitudinal designs.

The effects sizes of the two mediation paths (α and β) reported herein, were small, albeit significant. These effects refer to predicting changes in a variable from T1 to T2, after controlling for stability effects in the predicted variable. In regard of this issue, De Lange et al. (2004, p. 162) stated "by

definition these effects will be small, as many phenomena will be relatively stable across the 1-year time interval employed in the present study". In addition, a one such long-time interval may overlook short-term changes in study constructs (see McGrath et al., 2012). Multiwave research designs with short-term intervals between depressive symptoms, peer victimization, and anger rumination are recommended.

Theoretical assumptions of the present research were unidirectional and focused on testing whether depressive symptoms predict later anger rumination via peer victimization. Although depression is an established risk factor for later peer victimization, empirically supported theoretical models show that victimized individuals are also likely to experience later depression (for a review see Christina et al., 2021). Accordingly, peer victimization and anger rumination can be mutually related and reinforcing (Camacho et al., 2021). Further research is needed to examine depressive symptoms, peer victimization, and anger rumination simultaneously, and thus clarify how these constructs may relate over time.

In the present study it was hypothesized that depressive symptoms are associated with later anger rumination via peer victimization. Empirical findings however suggest that depressive symptoms may also predict sadness rumination (e.g., Krause et al., 2018). Accordingly, peer victimization has been related with both sadness rumination and anger rumination over time (Li et al., 2021; Malamut & Salmivalli, 2021). Given that youth who ruminate when angry are more likely to ruminate when sad (e.g., Malamut & Salmivalli, 2021), current results cannot rule out a possibility that depressive symptoms may lead to greater rumination on sadness rather than anger (or both) via peer victimization. Although anger and sadness rumination are established as distinct constructs with unique correlates, studies that include both forms of rumination are also recommended (du Pont et al., 2018; Peled & Moretti, 2010). Further research is, therefore, needed to clarify whether depressive symptoms are associated with greater rumination on anger rather than sadness (or both) via peer victimization.

Measurement properties of the hypothesized three-factor model indicated that depressive symptoms and anger rumination are distinct (< 0.80; Brown, 2015), albeit highly correlated ($r_{T1/T2}$ = 0.57/0.72 > 0.50; Cohen, 1988). That means that a conceptual overlap between these two constructs might exist, that may have influenced, at least in part, estimates of relationships. Further research is suggested to test whether depressive symptoms and anger rumination are two distinct constructs or two different labels for the same concept or phenomenon (see Rönkkö & Cho, 2020).

Common-method (i.e., self-report measures) bias did not seem to pose any serious threat on accuracy of findings. However, depressive symptoms involve a myriad of biased perceptions that may have inflated, at least in part, estimates of association reported herein (e.g., adolescents with high depressive symptoms may perceive more victimization in ambiguous peer interactions; De Los Reyes & Prinstein, 2004). Future studies would be strengthened by conducting multiple-informant approaches (e.g., peer nominations).

The present study focused on symptoms of depression and not on the clinical diagnosis of depression, and, thus, generalizations are difficult to be made. Prior research has indicated that clinically depressed individuals are more likely to be violently victimized (Silver et al., 2005). Moreover, given that this was a non-stratified sample representativeness is not ensured. The novel study results need to be examined in diverse adolescent populations in regard of specific characteristic (e.g., sexual orientation). For instance, greater levels of victimization and depression were found to be reported by sexual minority adolescents (those who are attracted to the same or both sexes or are questioning) as compared to heterosexual ones (Luk et al., 2018). In addition, the students in this study all fell into the same age range, which limits the ability to generalize results to other age groups.

Results demonstrated that peer victimization is one pathway in which depressive symptoms are associated with subsequent anger rumination. However, there may be other pathways through which depressive symptoms may be linked with anger rumination. For instance, depressive symptoms were reported to predict increases in adolescents' social prescribed perfectionism (i.e., perceptions that others hold high standards of oneself and the need to satisfy these standards; Asseraf & Vaillancourt, 2015). Social prescribed perfectionism appears to be closely associated with individuals' tendency to experience anger and engage in anger rumination (Besharat & Shahidi, 2010).

Implications for Treatments

The findings suggest that targeting peer victimization could decrease anger rumination risk in depression. Growth mindset interventions (GMIs) could be beneficial in helping youth with internalizing problems build resilience against victimization (Calvete et al., 2022; Schleider & Weisz, 2018). GMIs are predicated on the idea that psychopathology stems from implicit beliefs in the fixed nature of one's condition (entity theories) (Yeager et al., 2013). Applied to the context of victimization,

GMIs teach young victims that people can change (growth mindset) and that peer victimization is not caused by fixed traits (Calvete et al., 2022). Perceiving events as controllable has been related with adaptive, problem-focused coping strategies and a lower likelihood for rumination (see Schleider & Weisz, 2018). Forgiveness education programs are also promising in helping victimized youth cope with anger, and alleviate anger rumination thinking (Contreras et al., 2021; Rapp et al., 2022). Forgiveness therapeutic techniques focus on teaching children how to neutralize stressors resulting from perceptions of interpersonal hurt, and, thus, overcome the pain that was inflicted by another person (see Watson et al., 2021).

Conclusion

The present study is the first to provide preliminary evidence that peer victimization mediates the prospective relation from depressive symptoms to anger rumination. By identifying peer victimization as a mediator of increased risk, the current findings underscore the potential importance of intervening on peer victimization as one approach to reduce early adolescents' anger rumination in depression. Further research is needed to replicate these findings as well as to explain whether, and if so why boys with higher depressive symptoms may face greater risk than girls to engage in anger rumination through peer victimization.

4.5 References

Ajilchi, B., & Nejati, V. (2017). Executive Functions in Students With Depression, Anxiety, and Stress Symptoms. *Basic and Clinical Neuroscience*, *8*(3), 223-232. https://doi.org/10.18869/nirp.bcn.8.3.223

Archibald, F. S., Bartholomew, K., & Marx, R. (1995). Loneliness in Early Adolescence: A Test of the Cognitive Discrepancy Model of Loneliness. *Personality and Social Psychology Bulletin, 21*(3), 296-301. https://doi.org/10.1177/0146167295213010

Asseraf, M., & Vaillancourt, T. (2015). Longitudinal Links Between Perfectionism and Depression in Children. *Journal of Abnormal Child Psychology*, *43*, 895-908. https://doi.org/10.1007/s10802-014-9947-9

Benbenishty, R., Astor, R. A., Roziner, I., & Wrabel, S. L. (2016). Testing the causal links between school climate, school violence, and school academic performance: a cross-lagged panel autoregressive model. *Educational Researcher*, *45*(3), 197-206. https://doi.org/10.3102/0013189X16644603

Besharat, M. A., & Shahidi, S. (2010). Perfectionism, anger, and anger rumination. *International Journal of Psychology*, *45*(6), 427-434. https://doi.org/10.1080/00207594.2010.501336

Borders, A., & Henneby, K. A. (2015). Angry rumination moderates the association between perceived ethnic discrimination and risky behaviors. *Personality and Individual Differences*, *79*, 81-86. https://doi.org/10.1016/j.paid.2015.01.047

Brown, T. A. (2015). *Confirmatory factor analysis for applied research* (2nd ed.). The Guilford Press.

Calvete, E., Orue, I., Echezarraga, A., Cortazar, N., & Fernández-González, L. (2022). A growth mindset intervention to promote resilience against online peer victimization: A randomized controlled trial. *Computers in Human Behavior*, *135*. https://doi.org/10.1016/j.chb.2022.107373

Camacho, A., Ortega-Ruiz, R., & Romera, E. M. (2021). Longitudinal associations between cybervictimization, anger rumination, and cyberaggression. *Aggressive Behavior, 47*(3), 332-342. https://doi.org/10.1002/ab.21958

Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling, 14*(3), 464-504. https://doi.org/10.1080/10705510701301834

Christina, S., Magson, N. R., Kakar, V., & Rapee, R. M. (2021). The bidirectional relationships between peer victimization and internalizing problems in school-aged children: An updated systematic review and meta-analysis. *Clinical Psychology Review, 85*(2). https://doi.org/10.1016/j.cpr.2021.101979

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). Routledge. https://doi.org/10.4324/9780203771587

Cole, D. A., & Maxwell, S. E. (2003). Testing Mediational Models With Longitudinal Data: Questions and Tips in the Use of Structural Equation Modeling. *Journal of Abnormal Psychology, 112*(4), 558-577. https://doi.org/10.1037/0021-843X.112.4.558

Contreras, I. M., Kosiak, K., Hardin, K. M., & Novaco, R. W. (2021). Anger rumination in the context of high anger and forgiveness. *Personality and Individual Differences, 171*. https://doi.org/10.1016/j.paid.2020.110531

Denson, T. F. (2013). The multiple systems model of angry rumination. *Personality and Social Psychology Review, 17*(2), 103-123. https://doi.org/10.1177/1088868312467086

De Lange, A. H., Taris, T. W., Kompier, M. A., Houtman, I. L., & Bongers, P. M. (2004). The relationships between work characteristics and mental health: Examining normal, reversed and reciprocal relationships in a 4-wave study. *Work & Stress, 18*(2), 149-166. https://doi.org/10.1080/02678370412331270860

De Los Reyes, A., & Prinstein, M. J. (2004). Applying Depression-Distortion Hypotheses to the Assessment of Peer Victimization in Adolescents. *Journal of Clinical Child and Adolescent Psychology, 33*(2), 325-335. https://doi.org/10.1207/s15374424jccp3302_14

Dickson, J. M., Moberly, N. J., & Huntley, C. D. (2019). Rumination selectively mediates the association between actual-ideal (but not actual-ought) self-discrepancy and anxious and depressive symptoms. *Personality and Individual Differences, 149*, 94-99. https://doi.org/10.1016/j.paid.2019.05.047

du Pont, A., Rhee, S. H., Corley, R. P., Hewitt, J. K., & Friedman, N. P. (2018). Rumination and Psychopathology: Are Anger and Depressive Rumination Differentially Associated with Internalizing and Externalizing Psychopathology? *Clinical Psychological Science, 6*(1), 18-31. https://doi.org/10.1177/2167702617720747

Edalati, H., Afzali, M. H., & Conrod, P. J. (2018). Poor response inhibition and peer victimization: A neurocognitive ecophenotype of risk for adolescent interpersonal aggression. *Journal of Abnormal Psychology, 127*(8), 830-839. https://psycnet.apa.org/doi/10.1037/abn0000380

Evans, S. C., Fite, P. J., Hendrickson, M. L., Rubens, S. L., & Mages, A. K. (2015). The Role of Reactive Aggression in the Link Between Hyperactive-Impulsive Behaviors and Peer Rejection in Adolescents. *Child Psychiatry & Human Development, 46*, 903-912. https://doi.org/10.1007/s10578-014-0530-y

Fanti, K. A., & Kimonis, E. R. (2012). Bullying and victimization: the role of conduct problems and psychopathic traits. *Journal of Research on Adolescence, 22*(4), 617-631. https://doi.org/10.1111/j.1532-7795.2012.00809.x

Ferguson, G. M., Hafen, C. A., & Laursen, B. (2010). Adolescent Psychological and Academic Adjustment as a Function of Discrepancies Between Actual and Ideal Self-Perceptions. *Journal of Youth and Adolescence, 39*, 1485-1497. https://doi.org/10.1007/s10964-009-9461-5

Foody, M., McGuire, L., Kuldas, S., & Norman, J. H. (2019). Friendship quality and Gender Differences in Association With Cyberbullying Involvement and Psychological Well-Being. *Frontiers in Psychology*. https://doi.org/10.3389/fpsyg.2019.01723

Fraley, R. C., & Roberts, B. W. (2005). Patterns of continuity: A dynamic model of conceptualizing the stability of individual differences in psychological constructs across the life course. *Psychological Review, 112*(1), 60-74. https://doi.org/10.1037/0033-295X.112.1.60

Frey, K. S., & Strong, Z. H. (2018). Aggression Predicts Changes in Peer Victimization that Vary by Form and Function. *Journal of Abnormal Child Psychology, 46*, 305-318. https://doi.org/10.1007/s10802-017-0306-5

Giannakopoulos, G., Kazantzi, M., & Dimitrakaki, C., Tsiantis, J., Kolaitis, G., & Tountas, Y. (2009). Screening for children's depression symptoms in Greece: the use of the Children's Depression

Inventory in a nation-wide school-based sample. *European Child & Adolescent Psychiatry*, *18*(8), 485-492. https://doi.org/10.1007/s00787-009-0005-z

Gilbert, P., Cheung, M., Irons, C., & McEwan, K. (2005). An Exploration into Depression-Focused and Anger-Focused Rumination in Relation to Depression in a Student Population. B*ehavioural and Cognitive Psychotherapy*, *33*(3), 273-283. https://doi.org/10.1017/S1352465804002048

Giovazolias, T., Kourkoutas, E., Mitsopoulou, E., & Georgiadi, M. (2010). The relationship between perceived school climate and the prevalence of bullying behavior in Greek schools: implications for preventive inclusive strategies. *Procedia - Social and Behavioral Sciences*, *5*, 2208-2215. https://doi.org/10.1016/j.sbspro.2010.07.437

Godleski, S. A., Kamper, K. E., Ostrov, J. M., Hart, E. J., & Blakely-McClure, S. J. (2015). Peer Victimization and Peer Rejection During Early Childhood. *Journal of Clinical Child & Adolescent Psychology*, *44*(3), 380-392. https://doi.org/10.1080/15374416.2014.940622

Goldner, L., Lev-Wiesel, R., & Simon, G. (2019). Revenge Fantasies After Experiencing Traumatic Events: Sex Differences. *Frontiers in Psychology*. https://doi.org/10.3389/fpsyg.2019.00886

Hankin, B. L. (2008). Stability of cognitive vulnerabilities to depression: A short-term prospective multiwave study. *Journal of Abnormal Psychology*, *117*(2), 324-333. https://doi.org/10.1037/0021-843X.117.2.324

Harmon, S. L., Stephens, H. F., Repper, K. K., Driscoll, K. A., & Kistner, J. A. (2019). Children's Rumination to Sadness and Anger: Implications for the Development of Depression and Aggression. *Journal of Clinical Child & Adolescent Psychology*, *48*(4), 622-632. https://doi.org/10.1080/15374416.2017.1359788

Henk, C. M., & Castro-Schilo, L. (2016). Preliminary detection of relations among dynamic processes with two-occasion data. *Structural Equation Modeling: A Multidisciplinary Journal*, *23*(2), 180-193. https://doi.org/10.1080/10705511.2015.1030022

Hjartarson, K. H., Snorrason, I., Bringmann, L. F., Ögmundsson, B. E., & Ólafsson, R. P. (2021). Do daily mood fluctuations activate ruminative thoughts as a mental habit? Results from an ecological momentary assessment study. *Behaviour Research and Therapy*, *140*. https://doi.org/10.1016/j.brat.2021.103832

Horváth, Z., Kökönyei, G., Sárosi, P., Koós, M., Demetrovics, Z., & Urbán, R. (2022). The mediating effect of anger rumination, coping and conformity motives on the association between hostility and problematic cannabis use. *Addictive Behaviors Reports, 16*. https://doi.org/10.1016/j.abrep.2022.100447

Hunter, S. C., Boyle, J. M. E., & Warden, D. (2007). Perceptions and correlates of peer-victimization and bullying. *British Journal of Educational Psychology, 77*(4), 797-810. https://doi.org/10.1348/000709906X171046

Kinney, T. A., Smith, B. A., & Donzella, B. (2001). The Influence of Sex, Gender, Self-Discrepancies, and Self-Awareness on Anger and Verbal Aggressiveness Among U.S. College Students. *The Journal of Social Psychology, 141*(2), https://doi.org/10.1080/00224540109600550

Kline, R. B. (2011). *Principles and practice of structural equation modelling*. New York, NY: Guilford Press.

Kline, R. B. (2016). *Methodology in the social sciences: Principle and practice of structural equation modeling* (4th ed.). Guilford Press.

Kochel, K. P., Ladd, G. W., & Rudolph, K. D. (2012). Longitudinal Associations Among Youth Depressive Symptoms, Peer Victimization, and Low Peer Acceptance: An Interpersonal Process Perspective. *Child Development, 83*(2), 637-650. https://doi.org/10.1111/j.1467-8624.2011.01722.x

Kokkinos, C. M., Karagianni, K., & Voulgaridou, I. (2017). Relational aggression, big five and hostile attribution bias in adolescents. *Journal of Applied Developmental Psychology, 52*, 101-113. https://doi.org/10.1016/j.appdev.2017.07.007

Kovacs, M. (1992). *The Children's Depression Inventory (CDI)*. Toronto, ON: Multi-Health Systems Inc.

Krause, E. D., Vélez, C. E., Woo, R., Hoffmann, B., Freres, D. R., Abenavoli, R. M., & Gillham, J. E. (2018). Rumination, Depression, and Gender in Early Adolescence: A Longitudinal Study of a Bidirectional Model. *The Journal of Early Adolescence, 38*(7), 923-946. https://doi.org/10.1177/0272431617704956

Larsen, J., K., Vermulst, A. A., Geenen, R., van Middendorp, H., English, T., Gross, J. J., Ha, T., Evers, C., & Engels, R. C. M. E. (2013). Emotion Regulation in Adolescence: A Prospective Study of Expressive Suppression and Depressive Symptoms. *The Journal of Early Adolescence, 33*(2), 184-200. https://doi.org/10.1177/0272431611432712

Ledgerwood, A., & Shrout, P. E. (2011). The trade-off between accuracy and precision in latent variable models of mediation processes. *Journal of Personality and Social Psychology, 101*(6). https://doi.org/10.1037/a0024776

Leeuwis, F. H., Koot, H. M., Creemers, D. H. M., & van Lier, P. A. C. (2015). Implicit and Explicit Self-Esteem Discrepancies, Victimization and the Development of Late Childhood Internalizing Problems. *Journal of Abnormal Child Psychology, 43*, 909-919. https://doi.org/10.1007/s10802-014-9959-5

León-Moreno, C., Martínez-Ferrer, B., Moreno-Ruiz, D., & Musitu-Ferrer, D. (2019). Forgiveness and Loneliness in Peer-Victimized Adolescents. *Journal of Interpersonal Violence, 36*(19-20), 9648-9669. https://doi.org/10.1177/0886260519869078

Lester, L., Dooley, J., Cross, D., & Shaw, T. (2012). Internalising Symptoms: An Antecedent or Precedent in Adolescent Peer Victimization. *Australian Journal of Guidance and Counselling, 22*(2), 173-189. https://doi.org/10.1017/jgc.2012.25

Lewinsohn, P. M., Steinmetz, J. L., Larson, D. W., & Franklin, J. (1981). Depression-related cognitions: Antecedent or consequence? *Journal of Abnormal Psychology, 90*(3), 213-219. https://doi.org/10.1037/0021-843X.90.3.213

Li, C., Zhao, Q., Dai, W., & Zhang, Y. (2021). Victims Become Covert Aggressors: Gender Differences in the Mediating Effects of Rumination on Anger and Sadness. *The Journal of Psychology, 155*(4), 441-456. https://doi.org/10.1080/00223980.2021.1901254

Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To Parcel or Not to Parcel: Exploring the Question, Weighing the Merits. *Structural Equation Modeling, 9*(2), 151-173. https://doi.org/10.1207/S15328007SEM0902_1

Luk, J. W., Gilman, S. E., Haynie, D. L., & Simons-Morton, B. G. (2018). Sexual Orientation and Depressive Symptoms in Adolescence. *Pediatrics*, *141*(5). https://doi.org/ https://doi.org/10.1542/peds.2017-3309

Luttenbacher, I., Breukel, J. S., & Adamson, M. M. (2021). The Mediating Role of Rumination in the Relationship between Loneliness and Depression in University Students during the COVID-19 Pandemic. *COVID, 1*, 447-457. https://doi.org/10.3390/covid1020038

Makros, J., & McCabe, M. P. (2001). Relationships Between Identity and Self-Representations During Adolescence. *Journal of Youth and Adolescence, 30*(5), 623-639. https://doi.org/10.1023/A:1010404822585

Malamut, S. T., & Salmivalli, C. (2021). Rumination as a Mediator of the Prospective Association Between Victimization and Bullying. *Research on Child and Adolescent Psychopathology*, *49*, 339-350. https://doi.org/10.1007/s10802-020-00755-z

Marsh, H. W., Hau, K. T., Balla, J. R., & Grayson, D. (1998). Is more ever too much? The number of indicators per factor in confirmatory factor analysis. *Multivariate Behavioral Research*, *33*(2), 181-220. https://doi.org/10.1207/s15327906mbr3302_1

Martin, L. L., & Tesser, A. (1989). Toward a motivational and structural theory of ruminative thought. In J. S. Uleman & J. A. Bargh (Eds.), *Unintended thought* (pp. 306-326). The Guildford Press.

Matsugana, M. (2008). Item Parceling in Structural Equation Modeling: A Primer. *Communication Methods & Measures*, *2*(4), 260-293. https://doi.org/10.1080/19312450802458935

Matthews, T., Caspi, A., Danese, A., Fisher, H. L., Moffitt, T. E., & Arseneault, L. (2022). A longitudinal twin study of victimization and loneliness from childhood to young adulthood. *Development and Psychopathology*, *34*(1), 367-377. https://doi.org/10.1017/S0954579420001005

McGrath, D. S., Sherry, S. B., Stewart, S. H., Mushquash, A. R., Allen, S. L., Nealis, L. J., & Sherry, D. L. (2012). Reciprocal relations between self-critical perfectionism and depressive symptoms: Evidence from a short-term, four-wave longitudinal study. *Canadian Journal of Behavioural Science, 44*(3), 169-181. https://doi.org/10.1037/a0027764

Modecki, K. L., Minchin, J., Harbaugh, A. G., Guerra, N. G., & Runions, K. C. (2014). Bullying prevalence across contexts: a meta-analysis measuring cyber and traditional bullying. *The Journal of Adolescent Health, 55*(5), 602-611. https://doi.org/10.1016/j.jadohealth.2014.06.007

Newsom, J. T. (2015). *Longitudinal structural equation modeling: A comprehensive introduction*. New York, NY: Routledge.

Ogundele, M. O. (2018). Behavioral and emotional disorders in childhood: A brief overview for paediatricians. *World Journal of Clinical Pediatrics, 7*(1), 9-26. https://doi.org/10.5409/wjcp.v7.i1.9

Peets, K., Turunen, T., & Salmivalli, C. (2021). Rumination Mediates the Longitudinal Associations Between Elementary-School Victimization and Adolescents' Internalizing Problems. *Journal of Interpersonal Violence*. https://doi.org/10.1177/08862605211025020

Peled, M., & Moretti, M. M. (2010). Rumination on rumination: Are rumination on anger and sadness differentially related to aggression and depressed mood? *Journal of Psychopathology and Behavioral Assessment, 32*(1), 108-117. https://psycnet.apa.org/doi/10.1007/s10862-009-9136-2

Ployhart, R. E., & MacKenzie, W. I. Jr. (2015). Two waves of measurement do not a longitudinal study make. In C. E. Lance & R. J. Vandenberg (Eds.), *More statistical and methodological myths and urban legends* (pp. 85-99). Routledge/Taylor & Francis Group.

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*(5), 879-903. https://doi.org/10.1037/0021-9010.88.5.879

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*, 879-891. https://doi.org/10.3758/BRM.40.3.879

Quan, F., Yang, R., & Xia, L-X. (2021). The longitudinal relationships among agreeableness, anger rumination, and aggression. *Current Psychology, 40*. https://doi.org/10.1007/s12144-020-01030-6

Rapp, H., Xu, J. W., & Enright, R. D. (2022). A meta-analysis of forgiveness education interventions' effects on forgiveness and anger in children and adolescents. *Child Development, 00*, 1-21. https://doi.org/10.1111/cdev.13771

Rönkkö, M., & Cho, E. (2020). An Updated Guideline for Assessing Discriminant Validity. *Organizational Research Methods, 25*(1), 6-14. https://doi.org/10.1177/1094428120968614

Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika, 66*(4), 507-514. https://doi.org/10.1007/BF02296192

Schleider, J. L., & Weisz, J. R. (2018). A single-session growth mindset intervention for adolescent anxiety and depression: 9-month outcomes of a randomized trial. *The Journal of Child Psychology and Psychiatry, 59*(2), 160-170. https://doi.org/10.1111/jcpp.12811

Schmidt, M. E., & Bagwell, C. L. (2007). The Protective Role of Friendships in Overtly and Relationally Victimized Boys and Girls. *Merrill-Palmer Quarterly, 53*(3), 439-460. https://www.jstor.org/stable/23096128

Selig, J. P., & Preacher, K. J. (2009). Mediation Models for Longitudinal Data in Developmental Research. *Research in Human Development, 6*(2-3), 144-164. https://doi.org/10.1080/15427600902911247

Sentse, M., Prinzie, P., & Salmivalli, C. (2017). Testing the Direction of Longitudinal Paths between Victimization, Peer Rejection, and Different Types of Internalizing Problems in Adolescence. *Journal of Abnormal Child Psychology, 45*, 1013-1023. https://doi.org/10.1007/s10802-016-0216-y

Seo, E., Lee, H. Y., Jamieson, J. P., Reis, H., Josephs, R. A., Beevers, C. G., & Yeager, D. S. (2021). Trait attributions and trait appraisals explain why an entity theory of personality predicts greater internalizing symptoms during adolescence. *Development and Psychopathology, 34*(3), 1104-1114. https://doi.org/10.1017/S0954579420001832

Shorey, S., Ng, E. D., & Wong, C. H. J. (2022). Global prevalence of depression and elevated depressive symptoms among adolescents: A systematic review and meta-analysis. *British Journal of Clinical Psychology, 61*(2), 287-305. https://doi.org/10.1111/bjc.12333

Sileo, K. M., & Kershaw, T. S. (2020). Dimensions of Masculine Norms, Depression, and Mental Health Service Utilization: Results From a Prospective Cohort Study Among Emerging Adult Men in the United States. *American Journal of Men's Health, 14*(1). https://doi.org/10.1177/1557988320906980

Silver, E., Arseneault, L., Langley, J., Caspi, A., & Moffitt, T. E. (2005). Mental Disorder and Violent Victimization in a Total Birth Cohort. *American Journal of Public Health, 95*(11), 2015-2021. http://doi.org/10.2105/AJPH.2003.021436

Smith, S. D., Stephens, H. F., Repper, K., & Kistner, J. A. (2016). The Relationship between Anger Rumination and Aggression in Typically Developing Children and High-Risk Adolescents. *Journal of Psychopathology and Behavioral Assessment, 38*, 515-527. https://doi.org/10.1007/s10862-016-9542-1

Sokratous, S., Zilides, C., Panagi, D., & Karanikola, M. (2017). Prevalence of depressive symptoms among schoolchildren in Cyprus: a cross-sectional descriptive correlational study. *Child and Adolescent Psychiatry and Mental Health, 11*(7). https://doi.org/10.1186/s13034-017-0145-8

Spyropoulou, E., & Giovazolias, T. (2021). Investigating the Multidimensionality and Psychometric Properties of the Children's Anger Rumination Scale (CARS): A Bifactor Exploratory Structural Equation Modeling Framework. *Assessment*. https://doi.org/10.1177/10731911211043569

Spyropoulou, E., & Giovazolias, T. (2022a). Anger Rumination in Early Adolescence: Risk Factor or Outcome of Depressive Symptoms" A Prospective Study. *Journal of Youth and Adolescence, 51*, 1708-1719. https://doi.org/10.1007/s10964-022-01624-2

Spyropoulou, E., & Giovazolias, T. (2022b). Exploring the longitudinal relationship between anger rumination and peer victimization when controlling for sadness rumination. *Current Psychology*. https://doi.org/10.1007/s12144-022-03906-1

Sukhodolsky, D., Golub, A., & Cromwell, E. N. (2001). Development and validation of the Anger Rumination Scale. *Personality and Individual Differences, 31*(5), 689-700. https://doi.org/10.1016/S0191-8869(00)00171-9

Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics* (4th ed.). Allyn & Bacon.

Tak, Y. R., Brunwasser, S. M., Lichtwarck-Aschoff, A., & Engels, R. C. M. E. (2017). The Prospective Associations between Self-Efficacy and Depressive Symptoms from Early to Middle Adolescence: A Cross-Lagged Model. *Journal of Youth and Adolescence, 46*, 744-756. https://doi.org/10.1007/s10964-016-0614-z

Tran, C. V., Cole, D. A., & Weiss, B. (2012). Testing Reciprocal Longitudinal Relations Between Peer Victimization and Depressive Symptoms in Young Adolescents. *Journal of Clinical Child & Adolescent Psychology, 41*(3), 353-360. https://doi.org/10.1080/15374416.2012.662674

Verberg, E. M., Jacobs, A. K., Hershberger, S. L. (1999). Peer Victimization and Attitudes About Violence During Early Adolescence. *Journal of Clinical Child Psychology, 28*(3), 386-395. https://doi.org/10.1207/S15374424jccp280311

von Salisch, M., & Zeman, J. L. (2018). Pathways to Reciprocated Friendships: A Cross-Lagged Panel Study on Young Adolescents' Anger Regulation towards Friends. *Journal of Youth and Adolescence, 47*, 673-687. https://doi.org/10.1007/s10964-017-0628-7

Watson, H., Todorov, N., & Rapee, R. M. (2021). Healing from Bullying in Early Adolescent Boys: The Positive Impact of Both Forgiveness and Revenge Fantasies. *Journal of School Violence, 20*(2), 139-152. https://doi.org/10.1080/15388220.2020.1858425

Yeager, D. S., Trzesniewski, K. H., & Dweck, C. S. (2013). An implicit theories of personality intervention reduces adolescent aggression in response to victimization and exclusion. *Child Development, 84*(3), 970-988. https://doi.org/10.1111/cdev.12003

Yeager, D. S., Trzesniewski, K. H., Tirri, K., Nokelainen, P., & Dweck, C. S. (2011). Adolescents' implicit theories predict desire for vengeance after peer conflicts: correlational and experimental evidence. *Developmental Psychology, 47*(4), 1090-1107. https://doi.org/10.1037/a0023769

Yu, R., Branje, S., Meeus, W., Koot, H. M., Lier, P., & Fazel, S. (2018). Victimization Mediates the Longitudinal Association Between Depressive Symptoms and Violent Behaviors in Adolescence. *Journal of Abnormal Child Psychology, 46*(4), 839-848. https://doi.org/10.1007/s10802-017-0325-2

5. General Discussion

Early adolescence represents a critical period in human development that marks the emergence of a sharp increase in both emotional and interpersonal difficulties. The bulk of studies exploring relations between depressive symptoms, rumination tendencies, and peer victimization experiences in young individuals have mainly focused on examining ruminatory thinking in the context of sad mood. Despite of evidence showing anger coping deficits to be common in both depressed-prone individuals and victims of peer mistreatment, potential relationships between depressive symptoms, anger rumination tendencies and peer victimization are less clarified. Literature has long underscored the importance of cross-cultural adaption of the research instruments, as it enables results comparisons across different studies and confirms the conceptual accuracy the construct measures (see Borsa et al., 2012). Taking all these into consideration, the goal of the present research was threefold: (1) to investigate the factorial structure and psychometric properties of the Greek version of the Children's Anger Rumination Scale (CARS) (**Study 1**), (2) to explore the longitudinal bidirectional association between anger rumination and depressive symptoms in early adolescence, and to examine whether this relation differs by sex (**Study 2**), and, (3) to extend Study 2 by assessing whether peer victimization mediates the prospective relationship from depressive symptoms to anger rumination, and to examine whether this relation differs by sex (**Study 3**).

Study 1 examined the factorial structure of the Greek version of the CARS by contrasting alternative representations of the instrument: (one-factor and four-factor independent cluster models – confirmatory factor analysis [ICM – CFA], exploratory structural equation modelling [ESEM], bifactor-CFA and bifactor-ESEM). Instead of using only model fit indices, model selection also included the careful examination of parameter estimates (e.g., factor loadings) and the underlying theory as well (Morin et al., 2016). Psychometric properties of the CARS (e.g., measurement invariance) were also assessed.

Results indicated that the hypothesized bifactor-ESEM solution, composed by an anger rumination general factor (GF) and four specific factors (SFs; Angry Afterthoughts, Thoughts of Revenge, Angry Memories, and Understanding of Causes) provided the best fit to the data and revealed the unitary dimensionality of the CARS. Particularly, SFs did not retain their own specificity in addition to that accounted for by the GF, suggesting that they are ignorable nuisance dimensions adding no information

to anger rumination general factor. These findings provided support to the unidimensional CARS solution proposed by Repper (2006) and seemed to contrast Sukhodolsky et al.'s (2001) theoretical framework in which anger rumination represents a dynamic emotional-cognitive process composed by four interactive, albeit distinct stages.

Measurement invariance of the CARS across gender and age was confirmed, in support of previous findings (Smith et al., 2016). Regarding gender-based differences, the similar rates of anger rumination displayed by both boys and girls contrasted previous studies reporting that boys tend to ruminate more on angry thoughts as compared to girls (e.g., Harmon et al., 2019). In addition, the nonsignificant differences between children's and early adolescents' anger rumination tendencies seemed to advance prior findings supporting these differences to increase in later stages of development (Hankin, 2008). In line with previous researches, anger rumination was found to be highly correlated with the personality trait of Neuroticism, and negatively related with the other personality traits, namely Energy/Extraversion, Intellect/Openess, Consciousness, and Agreeableness (Fresnics & Borders, 2016; Mezulis et al., 2011; Oral & Arslan, 2017). In addition, the substantial depressogenic role of rumination is consistent with prior studies underscoring the close relationship between anger rumination and youth depression (e.g., Harmon et al., 2019). Indeed, high anger rumination tendencies may intensify preexisting cognitive appraisals of being unfairly treated (i.e., victim justice sensitivity) which, in turn, may render individuals vulnerable to depressive symptoms of worthlessness and helplessness (Bondü et al., 2017).

Anger rumination was found to have a positive weak, yet significant effect on bullying behaviors (e.g., Zsila et al., 2018). It has been suggested that fantasies of retaliation, inherently embedded in the anger rumination process, represent one way of individuals to resolve the high levels of emotional intensity, caused by recycling angry thoughts (Sukhodolsky et al., 2001). In a cross-sectional study performed with 318 secondary school students, thoughts of revenge were found to partially mediate the link between victimization and bullying (Sariçam & Çentinkaya, 2018). It seems that the stressful experience of being peer victimized can engender a distorted cognitive-affective cycle of revengeful thoughts, which may, in turn, predispose individuals to behave aggressively in order to resolve them (Li et al., 2021).

In Study 2, early adolescents' depressive symptoms were found to precede endorsement of anger rumination, after controlling for previous levels of anger rumination and sex. This finding seems to be

in line with the scar model (Lewinsohn et al., 1981) which states that depression may affect in a residual way central domains of human personality, including cognitive ones. Moreover, it provides support to prior studies reporting that depressive symptoms precede and negatively predict individuals' ability to regulate constructively emotions (de Jonge-Heesen et al., 2021; Larsen et al., 2013; Spyropoulou & Giovazolias, 2022a). For instance, in a two-wave study performed with 1,753 adolescents, depressive symptoms were found to predict later use of suppression but not vice versa (Larsen et al., 2013). Similarly, depressive symptoms emerged as a potential precursor of subsequent engagement in sadness rumination in a sample of 302 early adolescents (Spyropoulou & Giovazolias, 2022a).

Contrary to what was expected, early adolescents' baseline anger rumination was not found to be a vulnerability factor for later depressive symptomology, after accounting for prior levels of depressive symptoms and gender. This finding does not seem to align with prior studies suggesting that impairments in emotion regulation may increase risk for depressive symptoms over time (e.g., Abela & Hankin, 2011). Moreover, the low temporal stability of anger rumination, reported herein ($\beta = 0.27$), does not advance one central tenet of the vulnerability model; that is the high inter-individual stability of the hypothesized vulnerability factor (Caspi et al., 2005). Specifically, current results seem to provide support to prior findings suggesting the state-like features of ruminative thinking across early adolescence (Hankin, 2008). That is, compared to older adolescents whose rumination tendencies are more stable and trait-like, early adolescents seem to engage occasionally in rumination to cope with anger (Hankin, 2008). The fact that anger rumination was not found to predict later depressive symptoms, cannot preclude the possibility that this relation might occur when other third variables are considered. For instance, social support has been suggested to reduce the effect of rumination on negative affect (Puterman et al., 2010) as well as to mitigate the risk for depressive symptoms (Gariépy et al., 2018). That means that anger rumination can increase likelihood for depressive symptoms when low social support is received. Moreover, anger rumination about specific events rather than anger rumination in general may predispose young individuals to depressive symptomology over time. In line with this notion, empirically supported findings have shown perceived parental rejection to be positively associated with both depression (Hale et al., 2005) and inward expression of anger (anger-in; Cipriano et al., 2020) which appears to be closely with anger rumination (Sukhodolsky et al., 2001).

The prospective effects of depressive symptoms on anger rumination were found to be consistent for boys and girls. This finding supports prior studies reporting that depressive symptoms affect in a residual way emotion regulation strategies, similarly for boys and girls (e.g., Larsen et al., 2013). Inversely, anger rumination was not associated with later increases in depressive symptoms, neither for boys or girls. A possible explanation is that gender-based differences in the anger rumination-depression link may occur in latter stages of adolescence, when rumination has become a more trait-like response style. Indeed, a stronger association between anger and depressive symptoms has been reported among females than males, in cross-sectional (Asgeirsdottir & Sigfusdottir, 2015), and prospective studies performed with older samples (Galaif et al., 2003).

The temporal precedence of depressive symptoms over anger rumination reported in Study 2, offered a necessary but not sufficient, first step for claiming causality. Thus, because the observed prospective relationship from depressive symptoms to anger rumination could be accounted for by third underlying mechanisms. To address the issue raised, Study 3 drew upon prior empirically supported theoretical findings and extended Study 2 by examining peer victimization as a potential mediator in the depressive symptoms-anger rumination link. Sex-based differences in the hypothesized mediation model were also tested. Results indicated that peer victimization mediated the association from depressive symptoms to anger rumination. However, this relation was found to be significant only for boys and not for girls.

Particularly, the mediation model tested in Study 3, showed that depressive symptoms were associated with later peer victimization experiences. This finding provided support to the symptoms-driven model of depression (rooted in scar hypothesis), and to a great body of literature suggesting that depressive symptoms may exert a positive influence on interpersonal stressors, including peer victimization (e.g., Spyropoulou & Giovazolias, 2022a). The predictive effects of depression on peer victimization could be accounted for by several mechanisms. For instance, high levels of depressive symptoms have shown to dampen young individuals' cognitive ability to control and inhibit inappropriate stimulus-driven responses (Brieant et al., 2020). Low inhibitory control is reported to provoke peer victimization by activating impulsive and disruptive behaviors that peers may find unpleasant (Edalati et al., 2018; Fanti & Kimonis, 2012). In addition, depressed-prone children are more likely to hold an entity theory of personality (Seo et al., 2022) that seems to intensify hostile attribution bias of others' intentions (Schepman et al., 2014; Yeager et al., 2013). Interpreting others'

behaviors as having hostile rather than benign intent has shown to increase likelihood for reactive aggression (Dodge et al., 2015), and, subsequent, experiences of peer victimization (Frey & Strong, 2018; Salmivalli & Helteenvuori, 2007).

The mediation model also revealed that frequent experiences of peer victimization were associated with subsequent anger rumination. The finding that youth with higher levels of peer victimization were more likely to use anger rumination over time, aligned with previous studies reporting the positive association between peer victimization and later anger rumination tendencies (Camacho et al., 2021; Li et al., 2021; Malamut & Salmivalli, 2021). According to the Control theory proposed by Martin and Tesser (1989) rumination is activated to resolve one's own perceived self-discrepancies. In line with this theory, literature suggests that peer victimization can damage self-esteem by creating a dissonance between individuals' high implicit self-esteem (ideal self) and explicit self-esteem respectively (actual self) (Leeuwis et al., 2015). Ideal vs actual self-discrepancies are reported to activate feelings of anger and frustration (Makros & McCabe, 2001), and, thus initiate the anger rumination process in order to be resolved and distress is reduced (see Denson, 2013). Indeed, revengeful fantasies, inherently embedded in the anger rumination process seem to temporarily help victims of bullying downregulate aversive feelings and restore the damaged self-esteem by envisioning harming the perpetrator (Goldner et al., 2019). In line with this notion, findings have shown that revengeful thinking is implicated in the activation of neurological reward systems (e.g., dorsal striatum) (De Quervain et al., 2004). Frequent endorsement of vengeful fantasies so as to ameliorate emotional discomfort may, however, become a mental habit with delirious outcomes. For instance, serious school violence has been related with peer victimization and fantasies of retaliation afterwards (see Yeager et al., 2011). In a similar vein, loneliness is an established outcome of peer victimization (Matthews et al., 2022) that represents a discrepancy between ones' ideal level and one's actual level of being socially involved (see Luttenbacher et al., 2021). In a study performed with 617 students, findings have shown higher perceptions of emotional loneliness as well greater levels of revenge desire among most peer-victimized youth (León-Moreno et al., 2021).

The indirect effects of depressive symptoms on anger rumination through peer victimization were found to be significant only for boys and not for girls. That means that boys with higher levels of depressive symptoms were more likely than girls to endorse anger rumination over time through peer victimization. Particularly, in contrast with previous studies (Sentse et al., 2017; Yu et al., 2018)

depressive symptoms were associated with later increases in peer victimization only for boys and not for girls. Similarly, relative to girls, boys seemed more likely to engage in anger rumination following peer victimization, as opposed to prior research findings (Camacho et al., 2021; Li et al., 2021). The greater likelihood of boys with elevated depressive symptoms for endorsing anger rumination through peer victimization could be attributed to the culturally grounded expectations for men's social roles and behaviors. Based on evidence, men are generally socialized to be strong, with increased resilience and independence (see Sileo & Kershaw, 2020). In line with this notion, passivity represents a depression-linked behavior that could render young boys more susceptible than girls to peer victimization as it may signal nonconformity to masculine norms. In a similar vein, boys who experience peer victimization may be more likely to engage in anger rumination as compared to girls, as masculinity norms expect from them to be less emotional expressive (see Sileo & Kershaw, 2020). Indeed, both masculinity and one's desire to be masculine were found to explain anger rumination-related repressed anger (Kinney et al., 2001; Sukhodolsky et al., 2001). Inversely, the lower likelihood of girls with higher depressive symptoms for endorsing anger rumination through peer victimization could be explained by the higher friendship quality that girls usually endorse (Foody et al., 2019). Particularly, friendship quality is reported to protect from victimization (Schmidt & Bagwell, 2007) and anger regulation difficulties (von Salisch & Zeman, 2018). Moreover, female victims are typically more forgiving than male victims (Fehr et al., 2010 as cited in León-Moreno et al., 2021). Forgiveness disposition has been suggested to mitigate risk for anger rumination as it reduces angry and resentful emotions (Contreras et al., 2021).

Strengths, Limitations, and Future Directions

Along with strengths, Study 1 had also important limitations that should be mentioned, as they provide interesting directions for future research. First, the present results were specific to a non-clinical and non-stratified sample of Greek students enrolled in public schools of Crete, and thus, generalizations may be difficult to attain. Further research is needed to replicate these findings to clinical (e.g., youth with clinical diagnosis of depression) or more representative samples (e.g., other geographic regions). Second, given the prominent role that ethnicity plays in anger coping styles (e.g., Perry-Parrish et al., 2017), it would be recommendable to assess CARS's factorial structure in different cultural settings. Third, by relying exclusively on single-source (e.g., children) and single-method (self-

report) data collection, concerns regarding response bias and common method bias are raised (e.g., Podsakoff et al., 2003). A remedy for these types of bias, could be to employ alternative multisource (e.g., peers) and multimethod assessment modalities (e.g., semistructure interview, rumination diary). For instance, the diary methodology has become a valuable tool in research on rumination (Riley et al., 2019). Finally, a longitudinal research design would help to clarify the longitudinal invariance of the CARS's instrument as well as to understand how anger rumination may relate to depressive symptoms and bullying, over time.

Accordingly, alongside with strengths both studies 2 & 3 shared some limitations that should be mentioned as they provide interesting directions for future research. It has been acknowledged that two-waves of data provide in general little information about stability effects (Fraley & Roberts, 2005) as well as intra-individual (within-person) and inter-individual (between-person) changes in the level of variable over time (Ployhart & MacKenzie, 2015). However, two-waves of were assessed, because as Henk and Castro-Schilo (2016, p. 180) stated: "To neglect two-wave data is to ignore the fact that in any longitudinal investigation, there will inevitably be a time when only two waves of data have been collected. At that moment, researchers have a choice to stall until the remaining data are available, or to begin to identify trends in their data".

Longitudinal mediation typically requires at least three separated and ordered time points of measurement (i.e., change in the mediator precedes change in the outcome; Selig & Preacher, 2009). However, the two-wave "half-longitudinal mediation" approach performed in Study 3 outperforms other modeling alternatives [e.g., predictor (T1) → mediator (T2) → outcome (T2); Peets et al., 2022] in providing preliminary evidence about possible mediation effects with just two measurement points (Cole & Maxwell, 2003). This is because the time-interval between the predictor and the mediator (XT1 → MT2), as well the time-interval between the mediator and the outcome (MT1 → YT2) are taken into account (Cole & Maxwell, 2003). Moreover, while complete mediation is rarely achieved in psychological research, the two-wave "half-longitudinal mediation" design does not allow researchers to test for complete mediation; the significance of the direct path *c* from X to Y cannot be directly assessed (Cole & Maxwell, 2003). Therefore, future studies with 3 or more measurement occasion's data are suggested to conduct more complex data-analytic approaches (e.g., latent growth curve models; Selig & Preacher, 2009) and, thus, overcome methodological shortcomings inherently embedded in the two-wave longitudinal designs.

Theoretical assumptions in Study 3 were unidirectional and focused on testing whether depressive symptoms predict later anger rumination via peer victimization. Although depression is an established risk factor for later peer victimization, empirically supported theoretical models show that victimized individuals are also likely to experience later depression (for a review see Christina et al., 2021). Accordingly, peer victimization and anger rumination can be mutually related and reinforcing (Camacho et al., 2021). Further research with more data waves is needed to examine depressive symptoms, peer victimization, and anger rumination simultaneously, and thus clarify how these constructs may relate over time.

In Study 3, it was hypothesized that depressive symptoms were associated with later anger rumination tendencies through peer victimization experiences. Empirical findings however demonstrate that depressive symptoms may also predict increased use of sadness rumination (e.g., Krause et al., 2018). Accordingly, peer victimization has been found to predict both sadness rumination and anger rumination over time (Li et al., 2021; Malamut & Salmivalli, 2021). Further research is, therefore, recommended to clarify whether depressive symptoms are associated with greater rumination on anger rather than sadness (or both) via peer victimization.

Study 3 indicated peer victimization as one pathway through which depressive symptoms may be associated with subsequent anger rumination in youth. However, there may be also other pathways through which depressive symptoms may be related with anger rumination over time. For instance, depressive symptoms were reported to predict subsequent increases in young individuals' social prescribed perfectionism (i.e., perceptions that others hold high standards of oneself and the need to satisfy these standards; Asseraf & Vaillancourt, 2015). Social prescribed perfectionism is suggested to be closely associated with individuals' tendency to experience anger and engage in anger rumination (Besharat & Shahidi, 2010). Victims-justice sensitivity is another mechanism that could explain why depressive symptoms may increase risk for anger rumination over time. Particularly, depressive symptoms were found to be associated with individuals' high perceptions of being unfairly treated or being taken advantage of (Bondü et al., 2017). Victim-sensitive people may be more inclined to experience anger and endorse anger rumination (Schmitt et al., 2010). Future studies may benefit by addressing these hypotheses.

In Study 3, peer victimization experiences were found to explain anger rumination risk in depression. However, not all peer-victimized youth seem to face the same odds for developing poor

mental health outcomes following negative interactions with peers (Cui & Xie, 2022). Identifying factors that might reduce likelihood for anger rumination following peer victimization seems important both at theoretical and intervention level. For instance, in a longitudinal study conducted with 800 3rd to 6th-grade students in China, *positive school climate* was found to buffer the positive association between perceived exposure to peer victimization and later engagement in aggression (Sullivan et al., 2021), an established outcome of anger rumination (Quan et al., 2021). Accordingly, ample of evidence suggests *friendship quality* to mitigate the aversive outcomes related to peer victimization (see Schacter et al., 2021). Indeed, higher friendship involvement was found to explain more frequent use of cognitive reappraisal of an anger-eliciting event and less maladaptive anger regulation strategies over time (von Salich & Zeman, 2018).

Measurement properties of the hypothesized two-factor (Study 2) and three-factor model (Study 3) indicated that depressive symptoms and anger rumination are distinct (< 0.80; Brown, 2015), albeit highly correlated (r_s = 0.57 to 0.74 > 0.05; Cohen, 1988). That means that a conceptual overlap between these two constructs might exist, that may have influenced, at least in part, estimates of relationships. Further research is suggested to test whether depressive symptoms and anger rumination are two distinct constructs or two different labels for the same concept or phenomenon (see Rönkkö & Cho, 2020).

In both prospective studies, only self-reports were employed. It is well known that depressive symptoms entail a myriad of biased perceptions that may have inflated, at least partly, estimates of association. For instance, the relation between depressive symptoms and peer victimization, reported in Study 3 may be partially attributed to the cognitive biases linked with the depressive symptoms themselves (e.g., adolescents high on depressive symptoms may perceive more victimization in ambiguous peer interactions; De Los Reyes & Prinstein, 2004). Future studies would be strengthened by conducting multiple-informant approaches (e.g., peer nominations) to overcome limitations related to self-report measures.

Both studies focused on symptoms of depression and not on the clinical diagnosis of depression, and, thus, generalizations of findings could not be made. Prior research has shown that clinically depressed individuals are more at risk to be violently victimized (Silver et al., 2005). Moreover, the present sample was non-stratified and, thus, representativeness could not be ensured. The novel study results need to be examined in diverse adolescent populations in regard of specific characteristic (e.g.,

refugee status, sexual orientation). For instance, sexual minority adolescents (those who are attracted to the same or both sexes or are questioning) were found to report higher levels of victimization experiences and greater depressive symptoms relative to heterosexual adolescents (Luk et al., 2018). Similarly, depressive symptoms and exposure to peer victimization may be overrepresented among forcibly displaced youth (e.g., Fabbri et al., 2022). Finally, students in this study all fell into the same age range, which reduces the ability to generalize results to other age groups.

Implications for Counselling Interventions

Overall, results suggested that depressive symptoms preceded and positively predicted anger rumination in early adolescence, and indicated peer victimization as a potential underlying mechanism in this relation. By identifying self-reported peer victimization as a mediator of increased risk, the current findings underscore the potential importance of intervening on perceived peer victimization as one approach to reduce early adolescents' anger rumination in depression.

There is a growing body of literature supporting the effectiveness of the so-called wise interventions (WIs) in reducing youth psychological maladjustment (for a review see Schleider et al., 2020). WIs represent well-designed, brief (~ 35-40 min.) and computer-based programs that aim to build individuals' resilience by changing in a minimally directive manner theirs attributes on personality qualities and social situations (for a review see Walton & Wilson, 2018). In our case, a WI with a growth mindset (GM) approach could be promising in helping youth reduce depression-related peer victimization experiences and, thus, overcome the risk for endorsing anger rumination over time. Indeed, empirically supported findings have underscored the effectiveness of GMIs in reducing youth depression (Schleider & Weisz, 2016; Schleider & Weisz, 2018) as well as other types of internalizing following exposure to online peer victimization (Calvete et al., 2022). Predicated on the idea that psychopathology derives from implicit maladaptive beliefs in the fixed nature of one's condition (Yeager et al., 2013), GMIs aim to help individuals change the attributes that give to themselves and to potential stressors by replacing fixed mindsets (i.e., personality cannot change) with growth mindsets (i.e., personality can change). In case of peer victimization, evidence has shown that adolescents with a more of an entity theory of personality, are more likely to perceive victimization as a fixed, uncontrollable and enduring process, in which all those involved have little potential to change (see

Kaufman et al., 2020). Uncontrollability beliefs have been linked with greater levels of daily worry and distress (see LaFreniere & Newman, 2019). Inversely, individuals who believe in their efficacy to control their responses to stressors usually feel less distressed after social exclusion (Yeager et al., 2014), and use more adaptive, problem-focused coping strategies (see Schleider & Weisz, 2018) such as reappraisal (see King & dela Rosa, 2019). Interventions with a growth mindset approach usually include the following basic elements: (1) scientific information on the possibility of personality change (i.e., concept of neuroplasticity), (2) descriptions provided by older adolescents (e.g., testimonials or vignettes) regarding the malleability of personality traits as well as the benefits of employing a growth mindset and specific management strategies to cope with stressors (i.e., distraction, social support, cognitive reframing) (Calvete et al., 2022; Schleider & Weisz, 2016). Based on results reported herein, a wise GMI could also be implemented by forgiveness therapeutic techniques which seem beneficial in helping victimized youth, cope with anger, and alleviate anger rumination thinking (Contreras et al., 2021; Rapp et al., 2022). Particularly, forgiveness intervention programs focus on teaching children how to neutralize stressors resulting from perceptions of interpersonal hurt, and, thus, overcome the pain that was inflicted by another person (see Watson et al., 2021). Timely targeting anger rumination seems, however, also important as frequent endorsement of this emotion-focused strategy may become a mental habit with trait-like features (Hjartarson et al., 2021). Distraction (i.e., purposefully allocate one's attention to pleasant or neutral activities and thoughts rather than one's own distress) and mindfulness techniques (i.e., fostering awareness and ways of focusing on mental events in a nonjudgmental way) are reported to be helpful in getting youth out of a ruminative state (Hilt & Pollak, 2012). Particularly, mindfulness techniques informed by neurodevelopmental trajectories have been shown to alleviate mental health problems of adolescents by empowering executive functions (i.e., higher cognitive abilities necessary for goal directed thoughts and actions) necessary for adaptive coping (Sanger & Dorjee, 2015). Alongside with self-administered wise GMIs, emphasis should also be given to socio-contextual factors that may increase risk for peer victimization experiences as being victimized is not a phenomenon that occurs in isolation from one's own environment (Bronfenbrenner, 1995). The "whole-school" anti-bullying programs seem promising in reducing existing bullying victimization problems by including intervention elements at multiple levels, such as school, classroom, parents, and community (Gaffney et al., 2019). For instance, in a recent longitudinal study performed with 750 early adolescents, evidence supported the effectiveness of teacher interventions in

targeting bullying/victimization (Burger et al., 2022). Particularly, disciplinary sanctions were found to reduce the likelihood of being a bully or victim, whereas group discussions showed beneficial effects in increasing the odds of being a defender (Burger et al., 2022). Accordingly, evidence has also shown the effectiveness of parental compensatory involvement (e.g., teaching children positive self-appraisals) in preventing psychological maladjustment in peer victimized children (Erath et al., 2021). It should be noted, however, that before implementing any intervention, practitioners should take a number of factors into consideration, including the specific characteristics of bullying victimization both at individual and at system level (Gaffney et al., 2019).

General Conclusion

The present research was the first to support the unidimensional factorial structure of the Children's Anger Rumination Scale (CARS) as well as its psychometric properties in a sample of Greek youth. Moreover, it was the first to provide evidence that depressive symptoms may precede increased use of anger rumination in early adolescence but not vice versa, similarly for boys and girls. Additionally, it contributed to existing literature by showing that peer victimization can mediate the prospective relation from depressive symptoms to anger rumination. In other words, early adolescents with higher depressive symptoms may face greater risk for anger rumination through peer victimization experiences. Gender-moderation effects were not established in the prospective depressive symptoms-peer victimization-anger rumination link. However, boys with higher depressive symptoms were found to be more likely than girls to engage in anger rumination through peer victimization. Culturally grounded expectations for men's social roles and behaviors (e.g., men are expected to be strong and independent; see Sileo & Kershaw, 2020) could partially explain the greater likelihood of boys with elevated depressive symptoms of endorsing anger rumination through peer victimization. Indeed, evidence shows that men are generally socialized to be strong, with increased resilience and independence (see Sileo & Kershaw, 2020). A wise intervention with a growth mindset approach (for a review see Schleider et al., 2020), implemented by forgiveness therapy (Watson et al., 2021) and adaptive emotion regulation techniques (e.g., distraction; Hilt & Pollak, 2012) could be beneficial in helping youth reduce depression-related peer victimization experiences and, thus, reduce risk for using anger rumination over time. Alongside with self-administered growth mindset interventions, emphasis should also be given to "whole-school' anti-bullying programs that take into account several socio-

contextual factors that could increase risk for peer victimization (Gaffney et al., 2019). It should be noted, however, that before implementing any intervention, more empirical work is needed to replicate these findings as well as to further explain whether, and if so why boys with higher depressive symptoms are more likely than girls to endorse anger rumination through peer victimization. In any case, practitioners should carefully consider the specific characteristics of bullying victimization both at individual and at system level before implementing any intervention (Gaffney et al., 2019).

6. General Introduction & Discussion References

Abela, J. R. Z., & Hankin, B. L. (2011). Rumination as a vulnerability factor to depression during the transition from early to middle adolescence: A multiwave longitudinal study. *Journal of Abnormal Psychology, 120*(2), 259-271. https://doi/10.1037/a0022796

Abela, J. R. Z., Vanderbilt, E., & Rochon, A. (2004). A test of the integration of the response styles and social support theories of depression in third and seventh grade children. *Journal of Social and Clinical Psychology, 23*(5), 653-674. https://doi.org/10.1521/jscp.23.5.653.50752

Arnett J. J. (Ed.). (2016). *The Oxford Handbook of Emerging Adulthood*. Oxford University Press.

Asgeirdottir, B. B., & Sigfusdottir, I. D. (2015). Gender differences in co-occurrence of depressive and anger symptoms among adolescents in five Nordic countries. *Scandinavian Journal of Public Health, 43*(2), 183-189

Asseraf, M. & Vaillancourt, T. (2015). Longitudinal links between perfectionism and depression in children. *Journal of Abnormal Child Psychology, 43*(5), 895-908. https://doi/10.1007/s10802-014-9947-9

Besharat, M. A. (2011). Factorial and cross-cultural validity of a Farsi version of the Anger Rumination Scale. *Psychological Reports, 108*(1), 317-328. https://doi.org/10.2466/02.08.09.PR0.108.1.317-328

Besharat, M. A., & Shahidi, S. (2010). Perfectionism, anger, and anger rumination. *International Journal of Psychology, 45*(6), 427-434. https://doi.org/10.1080/00207594.2010.501336

Blain-Arcaro, C., & Vaillancourt, T. (2017). Longitudinal Associations between Depression and Aggression in Children and Adolescents. *Journal of Abnormal Child Psychology, 45*, 959-970. https://doi.org/10.1007/s10802-016-0204-2

Blum, R. W., Astone, N. M., Decker, M. R., & Mouli, V. C. (2014). A conceptual framework for early adolescence: a platform for research. *International Journal of Adolescent Medicine and Health, 26*(3). https://doi.org/10.1515/ijamh-2013-0327

Bondü, R., Sahyanzici-Knaak, F., & Esser, G. (2017). Long-Term Associations of Justice Sensitivity, Rejection Sensitivity, and Depressive Symptoms in Children and Adolescents. *Frontiers in Psychology*. https://doi.org/10.3389/fpsyg.2017.01446

Borders, A., & Henneby, K. A. (2015). Angry rumination moderates the association between perceived ethnic discrimination and risky behaviors. *Personality and Individual Differences, 79*, 81-86. https://doi/10.1016/j.paid.2015.01.047

Borsa, J. C., Damásio, B. F., & Bandeira, D. R. (2012). Cross-Cultural Adaption and Validation of Psychological Instruments: Some Considerations. *Paidéia, 22*(53), 423-432. https://doi.org/10.1590/1982-43272253201314

Brieant, A., Holmes, C. J., Maciejewski, D., Lee, J., Deater-Deckard, K., King-Casas, B., & Kim-Spoon, J. (2018). Positive and Negative Affect and Adolescent Adjustment: Moderation Effects of Prefrontal Functioning. *Journal of Research on Adolescence, 28*(1), 40-55. https://doi.org/10.1111/jora.12339

Brieant, A., King-Casas, B., & Kim-Spoon, J. (2020). Transactional relations between developmental trajectories of executive functioning and internalizing and externalizing symptomatology in adolescence. *Development and Psychopathology, 34*(1), 213-224. https://doi.org/10.1017/S0954579420001054

Bronfenbrenner, U. (1995). Developmental ecology through space and time: A future perspective. In P. Moen, G. H., Elder, & K. Luscher (Eds.), *Examining lives in context: perspectives on the ecology of human development* (pp. 619-647). Washington, DC: American Psychological Association.

Brown, T. A. (2015). *Confirmatory Factor Analysis for Applied Research* (2nd ed.). New York, NY: Guildford Publications.

Burger, C., Strohmeier, D., & Kollerová, L. (2022). Teachers Can Make a Difference in Bullying: Effects of Teacher Interventions on Students' Adoption of Bully, Victim, Bully-Victim or Defender Roles across Time. *Journal of Youth and Adolescence, 51*, 2312-2327. https://doi.org/10.1007/s10964-022-01674-6

Calvete, E., Orue, I., & Hankin, B. L. (2015). Cross-lagged associations among ruminative response style, stressors, and depressive symptoms in adolescents. *Journal of Social and Clinical Psychology, 34*(3), 203-220. https://doi/10.1521/jscp.2015.34.3.203

Calvete, E., Orue, I., Echezarraga, A., Cortazar, N., & Fernández-González, L. (2022). A growth mindset intervention to promote resilience against online peer victimization: A randomized controlled trial. *Computers in Human Behavior, 135*. https://doi.org/10.1016/j.chb.2022.107373

Camacho, A., Ortega-Ruiz, R., & Romera, E. M. (2021). Longitudinal associations between cybervictimization, anger rumination, and cyberaggression. *Aggressive Behavior, 47*(3), 332-342. https://doi.org/10.1002/ab.21958

Caspi, A., Roberts, B. W., & Shiner, R. L. (2005). Personality Development: Stability and Change. *Annual Review of Psychology, 56*, 453-484. https://doi.org/10.1146/annurev.psych.55.090902.141913

Chen, H-W. B., Gardner, E. S., Clarkson, T., Eaton, N. R., Wiggins, J. L., Leibenluft, E., & Jarcho, J. M. (2022). Bullying Perpetration and Victimization in Youth: Associations with Irritability and Anxiety. *Child Psychiatry & Human Development, 53*, 1075-1082. https://doi.org/10.1007/s10578-021-01192-9

Christina, S., Magson, N. R., Kakar, V., & Rapee, R. M. (2021). The bidirectional relationships between peer victimization and internalizing problems in school-aged children: An updated systematic review and meta-analysis. *Clinical Psychology Review, 85*. https://doi.org/10.1016/j.cpr.2021.101979

Cipriano, A., Claes, L., Gandhi, A., Cella, S., & Cotrufo, P. (2020). Does Anger Expression Mediate the Relationship Between Parental Rejection and Direct and Indirect Forms of Non-suicidal Self-injury? *Journal of Child and Family Studies, 29*, 3575-3585. https://doi.org/10.1007/s10826-020-01844-9

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). Routledge. https://doi.org/10.4324/9780203771

Cole, D. A., & Maxwell, S. E. (2003). Testing Mediational Models With Longitudinal Data: Questions and Tips in the Use of Structural Equation Modeling. *Journal of Abnormal Psychology, 112*(4), 558-577. https://doi.org/10.1037/0021-843X.112.4.558

Contreras, I. M., Kosiak, K., Hardin, K. M., & Novaco, R. W. (2021). Anger rumination in the context of high anger and forgiveness. *Personality and Individual Differences, 171*. https://doi.org/10.1016/j.paid.2020.110531

Conway, M., Csank, P. A. R., Holm, S. L., & Blake, C. K. (2000). On assessing individual differences in rumination on sadness. *Journal of Personality Assessment, 75*(3), 404-425. https://doi.org/10.1207/s15327752jpa7503_04

Cooley, J. L., & Fite, P. J. (2016). Peer Victimization and Forms of Aggression During Middle Childhood: The Role of Emotion Regulation. *Journal of Abnormal Child Psychology, 44*, 535-546. https://doi.org/10.1007/s10802-015-0051-6

Cui, K. & Xie, H. (2022). Intrapersonal and Interpersonal Sources of Resilience: Mechanisms of Relationship Between Bullying Victimization and Mental Health Among Migrant Children in China. *Applied Research in Quality of Life, 17*, 2479-2497. https://doi.org/10.1007/s11482-021-09984-w

Damian, L. E., Stoeber, J., Negru, O., & Băban, A. (2013). On the development of perfectionism in adolescence: Perceived parental expectations predict longitudinal increases in socially prescribed perfectionism. *Personality and Individual Differences, 55*(6), 688-693. https://doi.org/10.1016/j.paid.2013.05.021

De Los Reyes, A., & Pristein, M. J. (2004). Applying Depression-Distortion Hypotheses to the Assessment of Peer Victimization in Adolescents. *Journal of Clinical Child and Adolescent Psychology, 33*(2), 325-335. https://doi/10.1207/s15374424jccp3302_14

Denson, T. F. (2013). The Multiple Systems Model of Angry Rumination. *Personality and Social Psychology Review, 17*(2), 103-123. https://doi.org/10.1177/1088868312467086

de Jonge-Heesen, K. W. J., Rasing, S. P. A., Vermulst, Ad. A., Tak, Y. R., Engels, R. C. M. E., & Creemers, D. H. M. (2020). Associations Between Coping Strategies and Depressive Symptoms in

Adolescence: A Longitudinal Perspective. *The Journal of Early Adolescence, 41*(7), 1020-1054. https://doi.org/10.1177/0272431620978533

De Quervain, D. J. F., Fischbacher, U., Treyer, V., Schellhammer, M., Schnyder, U., Buck, A., & Fehr, E. (2004). The Neural Basis of Altruistic Punishment. *Science, 305*(5688), 1254-1258. https://doi.org/10.1126/science.1100735

Dodge, K. A., Malone, P. S., Lansford, J. E., & Pastorelli, C. (2015). Hostile attributional bias and aggressive behavior in global context. *PNAS, 112*(30). https://doi.org/10.1073/pnas.1418572112

Dougherty, L. R., Smith, V. C., Bufferd, S. J., Stringaris, A., Leibenluft, E., Carlson, G., & Klein, D. N. (2013). Preschool Irritability: Longitudinal Associations With Psychiatric Disorders at Age 6 and Parental Psychopathology. *Journal of American Academy of Child & Adolescent Psychiatry, 52*(12), 1304-1313. https://doi.org/10.1016/j.jaac.2013.09.007

Dugas, E., Low, N. C. P., Rodriguez, D., Burrows, S., Contreras, G., Chaiton, M., & O'Loughlin, J. (2012). Early Predictors of Suicidal Ideation in Young Adults. *The Canadian Journal of Psychiatry, 57*(7), 429-436. https://doi.org/10.1177/070674371205700706

Edalati, H., Mohammad, A., & Conrod, P. J. (2018). Poor response inhibition and peer victimization: A neurocognitive ecophenotype of risk for adolescent interpersonal aggression. *Journal of Abnormal Psychology, 127*(8), 830-839. https://doi.org/10.1037/abn0000380

Erath, S. A., Pettit, G. S., & Troop-Gordon, W. (2021). Direct and Compensatory Parental Responses to Peer Victimization. *Journal of Early Adolescence, 41*(1), 197-217. https://doi.org/10.1177/0272431620940386

Esfahani, F. S., & Besharat, M. A. (2010). Perfectionism and Anger. *Procedia Social and Behavioral Sciences, 5*, 803-807. http://doi.org/10.1016/j.sbspro.2010.07.188

Evans, S. C., Fite, P. J., Hendrickson, M. L., Rubens, S. L., & Mages, A. K. (2015). The Role of Reactive Aggression in the Link Between Hyperactive-Impulsive Behaviors and Peer Rejection in Adolescents. *Child Psychiatry & Human Development, 46*, 903-912. https://doi.org/10.1007/s10578-014-0530-y

Fabbri, C., Powell-Jackson, T., Leurent, B., Rodrigues, K., Shayo, E., Barongo, V., & Devries, K. M. (2022). School violence, depression symptoms, and school climate: a cross-sectional study of Congolese and Burundian refugee children. *Conflict and Health, 16*, 42. https://doi.org/10.1186/s13031-022-00475-9

Fanti, K. A., & Kimonis, E. R. (2012). Bullying and victimization: The role of conduct problems and psychopathic traits. *Journal of Research on Adolescence, 22*(4), 617-631. https://doi/10.1111/j.1532-7795.2012.00809.x

Feinstein, B. A., Bhatia, V., & Davila, J. (2014). Rumination Mediates the Association Between Cyber-Victimization and Depressive Symptoms. *Journal of Interpersonal Violence, 29*(9), 1732-1746. https://doi.org/10.1177/0886260513511534

Ferguson, G. M., Hafen, C. A., & Laursen, B. (2010). Adolescent Psychological and Academic Adjustment as a Function of Discrepancies Between Actual and Ideal Self-Perceptions. *Journal of Youth and Adolescence, 39*, 1485-1497. https://doi.org/10.1007/s10964-009-9461-5

Fergusson, D. M., & Woodward, L J. (2002). Mental Health, Educational, and Social Role Outcomes of Adolescents With Depression. *Archives of General Psychiatry, 59*(3), 225-231. https://doi.org/10.1001/archpsyc.59.3.335

Folk, J. B., Zeman, J. L., Poon, J. A., & Dallaire, D. H. (2014). A longitudinal examination of emotion regulation: pathways to anxiety and depressive symptoms in urban minority youth. *Child and Adolescent Mental Health*. https://doi.org/10.1111/camh.12058

Foody, M., McGuire, L., Kuldas, S., & O'Higgins Norman, J. (2019). Friendship Quality and Gender Differences in Association With Cyberbullyng Involvement and Psychological Well-Being. *Frontiers in Psychology, 10*. https://doi.org/10.3389%2Ffpsyg.2019.01723

Fraley, R. C., & Roberts, B. W. (2005). Patterns of Continuity: A Dynamic Model for Conceptualizing the Stability of Individual Differences in Psychological Constructs Across the Life Course. *Psychological Review, 112*(1), 60-74. https://doi.org/10.1037/0033-295X.112.1.60

Fredrick, J. W., Nagle, K., Langberg, J. M., Dvorsky, M. R., Breaux, R. & Becker, S. P. (2022). Rumination as a Mechanism of the Longitudinal Association Between COVID-19-Related Stress

and Internalizing Symptoms in Adolescents. *Child Psychiatry & Human Development*. https://doi.org/10.1007/s10578-022-01435-3

Fresnics, A., & Borders, A. (2017). Angry Rumination Mediates the Unique Associations Between Self-Compassion and Anger and Aggression. *Mindfulness, 8*, 554-564. https://doi.org/10.1007/s12671-016-0629-2

Frey, K. S., & Strong, Z. H. (2018). Aggression predicts changes in peer victimization that vary by form and function. *Journal of Abnormal Child Psychology, 46*(2), 305-318. https://doi/10.1007/s10802-017-0306-5

Gaffney, H., Farrington, D. P., & Ttofi, M. M. (2019). Examining the Effectiveness of School-Bullying Intervention Programs Globally: a Meta-analysis. *International Journal of Bullying Prevention, 1*(4). https://doi.org/10.1007/s42380-019-0007-4

Gagnon, J., & Rochat, L. (2017). Relationships between hostile attribution bias, negative urgency, and reactive aggression. *Journal of Individual Differences, 38*(4), 211-219. https://doi.org/10.1027/1614-0001/a000238

Galaif, E. R., Sussman, S., Chou, C-P., & Wills, T. A. (2003). Longitudinal Relations Among Depression, Stress, and Coping in High Risk Youth. *Journal of Youth and Adolescence, 32*, 243-258. https://doi.org/10.1023/A:1023028809718

Gariépy, G., Honkaniemi, H., & Quesnel-Vallée, Q. (2018). Social support and protection from depression: systematic review of current findings in Western countries. *British Journal of Psychiatry, 209*(4), 284-293. https://doi.org/10.1192/bjp.bp.115.169094

Godleski, S. A., Kamper, K. E., Ostrov, J. M., Hart, E. J., & Blakely-McClure, B. (2015). Peer Victimization and Peer Rejection During Early Childhood. *Journal of Clinical Child & Adolescent Psychology, 44*(3), 380-392. https://doi.org/10.1080/15374416.2014.940622

Goldner, L., Lev-Wiesel, R., & Simon, G. (2019). Revenge Fantasies After Experiencing Traumatic Events: Sex Differences. *Frontiers in Psychology*. https://doi.org/10.3389/fpsyg.2019.00886

Goodwin, R. D. (2006). Association Between Coping with Anger and Feelings of Depression Among Youths. *American Journal of Public Health, 96*(4), 664-669. https://doi/10.2105/AJPH.2004.049742

Gürcan-Yildirim, D., & Gençöz, T. (2022). The association of self-discrepancy with depression and anxiety: Moderator roles of emotion regulation and resilience. *Current Psychology, 41*, 1821-1834. https://doi.org/10.1007/s12144-020-00701-8

Hager, A. D., & Leadbeater, B. J. (2016). The Longitudinal Effects of Peer Victimization on Physical Health From Adolescence to Young Adulthood. *Journal of Adolescent Health, 58*(3), 330-336. https://doi.org/10.1016/j.jadohealth.2015.10.014

Hale III, W. W., Van Der Valk, I., Engels, R., & Meeus, W. (2005). Does perceived parental rejection make adolescents sad or mad? The association of perceived rejection with adolescent depression and aggression. *Journal of Adolescent Health, 36*(6), 466-474. https://doi.org/10.1016/j.jadohealth.2004.04.007

Halse, M., Steinsbekk, S., Hammar, Å., & Wichstrøm, L. (2022). Longitudinal relations between impaired executive function and symptoms of psychiatric disorders in childhood. The Journal of Child Psychology and Psychiatry. *The Journal of Child Psychology and Psychiatry*. https://doi.org/10.1111/jcpp.13622

Hampel, P., & Petermann, F. (2005). Age and Gender Effects on Coping in Children and Adolescents. *Journal of Youth and Adolescence, 34*, 73-83. https://doi.org/10.1007/s10964-005-3207-9

Hanish, L. D., Eisenberg, N., Fabes, R. A., Spinrad, T. L., Ryan, P., & Schmidt, S. (2004). The expression and regulation of negative emotions: Risk factors for young children's peer victimization. *Development and Psychopathology, 16*, 335-353. https://doi.org/10.1017/S0954579404044542

Hankin, B. L. (2008). Stability of cognitive vulnerabilities to depression: A short-term prospective multiwave study. *Journal of Abnormal Psychology, 117*(2), 324-333. https://doi.org/10.1037/0021-843X.117.2.324

Hankin, B. L., Young, J. F., Abela, J. R. Z., Smolen, A., Jenness, J. L., Gulley, L. D., Technow, J. R., Gottlieb, A. B., Cohen, J. R., & Oppenheimer, C. W. (2015). Depression from childhood into late

adolescence: Influence of gender, development, genetic susceptibility, and peer stress. *Journal of Abnormal Psychology, 124*(4), 803-816. https://psycnet.apa.org/doi/10.1037/abn0000089

Haraldstad, K., Kvarme, L. G., Christophersen, K-A., & Helseth, S. (2019). Associations between self-efficacy, bullying and health-related quality of life in a school sample of adolescents: a cross-sectional study. *BMC Public Health, 19*, 757. https://doi.org/10.1186/s12889-019-7115-4

Harmon, S. L., Stephens, H. F., Repper, K. K., Driscoll, K. A., & Kistner, J. A. (2019). Children's Rumination to Sadness and Anger: Implications for the Development of Depression and Aggression. *Journal of Clinical Child & Adolescent Psychology, 48*(4), 622-632. https://doi.org/10.1080/15374416.2017.1359788

Hawker, D. S. J., & Boulton, M. J. (2000). Twenty Years' Research on Peer Victimization and Psychosocial Maladjustment: A Meta-analytic Review of Cross-sectional Studies. *The Journal of Child Psychology and Psychiatry, 41*(4), 441-455. https://doi.org/10.1111/1469-7610.00629

Henk, C. M., & Castro-Schilo, L. (2016). Preliminary detection of relations among dynamic processes with two-occasion data. *Structural Equation Modeling, 23*(2), 180-193. https://doi.org/10.1080/10705511.2015.1030022

Hjartarson, K. H., Snorrason, I., Bringmann, L. F., Ögmundsson, B. E., & Ólafsson, R. P. (2021). Do daily mood fluctuations activate ruminative thoughts as a mental habit? Results from an ecological momentary assessment study. *Behaviour Research and Therapy, 140*. https://doi.org/10.1016/j.brat.2021.103832

Hilt, L. M., & Pollak, S. D. (2012). Getting out of rumination: comparison of three brief interventions in a sample of youth. *Journal of Abnormal Child Psychology, 40*(7), 1157-1165. https://doi.org/10.1007/s10802-012-9638-3

Holt, M., Espelage, D., Van Rysin, M., & Bowman, C. (2018). Peer Victimization and Sexual Risk Taking Among Adolescents. *Journal of School Health, 88*(12), 903-909. https://doi.org/10.1111/josh.12698

Hunter, S. C., Boyle, J. M. E., & Warden, D. (2007). Perceptions and correlates of peer-victimization and bullying. *British Journal of Educational Psychology, 77*(4), 797-810. https://doi.org/10.1348/000709906X171046

Hymel, S., & Swearer, S. M. (2015). Four decades of research on school bullying: An introduction. *American Psychologist, 70*(4), 293-299. https://psycnet.apa.org/doi/10.1037/a0038928

Juul, E. M. L., Hjemdal, O., & Aune, T. (2021). Prevalence of depressive symptoms among older children and young adolescents: a longitudinal population-based study. *Child and Adolescent Psychiatry and Psychology, 9*, 64-72. https://doi.org/10.21307/sjcapp-2021-008

Kaufman, T. M. L., Lee, H. Y., Benner, A. D., & Yeager, D. S. (2020). How School Contexts Shape the Relations Among Adolescents' Beliefs, Peer Victimization, and Depressive Symptoms. *Journal of Research on Adolescence, 30*(3), 769-786. https://doi.org/10.1111/jora.12558

Keenan, K., & Hipwell, A. E. (2005). Preadolescent Clues to Understanding Depression in Girls. *Clinical Child and Family Psychology Review, 8*(2), 89-105. https://doi/10.1007/s10567-005-4750-3

King, R. B., & dela Rosa, E. D. (2019). Are your emotions under your control or not? Implicit theories of emotion predict well-being via cognitive reappraisal. *Personality and Individual Differences, 138*, 177-182. https://doi.org/10.1016/j.paid.2018.09.040

Kinney, T. A., Smith, B. A., & Donzella, B. (2001). The Influence of Sex, Gender, Self-Discrepancies and Self-Awareness on Anger and Verbal Aggressiveness Among U.S. College Students. *The Journal of Social Psychology, 141*(2). https://doi.org/10.1080/00224540109600550

Kochel, K. P., Bagwell, C., Ladd, G. W., & Rudolph, K. D. (2017). Do positive peer relations mitigate transactions between depressive symptoms and peer victimization in adolescence? *Journal of Applied Developmental Psychology, 51*, 44-54. https://doi.org/10.1016/j.appdev.2017.04.003

Kochel, K. P., Ladd, G. W., & Rudolph, K. D. (2012). Longitudinal Associations Among Youth Depressive Symptoms, Peer Victimization, and Low Peer Acceptance: An Interpersonal Process Perspective. *Child Development, 83*(2), 637-650. https://doi.org/10.1111/j.1467-8624.2011.01722.x

Kochel, K. P., & Rafferty, D. (2020). Prospective associations between children's depressive symptoms and peer victimization: The role of social helplessness. *British Journal of Developmental Psychology, 38*(1), 15-30. https://doi.org/10.1111/bjdp.12301

Krause, E. D., Vélez, C. E., Woo, R., Hoffmann, B., Freres, D. R., Abenavolli, R. M., & Gillham, J. E. (2018). Rumination, Depression, and Gender in Early Adolescence: A Longitudinal Study of a Bidirectional Model. *The Journal of Early Adolescence, 38*(7), 923-946. https://doi.org/10.1177/0272431617704956

LaFreniere, L. S., & Newman, M. G. (2019). The Impact of Uncontrollability Beliefs and Thought-Related Distress on Ecological Momentary Interventions for Generalized Anxiety Disorder: A Moderated Mediation Model. *Journal of Anxiety Disorders, 66*. https://doi.org/10.1016/j.janxdis.2019.102113

Lane, C., Brundage, C. L., & Kreinin, T. (2017). Why We Must Invest in Early Adolescence: Early Intervention, Lasting Impact. *Journal of Adolescent Health, 61*(4). https://doi.org/10.1016/j.jadohealth.2017.07.011

Larsen, J., Vermulst, A. A., Geenen, R., van Middendorp, H., English, T., Gross, J. J., Ha, T., Evers, C., & Engels, R. C. M. E. (2013). Emotion Regulation in Adolescence: A Prospective Study of Expressive Suppression and Depressive Symptoms. *The Journal of Early Adolescence, 33*(2), 184-200. http://doi.org/10.1177/0272431611432712

Laube, C., van den Bos, W., & Fandakova, Y. (2020). The relationship between pubertal hormones and brain plasticity: Implications for cognitive training in adolescence. *Developmental Cognitive Neuroscience, 42*. https://doi/10.1016/j.dcn.2020.100753

Law, K. C., Rogers, M. L., Tucker, R. P., Bauer, B. W., Capron, D. W., Anestis, M. D., & Joiner, T. E. (2021). Rumination in the Context of Anger and Sadness: Differential Effects on State Agitation. *Journal of Affective Disorders, 280*, 89-96. https://doi.org/10.1016/j.jad.2020.11.071

Lee, G. P., Storr, C. L., Ialongo, N. S., & Martins, S. S. (2011). Compounded effect of early adolescence depressive symptoms and impulsivity on late adolescence gambling: A longitudinal study. *Journal of Adolescent Health, 48*(2), 164-169. https://doi.org/10.1016/j.jadohealth.2010.06.002

Leeuwis, F. H., Koot, H. M., Creemers, D. H. M., & van Lier, P. A. C. (2015). Implicit and Explicit Self-Esteem Discrepancies, Victimization and the Development of Late Childhood Internalizing

Problems. *Journal of Abnormal Child Psychology, 43*, 909-919. https://doi.org/10.1007/s10802-014-9959-5

Leigh, E., Lee, A., Brown, H. M., Pisano, S., & Stringaris, A. (2020). A Prospective Study of Rumination and Irritability in Youth. *Journal of Abnormal Child Psychology, 48*, 1581-1589. https://doi.org/10.1007/s10802-020-00706-8

León-Moreno, C., Martínez-Ferrer, B., Moreno-Ruiz, D., & Musitu-Ferrer, D. (2021). Forgiveness and Loneliness in Peer-Victimized Adolescents. *Journal of Interpersonal Violence, 36*(19-20), 9648-9669. https://doi.org/10.1177/0886260519869078

Lewinsohn, P. M., Steinmetz, J. L., Larson, D. W., & Franklin, J. (1981). Depression-related cognitions: Antecedent or consequence? *Journal of Abnormal Psychology, 90*(3), 213-219. https://doi/10.1037/0021-843X.90.3.213

Li, C., Zhao, Q., Dai, W., & Zhang, Y. (2021). Victims Become Covert Aggressors: Gender Differences in the Mediating Effects of Rumination on Anger and Sadness. *The Journal of Psychology, 155*(4), 441-456. https://doi.org/10.1080/00223980.2021.1901254

Luk, J. W., Gilman, S. E., Haynie, D. L., & Simons-Morton, B. G. (2018). Sexual Orientation and Depressive Symptoms in Adolescents. *Pediatrics, 141*(5). https://doi.org/10.1542/peds.2017-3309

Luttenbacher, I., Breuket, J. S., & Adamson, M. M. (2021). The Mediating Role of Rumination in the Relationship between Loneliness and Depression in University Students during the COVID-19 Pandemic. *COVID, 1*(2), 447-457. https://doi.org/10.3390/covid1020038

Maciejewski, D. F., van Lier, P. A.C., Branje, S. J. T., Meeus, W. H. J., & Koot, H. M. (2015). A 5-Year Longitudinal Study on Mood Variability Across Adolescence Using Daily Diaries. *Child Development, 86*(6), 1908-1921. https://doi.org/10.1111/cdev.12420

Makros, J., & McCabe, M. P. (2001). Relationships between identity and self-representations during adolescence. *Journal of Youth and Adolescence, 30*(5), 623-639. https://doi.org/10.1023/A:1010404822585

Malamut, S. T., & Salmivalli, C. (2021). Rumination as a Mediator of the Prospective Association Between Victimization and Bullying. *Research on Child and Adolescent Psychopathology, 49*, 339-350. https://doi.org/10.1007/s10802-020-00755-z

Mannan, M., Mamun, A., Doi, S., & Clavarino, A. (2016). Prospective Associations between Depression and Obesity for Adolescent Males and Females- A Systematic Review and Meta-Analysis of Longitudinal Studies. *Plos One*. https://doi.org/10.1371/journal.pone.0157240

Marmorstein, N. R. (2009). Longitudinal associations between alcohol problems and depressive symptoms: early adolescence through early adulthood. *Alchoholism: Clinical & Experimental Research, 33*(1), 49-59. https://doi.org/10.1111/j.1530-0277.2008.00810.x

Martin, L. L., & Tesser, A. (1989). Toward a motivational and structural theory of ruminative thought. In J. S. Uleman & J. A. Bargh (Eds.), *Unintended thought* (pp. 306-326). The Guilford Press.

Mathieson, L. C., Klimes-Dougan, B., & Crick, N. R. (2014). Dwelling on it may make it worse: The links between relational victimization, relational aggression, rumination, and depressive symptoms in adolescents. *Development and Psychopathology, 26*(3), 735-747. https://doi.org/10.1017/S0954579414000352

Matthews, T., Qualter, P., Bryan, B. T., Caspi, A., Danese, A., Moffitt, T. E., Odgers, C. L., Strange, L., & Arseneault, L. (2022). The developmental course of loneliness in adolescence: Implications for mental health, educational attainment, and psychosocial functioning. *Development and Psychopathology*, 1-10. https://doi.org/10.1017/S0954579421001632

Maxwell, J. P., Sukhodolsky, D. G., Chow, C. C. F., & Wong, C. F. C. (2005). Anger rumination in Hong Kong and Great Britain: Validation of the scale and a cross-cultural comparison. *Personality and Individual Differences, 39*(6), 1147-1157. https://doi.org/10.1016/j.paid.2005.03.022

Mezulis, A. H., Priess, H. A., & Hyde, J. S. (2011). Rumination Mediates the Relationship between Infant Temperament and Adolescent Depressive Symptoms. *Depression Research and Treatment*. https://doi.org/10.1155/2011/487873

Monti, J. D., Rudolph, K. D., & Miernicki, M. E. (2017). Rumination about social stress mediates the association between peer victimization and depressive symptoms during middle childhood. *Journal of Applied Developmental Psychology, 48*, 25-32. https://doi.org/10.1016/j.appdev.2016.11.003

Morabito, D. M., Burani, K., & Hajak, G. (2022). Depressive Symptoms Prospectively Predict Peer Victimization: A Longitudinal Study Among Adolescent Females. *Child Psychiatry & Human Development*, *53*, 39-47. https://doi.org/10.1007/s10578-020-01100-7

Morin, A. J. S., Arens, A. K., & Marsh, H. W. (2016). A bifactor exploratory structural equation modeling framework for the identification of distinct sources of construct-relevant psychometric multidimensionality. *Structural Equation Modeling: A Multidisciplinary Journal*, *32*(1), 116-139. https://doi.org/10.1080/10705511.2014.961800

Nigg, J. T. (2017). Annual Research Review: On the relations among self-regulation, self-control, executive functioning, effortful control, cognitive control, impulsivity, risk-taking, and inhibition for developmental psychopathology. *The Journal of Child Psychology and Psychiatry*, *58*(4), 361-383. https://doi.org/10.1111/jcpp.12675

Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology*, *100*(4), 569-582.

Ogundele, M. O. (2018). Behavioral and emotional disorders in childhood: A brief overview for paediatricians. *World Journal of Clinical Pediatrics*, *7*(1), 9-26. https://doi.org/10.5409/wjcp.v7.i1.9

Olivier, E., Morin, A. J. S., Vitaro, F., & Galand, B. (2022). Challenging the "Mean Kid" Perception: Boys' and Girls' Profiles of Peer Victimization and Aggression from 4th to 10th Grades. *Journal of Interpersonal Violence*, *37*(17-18), NP15095-NP15129. https://doi.org/10.1177/0886260521997949

Oral, T., & Arslan, C. (2017). The Investigation of University Students' Forgiveness Levels in Terms of Self-Compassion, Rumination and Personality Traits. *Universal Journal of Educational Research*, *5*(9), 1447-1456. http://doi.org/10.13189/ujer.2017.050902

Ortega Andrade, N., Alcázar-Olán, R., Matías, O., Rivera Guerrero, A., & Domínguez Espinosa, A. (2017). Anger Rumination Scale: Validation in Mexico. *The Spanish Journal of Psychology*, *20*, E1. https://doi.org/10.1017/sjp.2016.105

Park, I. J., K., Wang, L., Williams, D. R., & Alegria, M. (2017). Does anger regulation mediate the discrimination-mental health link among Mexican-origin adolescents? A longitudinal mediation

analysis using multilevel modeling. *Developmental Psychology, 53*(2), 340-352. https:///doi.org/10.1037/dev0000235

Peets, K., Turunen, T., & Salmivalli, C. (2022). Rumination Mediates the Longitudinal Associations Between Elementary-School Victimization and Adolescents' Internalizing Problems. *Journal of Interpersonal Violence, 37*(17-18), NP16885-NP16906. https://doi.org/10.1177/08862605211025020

Perry-Parrish, C., Webb, L., Zeman, J., Spencer, S., Malone, C., Borowski, S., Reynolds, E., Hankinson, J., Specht, M., & Ostrander, R. (2017). Anger Regulation and Social Acceptance in Early Adolescence: Associations With Gender and Ethnicity. *Journal of Early Adolescence, 37*(4), 475-501. https://doi.org/10.1177/027431615611255

Ployhart, R. E., & MacKenzie, W. I., Jr. (2015). Two waves of measurement do not a longitudinal study make. In C. E. Lance & R. J. Vandenberg (Eds.), *More statistical and methodological myths and urban legends* (pp. 85-99). Routledge/Taylor & Francis Group.

Podsakoff, P. M., MacKenzie, S. B., Lee, S. B., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*(5), 879-903. https://doi.org/10.1037/0021-9010.88.5.879

Pouwels, J. L., Souren, P., Lansu, T. A. M., & Cillessen, A. H. N. (2016). Stability of peer victimization: A meta-analysis of longitudinal research. *Developmental Review, 40*(10B), 1-24. http://doi.org/10.1016/j.dr.2016.01.001

Puterman, E., Delongis, A., & Pomaki, G. (2010). Protecting us from ourselves: social support as a buffer of trait and state rumination. *Journal of Social and Clinical Psychology, 29*(7), 797-820. https://doi/10.1521/jscp.2010.29.7.797

Quan, F., Yang, R., & Xia, L-X. (2021). The longitudinal relationships among agreeableness, anger rumination, and aggression. *Current Psychology, 40*, 9-20. https://doi.org/10.1007/s12144-020-01030-6

Quan, F., Yang, R., Zhu, W., Wang, Y., Gong, X., Chen, Y., Dong, Y., & Xia, L-X. (2019). The relationship between hostile attribution bias and aggression and the mediating effect of anger

rumination. *Personality and Individual Differences, 139*, 228-234. https://doi.org/10.1016/j.paid.2018.11.029

Ramos-Cejudo, J., Salguero, J. M., Kannis-dymand, L., García-sancho, E., & Love, S. (2017). Anger rumination in Australia and Spain: Validation of the Anger Rumination Scale. *Australian Journal of Psychology, 69*(4), 293-302. https://doi.org/10.1111/ajpy.12154

Rapp, H., Xu, J. W., & Enright, R. D. (2022). A meta-analysis of forgiveness education interventions' effects on forgiveness and anger in children and adolescents. *Child Development, 93*(5), 1249-1269. https://doi.org/10.1111/cdev.13771

Repper, K. K. (2006). *The relationship between anger rumination and aggression in childhood.* [Unpublished doctoral dissertation] Florida State University.

Reynes, E., Berthouse-Aranda, S. E., Guillet-Descas, E., Chabaud, P., & Deflandre, A. (2013). French validation of the Anger Rumination Scale. *L'encephale, 39*(5), 339-346. https://doi.org/10.1016/j.encep.2012.11.006

Riley, K. E., Park, C. L., Laurenceau, J-P. (2019). A Daily Diary Study of Rumination and Health Behaviors: Modeling Moderators and Mediators. *Annals of Behavoral Medicine, 53*(8), 743-755. https://doi.org/10.1093%2Fabm%2Fkay081

Roberts, H., Watkins, E. R., & Wills, A. J. (2013). Cueing and unresolved personal goal causes persistent ruminative self-focus: An experimental evaluation of control theories of rumination. *Journal of Behavior Therapy and Experimental Psychiatry, 44*(4), 449-455. https://doi.org/10.1016/j.jbtep.2013.05.004

Rönkkö, M., & Cho, E. (2022). An Updated Guideline for Assessing Discriminant Validity. *Organizational Research Methods, 25*(1), 6-14. https://doi.org/10.1177/1094428120968614

Rose, A. J. (2002). Co-Rumination in the Friendships of Girls and Boys. *Child Development, 73*(6), 1830-1843. https://www.jstor.org/stable/3696420

Salmivalli, C., & Helteenvuori, T. (2007). Reactive, but not proactive aggression predicts victimization among boys. *Aggressive Behavior, 33*(3), 198-206. https:///doi.org/10.1002/ab.20210

Sanger, K. L., & Dorjee, D. (2015). Mindfulness training for adolescents: A neurodevelopmental perspective on investigating modifications in attention and emotion regulation using event-related brain potentials. *Cognitive, Affective, & Behavioral Neuroscience, 15*, 696-711. https://doi.org/10.3758/s13415-015-0354-7

Sariçam, H., & Çetinkaya, Ç. (2018). Exploring revenge as a mediator between bullying and victimization in gifted and talented students. *Current Issues in Personality Psychology, 6*(2), 102-111. https://doi.org/10.5114/cipp.2018.72267

Satici, S. A. (2014). Anger Rumination Scale: Psychometric properties of the Turkish version. *Alpha Psychiatry, 15*(4), 328-334. https://doi.org/10.5455/apd.42654

Schacter, H. L., Lessard, L. M., Kiperman, S., Bakth, F., Ehrhardt, A., & Uganski, J. (2021). Can Friendships Protect Against the Health Consequences of Peer Victimization in Adolescence? A Systematic Review. *School Mental Health, 13*, 578-601. https://doi.org/10.1007/s12310-021-09417-x

Schepman, K., Fombonne, E., Collishaw, S., & Taylor, E. (2014). Cognitive styles in depressed children with and without comorbid conduct disorders. *Journal of Adolescence, 37*(5), 622-631. https://doi.org/10.1016/j.adolescence.2014.04.004

Schleider, J. L., Mullarkey, M. C., & Chacko, A. (2020). Harnessing wise interventions to advance the potency and reach of youth mental health services. *Clinical Child and Family Psychological Review, 23*(1), 70-101. https://doi.org/10.1007/s10567-019-00301-4

Schleider, J. L., & Weisz, J. R. (2016). Reducing risk for anxiety and depression in adolescents: Effects of a single-session intervention teaching that personality can change. *Behaviour Research and Therapy, 87*, 170-181. https://doi.org/10.1016/j.brat.2016.09.011

Schleider, J., & Weisz, J. (2018). A single-session growth mindset intervention for adolescent anxiety and depression: 9-month outcomes of a randomized trial. *The Journal of Child Psychology and Psychiatry, 59*(2), 160-170. https://doi.org/10.1111/jcpp.12811

Schmidt, M. E., & Bagwell, C. L. (2007). The protective role of friendships in overtly and relationally victimized boys and girls. *Merrill-Palmer Quarterly, 53*(3), 439-460. https://doi.org/10.1353/mpq.2007.0021

Schmitt, M., Baumert, A., Gollwitzer, M., & Maes, J. (2010). The Justice Sensitivity Inventory: Factorial Validity, Location in the Personality Facet Space, Demographic Pattern, and Normative Data. *Social Justice Research, 23*, 211-238. https://doi.org/10.1007/s11211-010-0115-2

Selig, J. P., & Preacher, K. J. (2009). Mediation Models for Longitudinal Data in Developmental Research. *Research in Human Development, 6*(2-3), 144-164. https://doi.org/10.1080/15427600902911247

Sentse, M., Prinzie, P., & Salmivalli, C. (2017). Testing the Direction of Longitudinal Paths between Victimization, Peer Rejection, and Different Types of Internalizing Problems in Adolescence. *Journal of Abnormal Child Psychology, 45*, 1013-1023. https://doi.org/10.1007/s10802-016-0216-y

Seo, E., Lee, H., Jamieson, J., Reis, H., Josephs, R., Beevers, C., & Yeager, D. (2022). Trait attributions and threat appraisals explain why an entity theory of personality predicts greater internalizing symptoms during adolescence. *Development and Psychopathology, 34*(3), 1104-1114. https://doi.org/10.1017/S0954579420001832

Sileo, K. M., & Kershaw, T. S. (2020). Dimensions of masculine norms, depression, and mental health service utilization: Results from a prospective cohort study among emerging adult men in the United States. *American Journal of Men's Health, 14*(1). https://doi.org/10.1177/1557988320906980

Silver, E., Arseneault, L., Langley, J., Caspi, A., & Moffitt, T. E. (2005). Mental disorder and violent victimization in a total birth cohort. *American Journal of Public Health, 95*, 2015-2021.

Smith, S. D., Stephens, H. F., Repper, K., & Kistner, J. A. (2016). The relationship between anger rumination and aggression in typically developing children and high-risk adolescents. *Journal of Psychopathology and Behavioral Assessment, 38*(4), 515-527. https://doi.org/10.1007/s10862-016-9542-1

Snyder, H. R., Hankin, B., L. (2016). Spiraling Out of Control: Stress Generation and Subsequent Rumination Mediate the Link Between Poorer Cognitive Control and Internalizing Psychopathology. *Clinical Psychological Science, 4*(6), 1047-1064. https://doi.org/10.1177/2167702616633157

Spyropoulou, E., & Giovazolias, T. (2022a). The Scarring Effects of Depression Symptoms on Sadness Rumination and Peer Victimization in Greek Early Adolescents: Evidence for an Integrated Symptoms-Driven Model. *The Journal of Early Adolescence, 42*(7), 845-884. https://doi.org/10.1177/02724316221078827

Spyropoulou, E., & Giovazolias, T. (2022b). Exploring the longitudinal relationship between anger rumination and peer victimization when controlling for sadness rumination. *Current Psychology*. https://doi.org/10.1007/s12144-022-03906-1

Stein, K., & Fazel, M. (2015). Depression in young people often goes undetected. *Practitioner, 259*(1782), 17-22, 2-3. PMID: 27254891

Stone, L. B., & Gibb, B. E. (2015). Brief report: Preliminary evidence that co-rumination fosters adolescents' depression risk by increasing rumination. *Journal of Adolescence, 38*(1), 1-4. https://doi.org/10.1016/j.adolescence.2014.10.008

Stone, L. B., Hankin, B. L., Gibb, B. E., & Abela, J. R. Z. (2011). Co-rumination predicts the onset of depressive disorders during adolescence. *Journal of Abnormal Psychology, 120*(3), 752-757. https:///doi.org/10.1037/a0023384

Sukhodolsky, D. G., Golub, A., & Cromwell, E. N. (2001). Development and validation of the anger rumination scale. *Personality and Individual Differences, 31*(5), 689-700. https://doi.org/10.1016/S0191-8869(00)00171-9

Sullivan, K., Zhu, Q., Wang, C., & Boyanton, D. (2021). Relations Among Peer Victimization, Aggression, and School Climate Among Elementary School Students in China. *School Psychology Review*. https://doi.org/10.1080/2372966X.2021.1898290

Sunesson, E., Haglund, E., Bremander, A., Jarbin, H., & Larsson, I. (2021). Adolescents' Experiences of Facilitators for and Barriers to Maintaining Exercise 12 Months after Group-Based Intervention for Depression. *International Journal of Environmental Research and Public Health, 18*(10), 5427. https://doi.org/10.3390/ijerph18105427

Sweeting, H., Young, R., West, P., & Der, G. (2006). Peer victimization and depression in early-mid adolescence: A longitudinal study. *British Journal of Educational Psychology, 76*(3), 577-594. https://doi.org/10.1348/000709905X49890

Telzer, E. H., Fuligni, A. J., Lieberman, M. D., Miernicki, M. E., & Galván, A. (2015). The quality of adolescents' peer relationships modulates neural sensitivity to risk taking. *Social Cognitive and Affective Neuroscience, 10*(3), 389-398. https://doi.org/10.1093/scan/nsu064

Toro, R., García-García, J., & Zaldívar-Basurto, F. (2020). Factorial analysis and invariance by sex and age of the Anger Rumination Scale ARS Spanish version. *Annals of Psychology, 36*(3), 475-482. https://doi.org/10.6018/analesps.394021

Tran, C., Cole, D. A., & Weiss, B. (2012). Testing Reciprocal Longitudinal Relations Between Peer Victimization and Depressive Symptoms in Young Adolescents. *Journal of Clinical Child & Adolescent Psychology, 41*(3), 353-360. https://doi.org/10.1080/15374416.2012.662674

Uceda, I. M., Bleda, J. H. L., Nieto, M. A. P., Sukhodolsky, D., & Martínez, A. E. (2016). Psychometric Properties of the Spanish Adaption of the Anger Rumination Scale: Evidence of Reliability and Validity in the General Population. *The Spanish Journal of Psychology, 19*, E17. https://doi.org/10.1017/sjp.2016.17

van Geel, M., Goemans, A., Zwaanswijk, W., & Vedder, P. (2022). Does peer victimization predict future suicidal ideation? A meta-analysis on longitudinal studies. *Aggression and Violent Behavior, 64*. https://doi.org/10.1016/j.avb.2021.101577

von Salisch, M., & Zeman, J. L. (2018). Pathways to reciprocated friendships: A cross-lagged panel study on young adolescents' anger regulation towards friends. *Journal of Youth and Adolescence, 47*(3), 673-687. https://doi.org/10.1007/s10964-017-0683-7

Wakeford, G., Kannis-dymand, L., & Statham, D. (2018). Anger rumination, binge eating, and at-risk alcohol use in a university sample. *Australian Journal of Psychology, 70*(3), 269-276. https://doi.org/10.1111/ajpy.12187

Walton, G. M., & Wilson, T. D. (2018). Wise interventions: Psychological remedies for social and personal problems. *Psychological Review, 125*(5), 617-655. https://doi.org/10.1037/rev0000115

Wang, Y., Cao, S., Dong, Y., & Xia, L-X. (2019). Hostile attribution bias and angry rumination: A longitudinal study of undergraduate students. *Plos One, 14*(5). https://doi.org/10.1371%2Fjournal.pone.0217759

Wante, L., Mezulis, A., Van Beveren, M-L., & Braet, C. (2017). The mediating effect of adaptive and maladaptive emotion regulation strategies on executive functioning impairment and depressive symptoms among adolescents. *Child Neuropsychology, 23*(8), 935-953. https://doi.org/10.1080/09297049.2016.1212986

Watkins, E. R. (2008). Constructive and unconstructive repetitive thought. *Psychological Bulletin, 134*(2), 163-206. https://doi.org/10.1037/0033-2909.134.2.163

Watson, H., Todorov, N., & Rapee, R. M. (2021). Healing from Bullying in Early Adolescent Boys: The Positive Impact of Both Forgiveness and Revenge Fantasies. *Journal of School Violence, 20*(2), 139-152. https://doi.org/10.1080/15388220.2020.1858425

Wichers, M., Geschwind, N., Van Os, J., & Peeters, F. (2010). Scars in depression: Is a conceptual shift necessary to solve the puzzle? *Psychological Medicine, 40*(3), 359-365. https://doi.org/10.1017/S0033291709990420

Yang, J., Li, W., Wang, W., Gao, L., & Wang, X. (2021). Anger rumination and adolescents' cyberbullying perpetration: Moral disengagement and callous-unemotional traits as moderators. *Journal of Affective Disorders, 278*, 397-404. https://doi.org/10.1016/j.jad.2020.08.090

Yeager, D. S., Dahl, R. E., & Dweck, C. S. (2018). Why Interventions to Influence Adolescent Behavior Often Fail but Could Succeed. *Perspectives on Psychological Science, 13*(1), 101-122. https://doi.org/10.1177/1745691617722620

Yeager, D. S., Johnson, R., Spitzer, B. J., Trzesniewski, K. H., Powers, J., & Dweck, C. S. (2014). The far-reaching effects of believing people can change: Implicit theories of personality shape stress, health, and achievement during adolescence. *Journal of Personality and Social Psychology, 106*, 867-884. https://doi.org/10.1037/a0036335.supp

Yeager, D. S., Trzesniewski, K. H., & Dweck, C. S. (2013). An Implicit Theories of Personality Intervention Reduces Adolescent Aggression in Response to Victimization and Exclusion. *Child Development, 84*(3), 970-988. https://doi.org/10.1111/cdev.12003

Yeager, D. S., Trzesniewski, K. H., Tirri, K., Nokelainen, P., & Dweck, C. S. (2011). Adolescents' implicit theories predict desire for vengeance after peer conflicts: correlational and experimental evidence. *Developmental Psychology, 47*(4), 1090-1107. https://doi.org/10.1037/a0023769

Young, G. R., Karnilowicz, H. R., Mauss, I. B., Hastings, P. D., Guyer, A. E., & Robins, R. W. (2022). Prospective associations between emotion regulation and depressive symptoms among Mexican-origin adolescents. *Emotion, 22*(1), 129-141. https://doi/10.1037/emo0001060

Yu, R. Branje, S., Meeus, W., Koot, H. M., van Lier, P., & Fazel, S. (2018). Victimization Mediates the Longitudinal Association Between Depressive Symptoms and Violent Behaviors in Adolescence. *Journal of Abnormal Child Psychology, 46*, 839-848. https://doi.org/10.1007/s10802-017-0325-2

Zeman, J., Shipman, K., & Suveg, C. (2002). Anger and Sadness Regulation: Predictions to Internalizing and Externalizing Symptoms in Children. *Journal of Clinical Child & Adolescent Psychology, 31*(3), 393-398. https://doi.org/10.1207/s15374424jccp3103_11

Zsila, Á., Urbán, R., Griffiths, M. D., & Demetrovics, Z. (2018). Gender Differences in the Association Between Cyberbullying Victimization and Perpetration: The Role of Anger Rumination and Traditional Bullying Experiences. *International Journal of Mental Health and Addiction, 17*, 1252-1267. https://doi.org/10.1007/s11469-018-9893-9

Zwierzynska, K., Wolke, D., & Lereya, T. S. (2013). Peer Victimization in Childhood and Internalizing Problems in Adolescence: *A Prospective Longitudinal Study*, *41*, 309-323. https://doi.org/10.1007/s10802-012-9678-8

Appendix

A.

Article

Assessment
2023, Vol. 30(3) 533–550
© The Author(s) 2021
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/1073191121043569
journals.sagepub.com/home/asm
SAGE

Investigating the Multidimensionality and Psychometric Properties of the Children's Anger Rumination Scale (CARS): A Bifactor Exploratory Structural Equation Modeling Framework

Elli Spyropoulou[1] and Theodoros Giovazolias[1]

Abstract

Anger Rumination (AR) represents a maladaptive cognitive process that contributes negatively to psychosocial functioning. The purpose of the present study was to investigate the psychometric properties (e.g., factorial structure, measurement invariance, and reliability) of the Children's Anger Rumination Scale (CARS). Factorial structure was tested by contrasting alternative model representations of the instrument (one- and four-factor independent cluster models–confirmatory factor analysis [ICM-CFA], exploratory structural equation modelling [ESEM], bifactor-CFA and bifactor-ESEM) in a convenience sample of 552 Greek students (M_{age} = 11.50 years; 53.6% girls). The hypothesized bifactor-ESEM solution, composed by a general anger rumination factor and four specific factors (Angry Afterthoughts, Thoughts of Revenge, Angry Memories, and Understanding of Causes) provided the best fit to the data and revealed the unitary dimensionality of the CARS. Measurement invariance across gender and age in level of the latent means indicated no significant differences in relation to AR tendency. The CARS showed internal consistency, one-month test–retest reliability as well as desirable patterns of convergent and discriminant validity. The predictive power of the instrument was also supported as participants' AR propensity was found to explain both depressive symptoms and bullying behaviors. Overall, our findings indicate that the CARS is a developmentally appropriate and psychometrically sound instrument that conceptualizes AR as an unidimensional construct among children and preadolescents.

Keywords

anger rumination, psychometric properties, CFA, bifactor ESEM models, bullying

Rumination is a multifaceted, multidimensional construct that has been studied in relation to a variety of psychological and health outcomes (J. M. Smith & Alloy, 2009). According to the response styles theory (Nolen-Hoeksema et al., 2008) rumination represents a maladaptive form of self-reflection that involves repetitively and passively dwelling on the causes and the consequences of distress symptoms. Literature suggests that this inward-focus, perseverative, and harmful cognitive strategy not only fuels negative emotions (J. M. Smith & Alloy, 2009) but also amplifies a pessimistic and fatalistic way of thinking, thwarting individuals from goal attainment (Papageorgiou & Wells, 2004) and interpersonal problem solving (Watkins & Baracaia, 2002). High ruminators usually demonstrate an ineffectiveness to behave instrumentally as they tend to remain cognitively and emotionally fixated on a problem without taking actions to solve it actively (Nolen-Hoeksema et al., 2008). Rumination has been extensively identified as a transdiagnostic risk factor for several forms of psychopathology, including depression, anxiety, substance abuse, and eating disorders (Hankin et al., 2016; Lyubomirsky et al., 2015). However, the majority of studies in the relevant literature have conceptualized and measured rumination as a response tendency to sad mood and affect (Hilt & Pollak, 2013). Consequently, less is known about the role of other forms of rumination, such as anger rumination.

Anger rumination is regarded an unintentional and recurrent cognitive process that focuses one's attention on the causes and consequences of frustrating previous experiences (Sukhodolsky et al., 2001). It represents a dysfunctional emotional regulation strategy that unfolds after an

[1]University of Crete, Rethymno, Crete, Greece

Corresponding Author:
Theodoros Giovazolias, Department of Psychology, University of Crete, Gallos Campus, Rethymno, Crete 74100, Greece.
Email: giovazot@uoc.gr

Journal of Youth and Adolescence (2022) 51:1708–1719
https://doi.org/10.1007/s10964-022-01624-2

EMPIRICAL RESEARCH

Anger Rumination in Early Adolescence: Risk Factor or Outcome of Depressive Symptoms? A Prospective Study

Elli Spyropoulou[1] · Theodoros Giovazolias[1]

Received: 30 January 2022 / Accepted: 22 April 2022 / Published online: 12 May 2022

Abstract
Anger rumination is a maladaptive cognitive-emotional process associated with aversive adjustment outcomes. Despite of evidence showing a close relationship between anger rumination and depressive symptoms across adolescence, their longitudinal relationship is still unknown. The goal of the present study was to examine the bidirectional association between self-reported anger rumination and depressive symptoms at two waves, spaced 1-year. Participants were 304 early adolescents (44.7% boys; $M_{age} = 10.80$ years, $SD = 0.16$). Cross-lagged analyses showed that depressive symptoms predicted increases in anger rumination but not vice versa. These relationships were consistent across boys and girls. Overall, the findings suggest that depressive symptoms may be a potential risk factor for anger rumination in early adolescence. Implications for preventions and treatments are also discussed.

Keywords Anger rumination · Depressive symptoms · Early adolescence · Gender

Introduction

Anger coping deficits have long been associated with internalizing problems in adolescence (Jackson et al., 2011). Surprisingly, the vast majority of published research still focuses on sadness rumination so as to explain youth depression (Krause et al., 2018). The few studies that have already examined anger rumination in relation to adolescents' depressive symptoms have been cross-sectional in design and, thus, do not allow for inferences regarding directions of effect (Harmon et al., 2019; Spyropoulou & Giovazolias, 2021). Empirically supported theoretical models have shown that impairments in regulating effectively negative emotions may place adolescents at risk for later increases in depressive symptoms (Abela & Hankin, 2011; Young et al., 2022). Evidence, however, suggest that depressive symptoms may precede increased used of unconstructive emotion regulation strategies (de Jonge-Heesen et al., 2021; Larsen et al., 2013). Accordingly, maladaptive emotion regulation strategies and depressive symptoms can be mutually reinforcing and bidirectional (Calvete et al., 2015). Existing research has long underscored the need to disentangle the temporal associations between anger rumination and depressive symptoms (du Pont et al., 2017). As far as we know, this issue has not been addressed in any published article yet. Early adolescence is a transitive developmental period that marks the emergence of both rumination and depression (Wagner et al., 2015). Increased levels of anger are also commonly reported by youth (Lök et al., 2018). Consequently, understanding how anger rumination and depressive symptoms are related over time, is important for effective preventions and treatments. The current study used a longitudinal design to examine the bidirectional relationship between anger rumination and depressive symptoms among Greek early adolescents.

Rumination refers to intrusive and repetitive thoughts that revolve around the causes, meanings, and consequences of distress symptoms (Nolen-Hoeksema et al., 2008). Being initially conceptualized as an inward-focus and unintentional response style towards sad mood, rumination is also involved with hyperactive mood states, such as anger (Sukhodolsky et al., 2001).

Anger rumination entails the propensity to perseverate on personally meaningful anger provoking events (Denson, 2013). It is an unconstructive cognitive-emotion regulation strategy, closely associated with prolonged anger, emotional arousal and revengeful thinking (Sukhodolsky et al., 2001). Anger rumination may be initiated when a person experiences a discrepancy between one's desired state and one's actual

✉ Theodoros Giovazolias
giovazot@uoc.gr

[1] Department of Psychology, University of Crete, Crete, Greece

Β.

ΑΠΟΣΤΟΛΗ ΜΕ ΗΛΕΚΤΡΟΝΙΚΟ ΤΑΧΥΔΡΟΜΕΙΟ

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
ΥΠΟΥΡΓΕΙΟ ΠΑΙΔΕΙΑΣ,
ΕΡΕΥΝΑΣ ΚΑΙ ΘΡΗΣΚΕΥΜΑΤΩΝ

ΓΕΝΙΚΗ Δ/ΝΣΗ ΣΠΟΥΔΩΝ Π/ΘΜΙΑΣ ΚΑΙ Δ/ΘΜΙΑΣ ΕΚΠΑΙΔΕΥΣΗΣ
ΔΙΕΥΘΥΝΣΗ ΣΠΟΥΔΩΝ, ΠΡΟΓΡΑΜΜΑΤΩΝ & ΟΡΓΑΝΩΣΗΣ Π.Ε.
ΤΜΗΜΑ Α' ΣΠΟΥΔΩΝ
& ΕΦΑΡΜΟΓΗΣ ΠΡΟΓΡΑΜΜΑΤΩΝ

Ταχ. Δ/νση : Ανδρέα Παπανδρέου 37
Τ.Κ. – Πόλη : 15180 – Μαρούσι
Ιστοσελίδα : http://www.minedu.gov.gr
Email : spudonpe@minedu.gov.gr
Πληροφορίες : Κ. Γκουνέλα
Τηλέφωνο : 210 344 2248

Βαθμός Ασφαλείας:
Να διατηρηθεί μέχρι:
Βαθμός Προτεραιότητας

Μαρούσι, 14-3-2019

Αρ. Πρωτοκόλλου: Φ15/30515/40339/Δ1

ΠΡΟΣ :κα Έλλη Σπυροπούλου
elli_spiropoulou@yahoo.gr

ΚΟΙΝ.: 1. Ι.Ε.Π.
info@iep.edu.gr
2. Διευθυντή Εκπ/σης Π.Ε. Ηρακλείου

THEODOROS DIMITRAKOPOULOS
2019.03.15 07:40:46
THEODOROS DIMITRAKOPOULOS
CN= THEODOROS DIMITRAKOPOULOS
C=GR
O=Hellenic Public Administration Certification Services
E=thdimitrakopoulos2@minedu.gov.gr
Public key:

ΘΕΜΑ : **Έγκριση έρευνας**

Σχετικά έγγραφα: το σχετικό 30515/Δ1

Απαντώντας σε σχετικό αίτημά σας και έχοντας υπόψη την με αριθ. 7/21-02-2019 πράξη του Δ.Σ. του Ι.Ε.Π., σας κάνουμε γνωστό ότι εγκρίνεται η διεξαγωγή της έρευνάς σας με θέμα «*Διαχρονικά μοντέλα πρόβλεψης συναισθηματικών και συμπεριφορικών δυσκολιών σε μαθητές σχολικής ηλικίας*» η οποία θα πραγματοποιηθεί στα σχολεία του συνημμένου πίνακα με τις ακόλουθες επισημάνσεις:

1. Πριν από τις επισκέψεις σας στα σχολεία να υπάρχει συνεννόηση με τον Διευθυντή τους και συνεργασία με το διδακτικό προσωπικό, ώστε να εξασφαλίζεται η ομαλή λειτουργία των σχολικών μονάδων.

2. Να κατατεθεί ηλεκτρονικό αντίτυπο της ερευνητικής εργασίας σε ψηφιακό δίσκο στο πρωτόκολλο του Ινστιτούτου Εκπαιδευτικής Πολιτικής, καθώς επίσης και η ενυπόγραφη, σύμφωνη ή όχι, γνώμη της ερευνήτριας για το αν επιτρέπει στο Ι.Ε.Π. να προβεί σε ηλεκτρονική ανάρτηση της ερευνητικής εργασίας. Το αντίτυπο, αφού κατατεθεί στο πρωτόκολλο, θα διαβιβασθεί αρμοδίως στη Βιβλιοθήκη του Ι.Ε.Π.

3. Η έρευνα να διεξαχθεί με τη σύμφωνη γνώμη της Διεύθυνσης και των εκπαιδευτικών κάθε σχολικής μονάδας. Η συμμετοχή των εκπαιδευτικών στην έρευνα είναι πάντα προαιρετική, γίνεται με δική τους ευθύνη και εφόσον το επιθυμούν.

4. Για την διεξαγωγή της έρευνάς σας στους μαθητές θα πρέπει να προηγηθεί ενημέρωση των γονέων και των εκπαιδευτικών, ώστε να υπάρχει **ενυπόγραφη-υπεύθυνη** δήλωση των γονέων έχοντας υπόψη ότι για όλες τις περιπτώσεις η συμμετοχή στην έρευνα δεν είναι υποχρεωτική. Σε κάθε περίπτωση να εξασφαλισθεί η σύμφωνη γνώμη των εμπλεκομένων στην έρευνα, αφού ενημερωθούν

σχετικά με το περιεχόμενο των εργαλείων συλλογής της έρευνας, τον τρόπο καταγραφής των δεδομένων και το δικαίωμα της απόσυρσής τους οποιαδήποτε στιγμή το επιθυμήσουν

5. Η έρευνα απευθύνεται σε μαθητές Ε' τάξης δημοτικού και θα διεξαχθεί κατά το σχολικό έτος 2018-2019. Για τη συλλογή των δεδομένων θα χρησιμοποιηθούν ερωτηματολόγια. Η υλοποίηση της έρευνας στα σχολεία να πραγματοποιείται παρουσία των εκπαιδευτικών της τάξης. Η απασχόληση εκπαιδευτικών και μαθητών/-τριών εντός ωρολογίου προγράμματος δεν θα ξεπεράσει τις δύο (2) διδακτικές ώρες ανά τμήμα.

6. Οι ώρες και οι μέρες των επισκέψεων της ερευνήτριας στα σχολεία θα οριστούν μετά από συνεννόηση με τον/την Διευθυντή/ντρια και τους εκπαιδευτικούς των σχολικών μονάδων, ώστε να μην δημιουργούνται προβλήματα στην ομαλή διεξαγωγή του προγράμματος και της λειτουργίας του σχολείων.

7. Για την επόμενη ερευνητική φάση (επαναληπτική) η ερευνήτρια να επανέλθει με νέο αίτημα για χρονική επέκταση της άδειας διεξαγωγής της έρευνας, προσκομίζοντας όλα τα προβλεπόμενα δικαιολογητικά.

8. Δεν επιτρέπεται σε καμία περίπτωση η βιντεοσκόπηση, η φωτογράφιση και η μαγνητοφώνηση των μαθητών. Τα ερωτηματολόγια είναι πάντα ανώνυμα και κωδικοποιημένα. Η έρευνα να διεξαχθεί με την απαραίτητη διακριτικότητα και να προστατευθούν τα προσωπικά δεδομένα των συμμετεχόντων. Σε κάθε περίπτωση, να τηρηθεί επακριβώς η επιστημονική δεοντολογία όπως περιγράφεται στο Αναλυτικό Σχέδιο Έρευνας, το οποίο έχει υποβληθεί στο Ι.Ε.Π.

Επισημαίνεται ότι το συνημμένο υλικό της έρευνας θα φυλάσσεται στο αρχείο του Ι.Ε.Π. για δύο χρόνια από την ημερομηνία συζήτησής της στο Διοικητικό Συμβούλιο και μετά θα καταστρέφεται με ευθύνη του Τμήματος Γραμματειακής Υποστήριξης.

Ο Διευθυντής Πρωτοβάθμιας Εκπαίδευσης στον οποίο κοινοποιείται το έγγραφο αυτό, παρακαλείται να ενημερώσει σχετικά τα σχολεία στα οποία θα διεξαχθεί η έρευνα.

Συν.: 2 φύλλα

Ο ΥΠΟΥΡΓΟΣ ΠΑΙΔΕΙΑΣ, ΕΡΕΥΝΑΣ & ΘΡΗΣΚΕΥΜΑΤΩΝ

ΚΩΝΣΤΑΝΤΙΝΟΣ ΓΑΒΡΟΓΛΟΥ

Εσωτερική Διανομή
Δ/νση Σπουδών, Προγραμμάτων
& Οργάνωσης Π.Ε., Τμήμα Α'

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
ΥΠΟΥΡΓΕΙΟ ΠΑΙΔΕΙΑΣ ΚΑΙ ΘΡΗΣΚΕΥΜΑΤΩΝ

ΓΕΝΙΚΗ ΓΡΑΜΜΑΤΕΙΑ ΠΡΩΤΟΒΑΘΜΙΑΣ, ΔΕΥΤΕΡΟΒΑΘΜΙΑΣ ΕΚΠΑΙΔΕΥΣΗΣ ΚΑΙ ΕΙΔΙΚΗΣ ΑΓΩΓΗΣ
ΓΕΝΙΚΗ ΔΙΕΥΘΥΝΣΗ ΣΠΟΥΔΩΝ ΠΡΩΤΟΒΑΘΜΙΑΣ ΚΑΙ ΔΕΥΤΕΡΟΒΑΘΜΙΑΣ ΕΚΠΑΙΔΕΥΣΗΣ
ΔΙΕΥΘΥΝΣΗ ΣΠΟΥΔΩΝ, ΠΡΟΓΡΑΜΜΑΤΩΝ & ΟΡΓΑΝΩΣΗΣ Π.Ε.
ΤΜΗΜΑ Α' ΣΠΟΥΔΩΝ ΚΑΙ ΕΦΑΡΜΟΓΗΣ ΠΡΟΓΡΑΜΜΑΤΩΝ

Ταχ. Δ/νση : Ανδρέα Παπανδρέου 37
Τ.Κ. – Πόλη : 15180 – Μαρούσι
Ιστοσελίδα : http://www.minedu.gov.gr
Email : spudonpe@minedu.gov.gr
Πληροφορίες : Ζ. Χαλινίδου
Τηλέφωνο : 210 344 2425
FAX : 210 344 3354

ΝΑ ΑΠΟΣΤΑΛΕΙ ΜΕ ΗΛΕΚΤΡΟΝΙΚΟ ΤΑΧΥΔΡΟΜΕΙΟ

Βαθμός Ασφαλείας:
Να διατηρηθεί μέχρι:
Βαθμός Προτεραιότητας:

Μαρούσι, 11-6- 2020

Αρ. Πρωτ. : Φ15/40803/ΖΧ/71616/Δ1

ΠΡΟΣ : κα ΣΠΥΡΟΠΟΥΛΟΥ ΕΛΛΗ
Email: elli_spiropoulou@yahoo.gr

ΘΕΜΑ: Αναστολή ερευνών για το σχολικό έτος 2019-2020
ΣΧ.: Το υπ' αρ. 40803/27-3-2020 εισερχόμενο έγγραφο του Υ.ΠΑΙ.Θ.

Απαντώντας σε σχετικό αίτημά σας που αφορά στην επέκταση της άδειας διεξαγωγής της ήδη εγκεκριμένης έρευνας με θέμα «*Διαχρονικά μοντέλα πρόβλεψης συναισθηματικών και συμπεριφορικών δυσκολιών σε μαθητές σχολικής ηλικίας*», σας κάνουμε γνωστό ότι με την υπ' αρ. 15/19-03-2020 πράξη το Δ.Σ. του Ι.Ε.Π. γνωμοδότησε θετικά ως προς τη χρονική επέκταση της ανωτέρω έρευνας σε μαθητές/ριες και εκπαιδευτικούς σχολικών μονάδων πρωτοβάθμιας εκπαίδευσης του Ν. Ηρακλείου για το σχολικό έτος 2019-2020.

Εν τούτοις, πριν να εκδοθεί η απόφαση για την έρευνα από το αρμόδιο διοικητικό όργανο, οι τρέχουσες συνθήκες οδήγησαν το Διοικητικό Συμβούλιο του ΙΕΠ στην λήψη της με αριθ. 17/03-04-2020 Πράξης σύμφωνα με την οποία, λόγω των έκτακτων συνθηκών και δεδομένου ότι ο εναπομείνας διδακτικός χρόνος, κατά το διάστημα επαναλειτουργίας των σχολείων, θα είναι περιορισμένος, αποφάσισε την αναστολή απόφασης για εκπαιδευτικά προγράμματα, διαγωνισμούς, εκπαιδευτικές δράσεις και έρευνες για το τρέχον σχολικό έτος 2019-2020 και οι ενδιαφερόμενοι να επανέλθουν με νέα αίτηση για το επόμενο σχολικό έτος.

Ως εκ τούτου, μπορείτε να υποβάλετε αίτηση επέκτασης για το επόμενο σχολικό έτος 2020-2021.

ΜΕ ΕΝΤΟΛΗ ΥΦΥΠΟΥΡΓΟΥ,
Η ΓΕΝ. ΓΡΑΜΜΑΤΕΑΣ
Π.Ε., Δ.Ε. & Ε.Α.

ΑΝΑΣΤΑΣΙΑ ΓΚΙΚΑ

Εσωτερική Διανομή: -Δ/νση Σπουδών Προγραμμάτων & Οργάνωσης Π.Ε. Τμ. Α'

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΡΗΤΗΣ

ΣΧΟΛΗ ΚΟΙΝΩΝΙΚΩΝ ΕΠΙΣΤΗΜΩΝ
ΤΜΗΜΑ ΨΥΧΟΛΟΓΙΑΣ

ΕΝΤΥΠΟ ΣΥΓΚΑΤΑΘΕΣΗΣ ΓΟΝΕΑ ΚΑΤΟΠΙΝ ΕΝΗΜΕΡΩΣΗΣ

Ρέθυμνο, …….

Αγαπητοί γονείς,

Με αυτή την επιστολή σας ενημερώνουμε για μία έρευνα του Πανεπιστημίου Κρήτης (Σχολή Κοινωνικών Επιστημών-Τμήμα Ψυχολογίας) που αφορά στον σχεδιασμό μοντέλων πρόβλεψης συναισθηματικών και συμπεριφορικών δυσκολιών σε μαθητές σχολικής ηλικίας.

Παρακάτω παραθέτουμε αναλυτικά στοιχεία για την έρευνα και απαντούμε σε κάποιες πιθανές σας ερωτήσεις.

Τίτλος έρευνας: «Διαχρονικά μοντέλα πρόβλεψης συναισθηματικών και συμπεριφορικών δυσκολιών σε μαθητές σχολικής ηλικίας».

Ερευνήτρια: Σπυροπούλου Έλλη (Εκπαιδευτικός ΠΕ – Ψυχολόγος, υποψ. Διδάκτωρ Τμήματος Ψυχολογίας)

Σκοπός της παρούσας έρευνας αποτελεί η μελέτη ατομικών παραγόντων που πιθανώς συμβάλλουν στην εμφάνιση συναισθηματικών και συμπεριφορικών δυσκολιών σε μαθητές σχολικής ηλικίας.

Η διεξαγωγή της έρευνας έχει εγκριθεί από το Υπουργείο Έρευνας και Θρησκευμάτων (Φ15/30515/40339/Δ1) κι έχει ομαδικό χαρακτήρα. Δε θα παρακωλύει την ομαλή διεξαγωγή των μαθημάτων, καθώς θα είναι σύντομη σε διάρκεια. Στα ερωτηματολόγια δεν υπάρχουν σωστές και λάθος απαντήσεις και κάθε παιδί είναι ελεύθερο να επιλέξει την απάντηση που το αντιπροσωπεύει περισσότερο. Η συμμετοχή του είναι επίσης προαιρετική κι έχει το δικαίωμα να διακόψει τη διαδικασία οποιαδήποτε στιγμή το επιθυμεί. Σε κάθε περίπτωση πάντως η παρουσία της ερευνήτριας και του/της υπεύθυνου εκπαιδευτικού της τάξης θα βοηθήσει ώστε να ξεπεραστεί κάθε πιθανό εμπόδιο.

Οφείλουμε να τονίσουμε πως θα τηρηθούν αυστηρά η **ανωνυμία** και η διασφάλιση των προσωπικών δεδομένων των μαθητών.

Ζητούμε να δώσετε τη γραπτή σας συγκατάθεση για να συμμετέχει το παιδί σας στην παρούσα έρευνα, συμπληρώνοντας το Έντυπο Συγκατάθεσης Γονέα Κατόπιν Ενημέρωσης.

Σας ευχαριστούμε θερμά για τη συνεργασία σας στην προσπάθειά μας αυτή.

Η υπεύθυνη της έρευνας
Έλλη Σπυροπούλου

Επόπτης Καθηγητής
Α. Γιοβαζολιάς
Αναπλ. Καθηγητής Συμβ/κής Ψυχολογίας

Δίνω τη συγκατάθεσή μου για τη συμμετοχή του παιδιού μου στην έρευνα
Ονοματεπώνυμο Γονέα: …….. Υπογραφή: ……..

ΠΡΑΚΤΙΚΑ ΤΗΣ 337/13-04-2022 ΕΚΤΑΚΤΗΣ ΣΥΝΕΛΕΥΣΗΣ ΤΟΥ ΤΜΗΜΑΤΟΣ ΨΥΧΟΛΟΓΙΑΣ.

Σήμερα, 13/04/2022 ημέρα Τετάρτη και ώρα 11:00 π.μ. πραγματοποιήθηκε Έκτακτη Συνέλευση του Τμήματος Ψυχολογίας μέσω τηλεδιάσκεψης και με τη χρήση του τηλεπικοινωνιακού συστήματος e-presence.

Παρούσα ήταν η Πρόεδρος του Τμήματος, Αναπληρώτρια Καθηγήτρια κ. Στέλλα Γιακουμάκη και τα εξής μέλη του Τμήματος Ψυχολογίας:

1. Εμμανουήλ Δαφερμάκης, Καθηγητής,
2. Θεανώ Κοκκινάκη, Καθηγήτρια,
3. Γεώργιος Παναγής, Καθηγητής,
4. Όλγα Θεμελή Αναπληρώτρια Καθηγήτρια,
5. Ηλίας Τσακανίκος, Αναπληρωτής Καθηγητής,
6. Αλέξιος Αρβανίτης, Επίκουρος Καθηγητής,
7. Παναγιώτα Δημητροπούλου, Επίκουρη Καθηγήτρια,
8. Λεωνίδας Ζαμπετάκης, Επίκουρος Καθηγητής,
9. Αικατερίνη Κούτρα, Επίκουρη Καθηγήτρια,
10. Στέφανος Μαστροθεόδωρος, Επίκουρος Καθηγητής,
11. Δημήτριος Νικολόπουλος, Επίκουρος Καθηγητής,
12. Ηλίας Οικονόμου, Επίκουρος Καθηγητής,
13. Αικατερίνη Πετκαναπούλου, Επίκουρη Καθηγήτρια,

Απόντα Μέλη:

1. Σοφία Τριλίβα, Καθηγήτρια, (σε επιστημονική άδεια)
2. Θεόδωρος Γιοβαζολιάς, Καθηγητής, (σε επιστημονική άδεια)
3. Ευάγγελος Καραδήμας, Καθηγητής, (λόγω ανειλημμένων υποχρεώσεων)
4. Ανδρέας Καστελλάκης, Αναπληρωτής Καθηγητής, (λόγω ανειλημμένων υποχρεώσεων)
5. Γεώργιος Κανδύλης, Μέλος Ε.Δ.Ι.Π. (λόγω ανειλημμένων υποχρεώσεων)

Εκπρόσωπος φοιτητών και μελών Ε.Τ.Ε.Π. δεν έχει ορισθεί.

Διαπιστώθηκε απαρτία και πρακτικά τήρησε η αναπληρώτρια προϊσταμένη της Γραμματείας του Τμήματος κ. Χρυσούλα Κουταλά.

ΘΕΜΑΤΑ ΗΜΕΡΗΣΙΑΣ ΔΙΑΤΑΞΗΣ

……

Β. Θέματα μεταπτυχιακών σπουδών.

1. ……
2. Αίτημα Καθηγητή κ. Θεόδωρου Γιοβαζολιά για την Διδακτορική Διατριβή της κ. Έλλης Σπυροπούλου.

……

Θέμα Β2: Αίτημα Καθηγητή κ. Θεόδωρου Γιοβαζολιά για την Διδακτορική Διατριβή της κ. Έλλης Σπυροπούλου.

Η Πρόεδρος ανακοινώνει το 7649/238/6-4-22 αίτημα του Καθηγητή κ. Θ. Γιοβαζολιά με το οποίο ζητά:

α) Αλλαγή τίτλου της διδακτορικής διατριβής από «Διαχρονικά μοντέλα πρόβλεψης συναισθηματικών και συμπεριφορικών δυσκολιών σε μαθητές σχολικής ηλικίας» σε «Διαχρονικά μοντέλα σχέσεων συναισθηματικών και διαπροσωπικών δυσκολιών σε μαθητές σχολικής ηλικίας» ("Longitudinal associations between emotional and interpersonal difficulties in school-aged children"),

β) Η συγγραφή της διδακτορικής διατριβής να πραγματοποιηθεί στην αγγλική γλώσσα και

γ) Η επταμελής εξεταστική επιτροπή να αποτελείται από τους:

- Γιοβαζολιάς Θεόδωρος (επόπτης), Τμήμα Ψυχολογίας, Πανεπιστήμιο Κρήτης,
- Μουζάκη Αγγελική (μέλος Τ.Σ.Ε.), Π.Τ.Δ.Ε., Πανεπιστήμιο Κρήτης,
- Σιδερίδης Γεώργιος (μέλος Τ.Σ.Ε.) Π.Τ.Δ.Ε., Ε.Κ.Π.Α.,
- Κουρκούτας Ηλίας, Π.Τ.Δ.Ε., Πανεπιστήμιο Κρήτης,
- Αθανασιάδου Χριστίνα, Τμήμα Ψυχολογίας, Α.Π.Θ.,
- Βασιλόπουλος Στέφανος, Τμήμα Επιστημών της Εκπαίδευσης και Κοινωνικής Εργασίας, Πανεπιστήμιο Πατρών,
- Καραγιάννη- Καραγιαννοπούλου Ευαγγελία, Τμήμα Ψυχολογίας, Πανεπιστήμιο Ιωαννίνων.

Τα μέλη της Σ.Τ. **εγκρίνουν ομόφωνα**:

α) την αλλαγή τίτλου της Διδακτορικής Διατριβής της κ. Έλλης Σπυροπούλου από «Διαχρονικά μοντέλα πρόβλεψης συναισθηματικών και συμπεριφορικών δυσκολιών σε μαθητές σχολικής ηλικίας»

σε

«Διαχρονικά μοντέλα σχέσεων συναισθηματικών και διαπροσωπικών δυσκολιών σε μαθητές σχολικής ηλικίας» ("Longitudinal associations between emotional and interpersonal difficulties in school-aged children"),

β) Η συγγραφή της διδακτορικής διατριβής να πραγματοποιηθεί στην αγγλική γλώσσα

και

γ) Η επταμελής εξεταστική επιτροπή να αποτελείται από τους:

- Γιοβαζολιάς Θεόδωρος (επόπτης), Τμήμα Ψυχολογίας, Πανεπιστήμιο Κρήτης,
- Μουζάκη Αγγελική (μέλος Τ.Σ.Ε.), Π.Τ.Δ.Ε., Πανεπιστήμιο Κρήτης,
- Σιδερίδης Γεώργιος (μέλος Τ.Σ.Ε.) Π.Τ.Δ.Ε., Ε.Κ.Π.Α.,
- Κουρκούτας Ηλίας, Π.Τ.Δ.Ε., Πανεπιστήμιο Κρήτης,
- Αθανασιάδου Χριστίνα, Τμήμα Ψυχολογίας, Α.Π.Θ.,
- Βασιλόπουλος Στέφανος, Τμήμα Επιστημών της Εκπαίδευσης και Κοινωνικής Εργασίας, Πανεπιστήμιο Πατρών,
- Καραγιάννη- Καραγιαννοπούλου Ευαγγελία, Τμήμα Ψυχολογίας, Πανεπιστήμιο Ιωαννίνων.

Ακριβές απόσπασμα.
Η α/α Γραμματέας του Τμήματος

Χρυσούλα Κουταλά

C.

CARS

Τα παιδιά σκέπτονται και κάνουν διάφορα πράγματα, όταν αισθάνονται θυμωμένα. Θέλουμε να μάθουμε πόσο συχνά σκέπτεσαι ή κάνεις διάφορα πράγματα, όταν αισθάνεσαι θυμωμένος/η. Διάβασε σε παρακαλώ καθεμιά από τις παρακάτω προτάσεις και κύκλωσε τον αριθμό που δείχνει πόσο συχνά σκέπτεσαι ή κάνεις αυτό που σου λέει η πρόταση, όταν αισθάνεσαι θυμωμένος/η. Δε θέλουμε να μάθουμε τι σκέπτεσαι ή τι κάνεις γενικά. Θέλουμε να μάθουμε τι σκέπτεσαι και κάνεις **ΜΟΝΟ** όταν αισθάνεσαι θυμωμένος/η.

1. Σκέφτομαι πολύ τις φορές που ήμουν θυμωμένος/η.

1	2	3	4
Σχεδόν ποτέ	**Μερικές Φορές**	**Συχνά**	**Σχεδόν Πάντα**

2. Σκέφτομαι τα άσχημα πράγματα που μου έχουν συμβεί και τα οποία δεν άξιζα.

1	2	3	4
Σχεδόν ποτέ	**Μερικές Φορές**	**Συχνά**	**Σχεδόν Πάντα**

3. Σκέφτομαι για πολύ καιρό γεγονότα που με θύμωσαν.

1	2	3	4
Σχεδόν ποτέ	**Μερικές Φορές**	**Συχνά**	**Σχεδόν Πάντα**

4. Έχω για πολύ καιρό φαντασιώσεις εκδίκησης, ακόμα και όταν ο καβγάς έχει τελειώσει.

1	2	3	4
Σχεδόν ποτέ	**Μερικές Φορές**	**Συχνά**	**Σχεδόν Πάντα**

5. Σκέφτομαι συγκεκριμένα γεγονότα που έγιναν πριν από πολύ καιρό και τα οποία ακόμα με θυμώνουν.

1	2	3	4
Σχεδόν ποτέ	**Μερικές Φορές**	**Συχνά**	**Σχεδόν Πάντα**

6. Δυσκολεύομαι να συγχωρήσω ανθρώπους που μ' έχουν πληγώσει.

1	2	3	4
Σχεδόν ποτέ	**Μερικές Φορές**	**Συχνά**	**Σχεδόν Πάντα**

7. Ακόμα και όταν ένας καβγάς έχει τελειώσει, εγώ συνεχίζω να μαλώνω με το άτομο αυτό στο μυαλό μου.

1	2	3	4
Σχεδόν ποτέ	**Μερικές Φορές**	**Συχνά**	**Σχεδόν Πάντα**

8. Αναμνήσεις από τις φορές που ήμουν θυμωμένος/η ξεπηδούν στο κεφάλι μου πριν πέσω για ύπνο.

1	2	3	4
Σχεδόν ποτέ	**Μερικές Φορές**	**Συχνά**	**Σχεδόν Πάντα**

9. Κάθε φορά που νιώθω θυμό, συνεχίζω να το σκέφτομαι για κάποιο καιρό.

1	2	3	4
Σχεδόν ποτέ	**Μερικές Φορές**	**Συχνά**	**Σχεδόν Πάντα**

10. Έχουν υπάρξει φορές που δεν μπορούσα να σταματήσω να σκέφτομαι ένα συγκεκριμένο γεγονός.

1	2	3	4
Σχεδόν ποτέ	**Μερικές Φορές**	**Συχνά**	**Σχεδόν Πάντα**

11. Προσπαθώ να καταλάβω ποια πράγματα με θυμώνουν.

1	2	3	4
Σχεδόν ποτέ	**Μερικές Φορές**	**Συχνά**	**Σχεδόν Πάντα**

12. Σκέφτομαι τους λόγους για τους οποίους οι άνθρωποι μου συμπεριφέρονται άσχημα.

1	2	3	4
Σχεδόν ποτέ	**Μερικές Φορές**	**Συχνά**	**Σχεδόν Πάντα**

13. Κατά τη διάρκεια της ημέρας φαντάζομαι πράγματα που είναι βίαια.

1	2	3	4
Σχεδόν ποτέ	**Μερικές Φορές**	**Συχνά**	**Σχεδόν Πάντα**

14. Νιώθω θυμωμένος/η για κάποια πράγματα στη ζωή μου.

1	2	3	4
Σχεδόν ποτέ	**Μερικές Φορές**	**Συχνά**	**Σχεδόν Πάντα**

15. Όταν κάποιος/α με θυμώνει, δεν μπορώ να σταματήσω να σκέφτομαι τον τρόπο με τον οποίο θα τον/την εκδικηθώ.

1	2	3	4
Σχεδόν ποτέ	**Μερικές Φορές**	**Συχνά**	**Σχεδόν Πάντα**

16. Όταν κάποιος με θυμώνει, αναρωτιέμαι συνεχώς γιατί συνέβη αυτό σε μένα.

1	2	3	4
Σχεδόν ποτέ	**Μερικές Φορές**	**Συχνά**	**Σχεδόν Πάντα**

17. Αναμνήσεις ακόμα και από μικρά προβλήματα με ενοχλούν για κάποιο καιρό.

1	2	3	4
Σχεδόν ποτέ	**Μερικές Φορές**	**Συχνά**	**Σχεδόν Πάντα**

18. Όταν κάτι με θυμώνει, απασχολεί συνεχώς τη σκέψη μου.

1	2	3	4
Σχεδόν ποτέ	**Μερικές Φορές**	**Συχνά**	**Σχεδόν Πάντα**

19. Σκέφτομαι συνεχώς πράγματα που έχουν συμβεί και τα οποία με έκαναν να θυμώσω.

1	2	3	4
Σχεδόν ποτέ	**Μερικές Φορές**	**Συχνά**	**Σχεδόν Πάντα**

CDI

Παρακάτω υπάρχουν μια σειρά από προτάσεις που περιγράφουν πως αισθάνεσαι για διάφορα πράγματα. Διάβασέ τις προτάσεις με προσοχή και βάλε σε κύκλο μια από τις 3 απαντήσεις (α, β, ή γ) ανάλογα με το πώς αισθάνεσαι για κάθε μια από αυτές. Μην ξοδεύεις πολύ χρόνο σε καμία πρόταση.

1. **Σχετικά με τους φίλους-ες μου,**

(α) δεν έχω καθόλου, (β) έχω πολύ λίγους-ες, (γ) έχω αρκετούς-ες

2. **Σε σχέση με τους συμμαθητές-τριες μου, είμαι**

(α) κακό παιδί, (β) ούτε κακό ούτε καλό παιδί, (γ) αρκετά καλό παιδί

3. **Σε σχέση με τους συμμαθητές μου, είμαι,**

(α) άσχημος-η, (β) μέτριος-α στην εμφάνιση, (γ) όμορφος-η

4. **Διασκεδάζω,**

(α) πολύ συχνά, (β) μερικές φορές, (γ) ποτέ δε διασκεδάζω

5. **Νιώθω μόνος-η,**

(α) πολύ συχνά, (β) μερικές φορές, (γ) ποτέ δε νιώθω μόνος-η

6. **Διασκεδάζω στο σχολείο,**

(α) πολύ συχνά, (β) μερικές φορές, (γ) ποτέ δε διασκεδάζω

7. **Σε μερικά μαθήματα που ήμουν καλός-ή τώρα τα πάω,**

(α) άσχημα, (β) μέτρια, (γ) αρκετά καλά

8. **Κάνω λάθη,**

(α) πολύ συχνά, (β) μερικές φορές, (γ) ποτέ δε κάνω λάθη

9. Έχω πονοκεφάλους,

(α) πολύ συχνά, (β) μερικές φορές, (γ) ποτέ δεν έχω πονοκεφάλους

10. Όταν πρέπει να πάρω αποφάσεις,

(α) συχνά δυσκολεύομαι, (β) μερικές φορές δυσκολεύομαι, (γ) αποφασίζω εύκολα

11. Νιώθω ότι δεν με αγαπάει κανένας,

(α) πολύ συχνά, (β) μερικές φορές, (γ) ποτέ

12. Θέλω να είμαι με άλλα παιδιά,

(α) πολύ συχνά, (β) μερικές φορές, (γ) ποτέ δε θέλω να είμαι με άλλα παιδιά

13. Είμαι κακός σε ό,τι κάνω,

(α) πολλές φορές, (β) μερικές φορές, (γ) ποτέ δεν είμαι κακός σε αυτά που κάνω

14. Κάνω αυτά που μου λένε,

(α) πολύ συχνά, (β) μερικές φορές, (γ) ποτέ δεν κάνω αυτά που μου λένε

15. Μαλώνω με τα άλλα παιδιά,

(α) πολύ συχνά, (β) μερικές φορές, (γ) ποτέ δε μαλώνω

16. Φταίω,

(α) τις περισσότερες φορές, (β) μερικές φορές, (γ) ποτέ δε φταίω

17. Για να κάνω τα μαθήματα μου,

(α) πολλές φορές δυσκολεύομαι, (β) μερικές φορές δυσκολεύομαι, (γ) ποτέ δε δυσκολεύομαι

18. Αισθάνομαι πως θέλω να κλάψω,

(α) πολλές φορές, (β) μερικές φορές, (γ) ποτέ δεν αισθάνομαι πως θέλω να κλάψω

19. Είμαι λυπημένος-η,

(α) πολλές φορές, (β) μερικές φορές, (γ) ποτέ δεν είμαι λυπημένος-η

20. Με ενοχλούν διάφορα πράγματα,

(α) πολύ συχνά, (β) μερικές φορές, (γ) ποτέ δε με ενοχλεί τίποτα

21. Μισώ τον εαυτό μου,

(α) πολλές φορές, (β) μερικές φορές, (γ) ποτέ δεν σιχαίνομαι τον εαυτό μου

22. Τα βράδια έχω αϋπνίες (δε μπορώ να κοιμηθώ),

(α) πολλές φορές, (β) μερικές φορές, (γ) ποτέ δεν έχω αϋπνίες

23. Τα πράγματα πάνε καλά για μένα,

(α) τις περισσότερες φορές, (β) μερικές φορές, (γ) ποτέ δεν πάνε καλά

24. Είμαι κουρασμένος-η,

(α) πολλές φορές, (β) μερικές φορές, (γ) ποτέ δεν είμαι κουρασμένος

25. Πιστεύω πως κάτι κακό θα μου συμβεί,

(α) πολλές φορές, (β) μερικές φορές, (γ) ποτέ δεν το πιστεύω

26. Δεν έχω όρεξη για φαγητό,

(α) πολλές φορές, (β) μερικές φορές, (γ) πάντοτε έχω όρεξη

PEQ

- Κύκλωσε τον αριθμό που δείχνει με ποιο τρόπο οι άλλοι μαθητές σε **παρενόχλησαν** ή **τα έβαλαν** μαζί σου. Ανέφερε γεγονότα που συνέβησαν **κατά τη διάρκεια των τελευταίων 3 μηνών**.

1*= Ποτέ,* ***2****=Μια ή δυο φορές,* ***3****=Λίγες φορές,* ***4****=περίπου μια φορά την εβδομάδα,* ***5****=Λίγες φορές την εβδομάδα*

1	Ένας μαθητής /τρια με πείραξε με κακόβουλο τρόπο.	①	②	③	④	⑤
2	Ένας μαθητής/τρια είπε ότι θα με χτύπαγε ή θα με τραυμάτιζε.	①	②	③	④	⑤
3	Ένας μαθητής/τρια με αγνόησε επίτηδες για να πληγώσει τα αισθήματα μου.	①	②	③	④	⑤
4	Ένας μαθητής/τρια είπε ψέματα για μένα για να μην με συμπαθούν οι άλλοι μαθητές.	①	②	③	④	⑤
5	Ένας μαθητής/τρια με χτύπησε, με κλώτσησε ή με έσπρωξε με κακοήθη τρόπο.	①	②	③	④	⑤
6	Ένας μαθητής/τρια με άρπαξε, με κράτησε ή με άγγιξε με τρόπο που δεν μου άρεσε.	①	②	③	④	⑤
7	Κάποιοι μαθητές με άφησαν έξω από τα πράγματα από κακία και μόνο.	①	②	③	④	⑤
8	Ένας μαθητής/τρια με κυνήγησε σαν να ήθελε πραγματικά να μου κάνει κακό.	①	②	③	④	⑤
9	Κάποιοι/ες μαθητές/τριες μαζεύτηκαν εναντίον μου και μου φέρθηκαν άσχημα.	①	②	③	④	⑤

Κύκλωσε τον αριθμό που δείχνει πόσο συχνά **παρενόχλησες ή τα έβαλες** με έναν άλλο μαθητή/τρια στο σχολείο. Ανέφερε γεγονότα που συνέβησαν **κατά τη διάρκεια των τελευταίων 3 μηνών**.

1*= Ποτέ,* ***2****=Μια ή δυο φορές,* ***3****=Λίγες φορές,* ***4****=περίπου μια φορά την εβδομάδα,* ***5****=Λίγες φορές την εβδομάδα*

1	Πείραξα ή κορόιδεψα έναν μαθητή/τρια με κακοήθη τρόπο.	①	②	③	④	⑤
2	Απείλησα άλλον μαθητή/τρια ότι θα τον/την χτυπήσω ή θα τραυματίσω.	①	②	③	④	⑤
3	Αγνόησα άλλον μαθητή/τρια μόνο και μόνο για να πληγώσω τα αισθήματά του/της.	①	②	③	④	⑤
4	Είπα ψέματα για έναν άλλο μαθητή/τρια ώστε οι άλλοι μαθητές να μην τον/την συμπαθούν.	①	②	③	④	⑤
5	Χτύπησα, κλώτσησα ή έσπρωξα άλλον μαθητή/τρια με κακοήθη τρόπο.	①	②	③	④	⑤
6	Άρπαξα, κράτησα ή άγγιξα άλλον μαθητή/τρια με τρόπο που δεν του/της άρεσε.	①	②	③	④	⑤
7	Συντέλεσα κι εγώ στο να αποκλειστεί ένας μαθητή/τρια από τα πράγματα από κακία και μόνο.	①	②	③	④	⑤
8	Κυνήγησα έναν μαθητή/τρια προσπαθώντας να του/της κάνω κακό.	①	②	③	④	⑤
9	Εγώ και κάποιοι/ες μαθητές/τριες μαζευτήκαμε και φερθήκαμε άσχημα σε άλλον μαθητή/τρια.	①	②	③	④	⑤