Profiles of Emotion Regulation in Young People Accessing Youth Mental Health and Drug Treatment

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Abstract

Deficits regulating emotions are a core process underlying both substance use and mental health disorders. Research has focused on identifying one-to-one associations between individual emotion regulation (ER) strategies and mental health symptoms. Consequently, little is known about how patterns of ER relate to a broad range of psychopathology, in treatment seeking young people. Latent class analysis was used to examine patterns of ER strategies and their relationship with symptoms of depression, anxiety, eating disorders, substance use and borderline personality disorder, in a sample of young treatment seekers. Participants were young people ($N = 306$, $M = 20.8$ years) accessing youth advocacy and support or mental health services in Australia. Participants recalled an emotionally-arousing event experienced when on their own and indicated their use of 14 possible ER responses in an online questionnaire. Symptoms of mental health and substance use were measured. The LCA identified three distinct classes of ER responses: *Ruminators/avoiders* ($n = 76$), *active regulators* ($n = 81$), and *low regulators* ($n = 129$). The *ruminators/avoiders* endorsed the most severe symptom picture across all disorders except alcohol use. Within this cohort, distinct patterns of ER responding had unique relationships with symptoms of psychopathology. The deleterious impact of heightened maladaptive ER strategies (rumination and avoidance) in the absence of adaptive strategies was highlighted.

Keywords Emotion regulation · Youth · Psychopathology · Latent class analysis · Profile

Introduction

Adolescence to young adulthood constitutes a critical period of vulnerability for the development of mental health and substance use disorders. Indeed, large-scale prevalence studies indicate that 75% of all mental health disorders begin before the age of 25 years, with the median age-of-onset occurring between 17 and 22 years of age (Kessler et al. 2005). Rates of comorbidity between mental health and substance use disorders are also the highest within this age group (Kessler et al. 2005). Young people commonly present with diagnostic complexity and may meet criteria for multiple psychiatric disorders, including substance use disorders, and therefore our examination of psychopathology in this age group requires nuanced approaches. Treatment seeking young people are uniquely vulnerable with multiple interrelated mental health, substance use, and psychosocial difficulties (Mitchell et al. 2016). Their rates of substance use and mental health comorbidity are estimated to range between 61 and 88% (Couwenbergh et al. 2006). Furthermore, many of these young people have histories of social disadvantage and trauma, characterised by disturbances in attachment, emotional invalidation by caregivers, parental conflict or maltreatment and abuse, all of which alter the processes that underlie the development of healthy emotion regulation (ER; Chesney and Gordon 2017; Dixon-Gordon et al. 2014; Eftekhari et al. 2009). Consequently, rather than

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acquiring the skills necessary to tolerate and modify their emotions, these individuals experience increased emotional arousal, have difficulty tolerating emotional distress, and have poor emotional awareness and understanding (Cole et al. 1994). For these reasons, examining ER as one dimension that may underlie multiple diagnoses and complexity in these young people has the potential to provide a crucial foundation to inform early and effective intervention, which may prevent progression to chronic psychopathology and substance use disorders.

Emotion Regulation, Mental Health, and Substance Use Disorders

Deficits in ER appear to be pertinent to the development, maintenance, and treatment of various forms of psychopathology, including substance use (Kober 2013), depression (Hofmann et al. 2012), the anxiety disorders (Mennin et al. 2007), eating disorders (Lavender et al. 2015), and borderline personality disorder (BPD; Carpenter and Trull 2013). Emotion regulation has been conceptualised as a transdiagnostic process, or a core dimension which underlies multiple psychopathological classes (Kring and Sloan 2009; Sloan et al. 2017). This literature has focused on the relationship between single strategies that individuals use to regulate their emotions, and symptoms of a broad range of psychopathology, including substance misuse. These strategies have been conceptualised as putatively maladaptive or putatively adaptive based on their singular relationship with symptoms of psychopathology (Aldao et al. 2010). For example, ER strategies that are negatively associated with psychopathology have been conceptualised as adaptive (e.g. acceptance, reappraisal, problem solving), and those that have a positive association have been conceptualised as maladaptive (e.g. avoidance, rumination, suppression). In this literature, maladaptive strategies have consistently evidenced a stronger relationship with psychopathology than adaptive strategies (for a large meta-analysis, see Aldao et al. 2010).

Patterns of Emotion Regulation and Psychopathology

Research focusing on the one-to-one associations between ER strategies and psychopathological symptoms, represents an important first step in our understanding of ER and psychopathology. However, recent findings suggest that this approach may be overly simplistic, by failing to account for the complex, interactive and transactional processes involved in the selection and implementation of multiple ER strategies in response to contextual demands (Aldao 2013; Bonanno and Burton 2013). Indeed, it is now recognised that multiple ER strategies are implemented simultaneously, and the selection of one strategy is likely

to influence the effectiveness (or lack of effectiveness) of others (Aldao 2013; Aldao and Nolen-Hoeksema 2012a, 2013; Dixon-Gordon et al. 2014; Szasz et al. 2018).

Germane to this investigation are the small number of studies that have adopted person centred approaches to identify unique profiles of ER responding, defined as the within-individual patterns of strategies that an individual employs in any given context to regulate their emotions. These approaches promote a more nuanced examination of ER by identifying subgroups of individuals who share common patterns of ER responding and subsequently examining their utility in predicting psychopathology. Studies that have adopted these approaches differ in regards to the clinical characteristics of the sample, the number of ER strategies examined in a profile, the inclusion of context in the examination, and the classes of psychopathology included (Burke et al. 2018; Chesney and Gordon 2017; Dixon-Gordon et al. 2014; Eftekhari et al. 2009; Lougheed and Hollenstein 2012). However, taken together these studies identify many similarities in the patterns of ER responding which characterised participants' ER profiles. Across this literature, profiles of ER characterised by heightened engagement in maladaptive ER strategies are generally associated with more severe psychopathology (Burke et al. 2018; Chesney and Gordon 2017; Dixon-Gordon et al. 2014; Eftekhari et al. 2009; Lougheed and Hollenstein 2012). For example, Chesney and Gordon (2017) examined the relationship between six ER strategies in a broad urban community sample and found that those who employed a pattern of ER responding characterised by the highest levels of rumination, suppression and avoidance and the lowest levels of acceptance, reappraisal and problem solving had the highest level of Post Traumatic Stress Disorder (PTSD) symptoms. Dixon-Gordon et al. (2014) examined patterns of ER among the same strategies with the addition of self criticism in a large undergraduate sample. In this study, ER was examined across six situations which differed based on intensity (moderate or high) and type of emotion experienced (anger, sadness, anxiety) and whether or not it was in relation to a recalled achievement or social related stressor. This study identified a class of individuals who had a profile characterised by excessive use of worrying and ruminating, which was associated with the highest levels of psychopathology. The deleterious impact of high rumination in an ER profile was further supported by Burke et al. (2018) who examined patterns of trait affect (negative and positive affect) and cognitive ER strategies (i.e. positive rumination, ruminative reflection and ruminative brooding) in adolescents recruited from high schools and universities. This study found that adolescents with an ER profile characterised by high negative affect and rumination coupled with low levels of positive affect and positive

rumination, had the highest levels of depressive symptoms and engagement in non-suicidal self-injury (NSSI).

Previous studies examining ER profiles also identify patterns of ER responding characterised by heightened engagement across all ER strategies, which similar to maladaptive classes, were also associated with heightened symptoms of psychopathology (Chesney and Gordon 2017; Dixon-Gordon et al. 2014). Conversely, these studies also identify a pattern of ER responding characterised by frequent engagement in adaptive strategies and low engagement in maladaptive strategies as generally predictive of lower symptom severity across a wide range of psychopathologies (Chesney and Gordon 2017; Dixon-Gordon et al. 2014). Taken together, these studies highlight the complexity of ER and strengthen the importance of broadening our understanding of the unique patterns of ER responding in order to characterise the dynamic interplay between ER strategies and psychopathology.

Questions that Remain in Our Understanding of Emotion Regulation Strategy Use

Despite the rich insights that previous studies utilising person-centred approaches have provided in understanding the relationship between patterns of ER strategies and psychopathology, important gaps remain. First, previous studies have limited the ER strategies examined to a restricted number of "covert" strategies (i.e., rumination/worry, expressive suppression, self-criticize, experiential avoidance, reappraisal, problem solving, and acceptance; Burke et al. 2018; Dixon-Gordon et al. 2014; Chesney and Gordon 2017; Eftekhari et al. 2009). This is a notable limitation given the important role of "overt" ER strategies as highlighted in recent literature (Aldao and Dixon-Gordon 2014). Specifically, a number of overt behaviours conceptualised as serving an ER function (i.e., eating food, exercising, watching television, taking a nap, drinking alcohol) were found to predict symptoms of depression, anxiety, BPD, disordered eating and alcohol use, above-and-beyond the more frequently studied covert strategies (see Aldao and Dixon-Gordon 2014).

Second, despite recent interest in the influence of context on ER, the majority of studies (c/f Dixon-Gordon et al. 2014 who examined ER across six occasions), have relied on trait specific measures of ER strategy use which examine an individual's overall propensity to employ ER strategies (Burke et al. 2018; Chesney and Gordon 2017; Eftekhari et al. 2009; Lougheed and Hollenstein 2012). This has precluded the examination of ER in response to a specific situation or emotional experience which represents a notable limitation given that the adaptability of regulation is likely influenced by the degree to which ER strategies from one's profile are synchronised with contextual demands (e.g. Aldao 2013).

Third, the examination of ER patterns has been limited to community and undergraduate samples, despite recognition that ER differs significantly between non-clinical and clinical populations (Burke et al. 2018; Dixon-Gordon et al. 2014; Ehring et al. 2008; Harrison et al. 2009; Lougheed and Hollenstein 2012). Consequently, it remains unclear whether similar patterns of ER are evident in treatment seeking young people compared to non-clinical samples, and how these patterns relate to psychopathology. Given that treatment seeking young people present with significant comorbidity, the examination of unique ER profiles in this population may facilitate a more nuanced understanding of which specific patterns of ER have the biggest impact on subsequent psychopathology.

Current Study

The current study aimed to extend this prior research by examining whether young people recruited from a treatment seeking population exhibited distinct profiles of ER defined by the pattern of ER strategies employed in response to a single recalled emotionally eliciting situation. We examined a broader range of ER strategies to include both covert and overt, and accounted for the context specific nature of ER, by examining the use of these strategies in response to a single recalled emotionally evocative event experienced when alone. This context was of particular interest to the present study because of the inclusion of overt maladaptive strategies such as self-harm and binge eating and purging behaviours, which typically occur privately. Consistent with previous examinations of ER profiles and psychopathology, we also examined the relationship between ER profiles and symptoms of depression, anxiety, disordered eating, BPD, with the addition of substance use disorder symptomatology. Given that previous studies exploring ER profiles have examined a limited number of ER strategies and utilised undergraduate samples with relatively low clinical symptom severity, our hypotheses were driven by the literature on individual strategies of ER and psychopathology. Thus, we hypothesised that there would be a class of individuals whose ER profile was characterised by frequent use of adaptive ER strategies (e.g., acceptance, reappraisal, problem solving, connecting with others, enjoyable activities, physical activity), and relatively little use of maladaptive strategies (rumination, emotional suppression, emotional avoidance, behavioural avoidance, self-harm, binge/purge, substance use, argue with others). Furthermore, we hypothesise that there will be another class of young people who exhibit the opposite regulatory pattern (i.e. high maladaptive, low adaptive). Although these two profiles were unlikely to be an exhaustive representation of all possibilities, the limited research in this domain made additional profiles

exploratory. Since ER strategies are associated with differential symptom outcomes, we hypothesised that the severity of overall psychopathology, as well as the severity of each symptom group (e.g. depression, anxiety), would differ according to the proportions of adaptive and maladaptive strategies in an individual's ER profile (e.g. more severe symptoms would be related to profiles with higher proportions of maladaptive strategies).

Method

Participants

Participants were 306 young people (58.4% female) recruited from youth mental health and/or advocacy and support services across Victoria, Australia. These included two primary mental health services, three residential drug and alcohol services and eight youth support and advocacy services, providing outreach, case management, and drop in/day programs offering food, housing and welfare assistance to vulnerable young people. Participants were included in the study if they were consenting clients of participating services, and aged between 18 and 25 years. Participants were excluded if they were actively psychotic, experiencing an acute crisis presentation (e.g. intoxication or withdrawal episode, domestic violence situation, housing crisis), had an intellectual disability (that impaired their ability to provide informed consent) or acutely suicidal. The mean age of the sample was 20.76 (SD = 2.12).

Due to participant burden and sensitivity, comprehensive sociodemographic information was not obtained. However, a census of 1000 of the young people accessing the recruitment sites found 0.6% were intersex or transgender; 71% were identified as "Australian"; 8% as Aboriginal or Torres Strait Islander; 5.1% as Pacific Islander; 4.4% from African cultures, and 11.7% from other cultures (Mitchell et al. 2016). Other sociodemographic information in the census highlights the service users' complex mental health and psychosocial needs. For example, 34% of young people had a mental health diagnosis in addition to their substance use issues in the 4 weeks prior to the census; 41.5% had engaged in self-harming behaviour in their lifetime; 64% reported past involvement in the criminal justice system; 53% reported a history of abuse and/or neglect; and 33% reported past involvement with child protection services (Mitchell et al. 2016). The current study received approval from the relevant human research ethics committee. All participants provided informed consent before completing an online questionnaire, and research team members were available to assist if required. Following completion of the survey, participants received a $10 gift card.

Emotion Regulation Assessment

State-based ER strategy use was assessed using a paradigm adapted from Dixon-Gordon et al. (2014). Participants were instructed to read a brief lay description of the concept of emotion regulation, and then asked to recall a recent occasion that resulted in emotional arousal when they were alone (e.g. "think of the last time you felt overwhelmed by your feelings"). They were prompted to recall perceived triggers for their emotional response, and identify their emotions from a list based on the Positive and Negative Affect Schedule (PANAS; Watson and Clark 1998). Emotions included were both negative and positive. The inclusion of positive emotions was based on recent theoretical and empirical work which underscores the effect of positive affect in the development and maintenance of emotional disorders, and thus the subsequent need for its regulation (for a review, see Carl et al. 2013). Following the selection of emotions, participants were then asked to rate the extent to which they used 14 ER strategies (see below) to regulate these emotions in the described situation. Each strategy was rated on a 4-point Likert scale, ranging from 0 "not at all" to 3 "a lot". This approach is relatively novel (cf. Dixon-Gordon et al. 2014) but crucial to the examination of state-based ER responding, and addresses limitations of past research that has relied on trait-like self-report measures of ER.

Covert ER strategies selected replicated those examined by Dixon-Gordon et al. (2014) and included acceptance ('was open and accepting of how I felt and didn't try to change my feelings'), cognitive reappraisal ('thought of things from a different perspective to change how I felt'), problem solving ('came up with ideas to fix or solve the problem'), emotional avoidance ('pushed down my feelings or put them out of my mind'), suppression ('blocked out my thoughts, memories or images about what had happened'), and rumination ('repeatedly worried about what had happened without trying to find a solution').

The overt ER strategies replicated those examined by Aldao and Dixon-Gordon (2014) and included connecting with others ('made contact with a friend or family member'), undertaking an enjoyable activity ('watched tv, had a bath, took a nap, self-soothed'), using substances ('drank alcohol or took drugs'), behavioural avoidance ('got out, bolted, escaped'), and arguing with others ('picked a fight or argument with someone'). Given that the current study utilises young people with significant substance use and mental health concerns, a number of additional overt ER strategies were derived from the empirical literature (Buckholdt et al. 2014) and refined after consultation with the clinical research team and expert clinicians. They included physically calming oneself ('exercised, meditated or did a breathing exercise'), self-harming ('hurt myself on purpose') and binge/purge behaviours ('ate until I felt uncomfortable

and/or threw up'). Wording of both covert and overt ER strategies were amended to ensure the literacy level was appropriate for the sample population.

Psychopathology Symptom Measures

Depression, Anxiety and Stress Scale (DASS-21)

The DASS-21 is a self-report questionnaire used to assesses symptoms of depression, anxiety and stress which are rated on a four point Likert scale ranging from 0 (*did not apply to me at all*) to 3 (*applied to me very much, or most of the time*) (Lovibond and Lovibond 1995). The current study utilised the depression and anxiety subscale of this measure (14 items). These subscales have good reliability, with Cronbach's alphas of 0.94 for depression and 0.87 for anxiety (Antony et al. 1998).

Borderline Evaluation of Severity Over Time (BEST)

The BEST (Pfohl et al. 2009) is a 15-item self-report measure of BPD symptom severity, measuring BPD-related thoughts, feelings and behaviours and resulting dysfunction, on a scale from 1 (*none/slight)* to 5 *(extreme)*. The BEST has excellent psychometric properties (Pfohl et al. 2009).

Severity of Dependence Scale (SDS)

The SDS (Gossop et al. 1992) is a five-item self-report scale which measures the degree of dependence on illicit drugs (i.e., control of drug use, concern over drug use). Items are rated using a four-point Likert scale from 0 to 3. The SDS has been found to have sound psychometric properties across five samples of drug users (Gossop et al. 1995).

The Alcohol Use Disorder Identification Test Consumption (AUDIT-C)

The AUDIT-C (Bush et al. 1998) is a three-item instrument for identifying hazardous and harmful drinking consumption. The total score ranges from 0 to 12 and items are scored on a five-point Likert scale from 0 to 4 to measure frequency, quantity and binge use of alcohol. The AUDIT-C has evidenced sound psychometric properties (Barry et al. 2013).

The Eating Disorders Attitude Test (EAT-26)

The EAT-26 (Garner et al. 1982) is a widely cited standardized screening tool for eating disorders. Respondents are asked to indicate how true each statement is for them on a six-point Likert scale where 0 = never, rarely and sometimes; 1 = often; 2 = usually and 3 = always. A total of 20 or above is indicative of an individual being at risk of an eating disorder. The EAT-26 tool has strong internal reliability with a cronbach's alpha of 0.91 (Gearhardt et al. 2009).

Data Analytic Plan

Latent class analysis was used to identify classes of ER strategy use using Mplus version 7.2. Latent class analysis aims to identify relatively homogenous and unobserved (latent) groups or classes of individuals with similar response patterns on a set of indicator variables. Several statistics were used to identify the optimal number of classes. Specifically, the model with the lowest Bayesian Information Criterion (BIC; Schwartz 1978) and Akaike Information Criterion (AIC; Akaike 1973) was deemed to have the more parsimonious fit (Nylund et al. 2007). The Lo-Mendell-Rubin (LMR) likelihood ratio test and the Vuong-Lo-Mendell-Rubin (VMLR) likelihood ratio test were also used, which compare the fit of the estimated model (H_1) with k classes to the null (H_0) model with k-1 classes (Nylund et al. 2007). In addition, the entropy statistic (the extent to which class membership is discriminated), was also examined with values approaching 1 suggesting greater discrimination between classes (Celeux and Soromenho 1996). When entropy is greater than 0.80, it is appropriate to retain the most likely class membership for each participant to use as an observed variable in subsequent analyses (Clark and Muthen 2009).

To examine the associations between ER classes and symptoms of psychopathology, a linear mixed effects regression model with random intercept to account for within participant correlation was conducted using Stata 13. Specifically, participants' scores across the different psychopathology variables were regressed onto the ER classes variable (identified in the LCA), an indicator variable which denoted psychopathology symptom type (depression, anxiety, alcohol use, disordered eating and BPD), and their interaction. We also covaried for age and gender.

This analysis allowed for examination of whether the ER classes differed in their scores on the different psychopathology variables. Given significant skew in the data, each psychopathology variable was zero-skew Box-Cox transformed prior to analysis, and then z-score standardized to assist in interpretability. Post hoc examinations were undertaken to compare the marginal mean effects across the different classes and types of psychopathologies. Given severe skew of the substance use symptom variable, the relationship between this variable and ER class was done separately using negative binomial regression as the zero-skew Box-Cox transformation could not correct for non-normality. All regression analyses were preformed using a robust variance estimator.

Fig. 1 Percentage of sample meeting or exceeding the clinical cut off scores for each domain of psychopathology based on normative criteria. [1]Crawford et al. (2011); Dixon-Gordon et al. (2014); [2]Garner et al. (1982); [3]Dixon-Gordon et al. (2015); [4]Martin et al. (2006); [5]Bush et al. (1998)
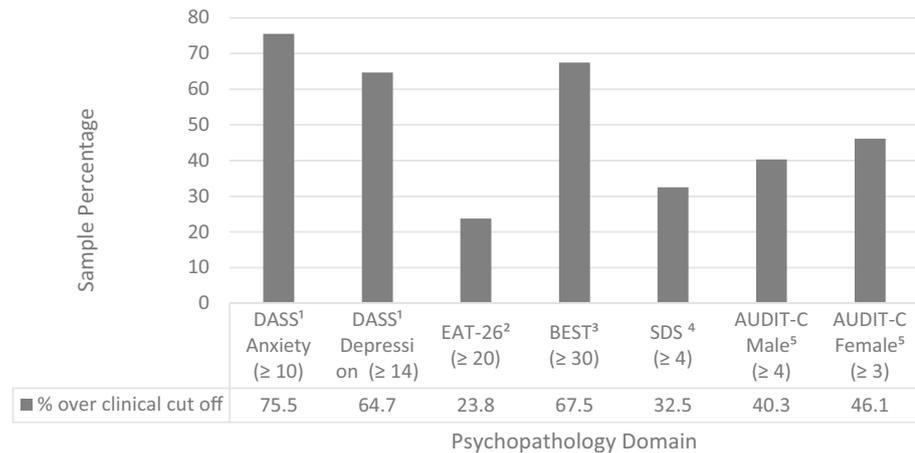

	DASS[1] Anxiety (≥ 10)	DASS[1] Depression (≥ 14)	EAT-26[2] (≥ 20)	BEST[3] (≥ 30)	SDS[4] (≥ 4)	AUDIT-C Male[5] (≥ 4)	AUDIT-C Female[5] (≥ 3)
■ % over clinical cut off	75.5	64.7	23.8	67.5	32.5	40.3	46.1

Table 1 Correlations between psychopathology variables

	1	2	3	4	5
1. EAT-26	1.00				
2. DASS-D	0.36*	1.00			
3. DASS-A	0.36*	0.67*	1.00		
4. BEST	0.38*	0.65*	0.59*	1.00	
5. AUDIT	0.04	− 0.02	0.02	0.16*	1.00

EAT-26 Eating Attitudes Test; *DASS-D* Depression Anxiety and Stress Scale Depression Subscale; *DASS-A* Depression Anxiety and Stress Scale Anxiety Subscale; *BEST* Borderline Evaluation of Severity over Time; *AUDIT-C* Alcohol Use Disorders Identification Test-Consumption

*$p > .05$

Results

Preliminary Analysis

Data was first examined for careless or purposeful erroneous responding, such as identical responses to all items of a scale (Godinho et al. 2015). Twenty participants were identified as 'careless responders', and their data was removed from the analysis leaving a total of 286 cases. Clinical cut off scores for each of the five groups of psychopathology were obtained from normative samples to characterise the clinical features of the current sample. These are presented in Fig. 1. Overall, 89.2% of participants exceeded the clinical cut off for at least one disorder, 72.3% of participants for two or more disorders, 51.7% for three and 27.2% for four or more disorders. Only 10.2% of participants did not exceed the clinical cut off for a disorder of interest. Correlations between these five psychopathology groups are presented in Table 1.

Table 2 Fit of models with different numbers of latent classes

Number of classes	AIC	BIC	Entropy	VLMR p value	LMR p value
1	9908.71	10065.9	N/A	N/A	N/A
2	9538.427	9856.50	0.80	0.33	0.33
3	9352.87	9831.80	0.86	0.17	0.17
4	9248.39	9888.19	0.90	0.76	0.76
5	9207.741	10008.4	0.91	0.77	0.77
6	9188.80	10150.33	0.93	0.76	0.77

Class Composition

Table 2 shows the fit statistics for the latent class models estimated. The VLMR and LMR tests were not significant for any of the classes. The AIC value decreased as the number of classes increased and did not reach a low point. However, the BIC value did reach a low point and was lowest for the three-class model which was thus retained for further analysis. It is noted that this model has strong entropy (0.86), suggesting good discrimination between class membership. Based on the pattern of responses across the ER strategies, three profiles of ER were identified: *ruminators/avoiders* ($n = 88$) characterised by heightened use of rumination, avoidance and suppression and low use of adaptive ER strategies, *active regulators* ($n = 76$) characterised by relatively high engagement across all ER strategies, and *low regulators* ($n = 129$), a profile characterised by low use across all ER strategies. Figure 2 provides a schematic representation of the three class model and for convenience, the figure represents the probability that an individual in a particular class endorsed either of the highest two categories for each ER strategy indicator ("quite a bit" or "a lot"). Full results for the ordinal indicators and mean scores for each ER strategy as a function of class are in the supplementary material. Class
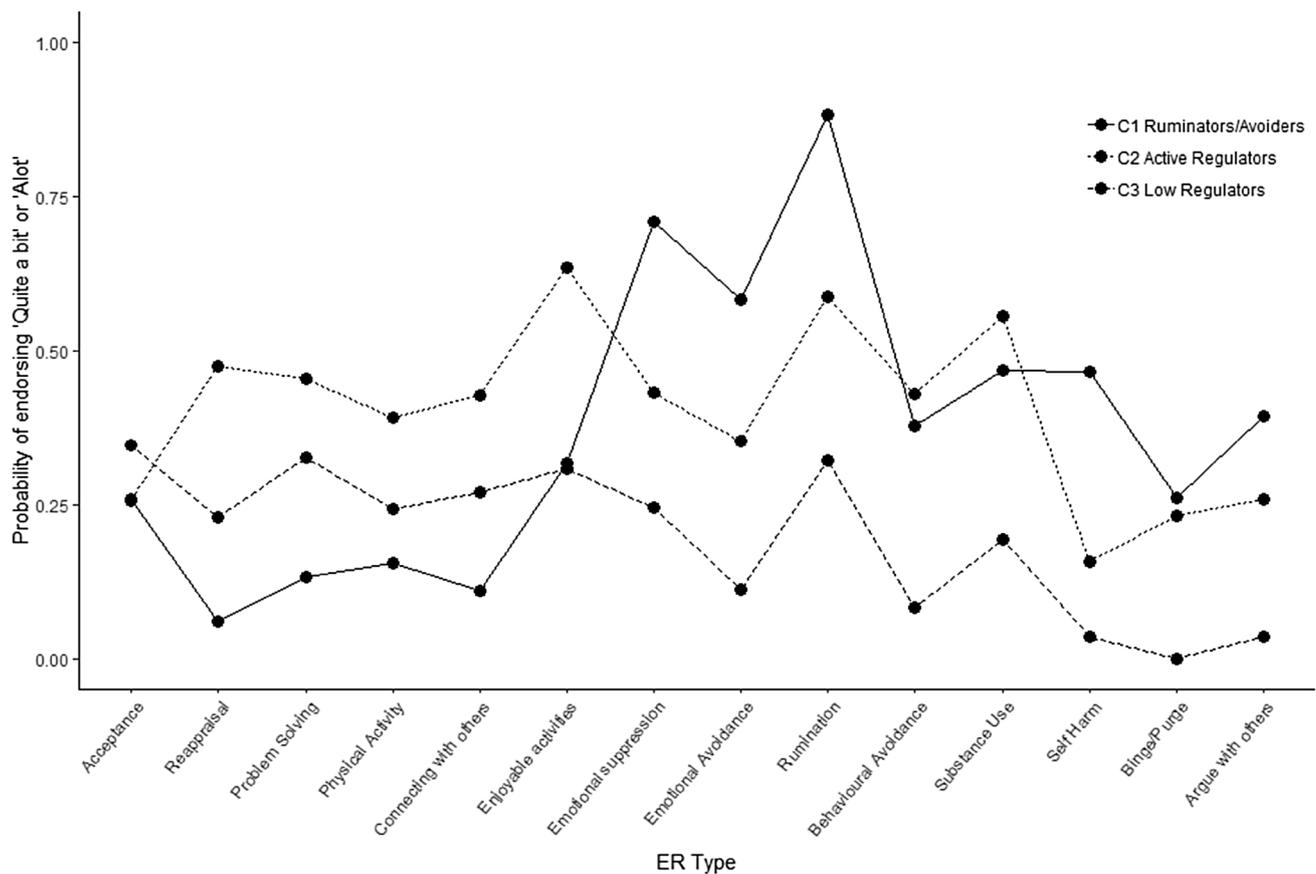
Fig. 2 Class profiles for the 3-class model. The x-axes denote the emotion regulation strategies. The y-axes denote the probability of endorsing high use of each strategy, indicated by selecting either 'quite a bit' or 'a lot'

membership was not associated with age, $F(2) = 1.95$, $p = .14$, or gender, $\chi^2(df = 2) = 0.75$ $p = .69$.

Associations Between Emotion Regulation Class and Psychopathology Symptoms

The linear mixed effect regression controlling for gender and age examined whether there were differences in the mean scores between the classes across the different psychopathology types. Analysis revealed a significant main effect of ER class, $\chi^2(2) = 59.78$, $p < .0001$, a non-significant main effect for psychopathology type, $\chi^2(4) = 1.38$, $p = .85$ and a significant ER Class × Psychopathology type interaction, $\chi^2(8) = 38.45$, $p < .0001$ indicating that classes differed in their psychopathology symptoms, but only for certain psychopathology types. To examine the ER Class × Psychopathology type interaction further, a series of pairwise comparisons were undertaken. For illustrative purposes, Fig. 3 presents the marginal mean scores for the three classes across the five types of psychopathology

(note these are Box-Cox transformed and then z-score standardized data). For convenience, raw scores for the different types of psychopathology as a function of ER class are presented below the figure.
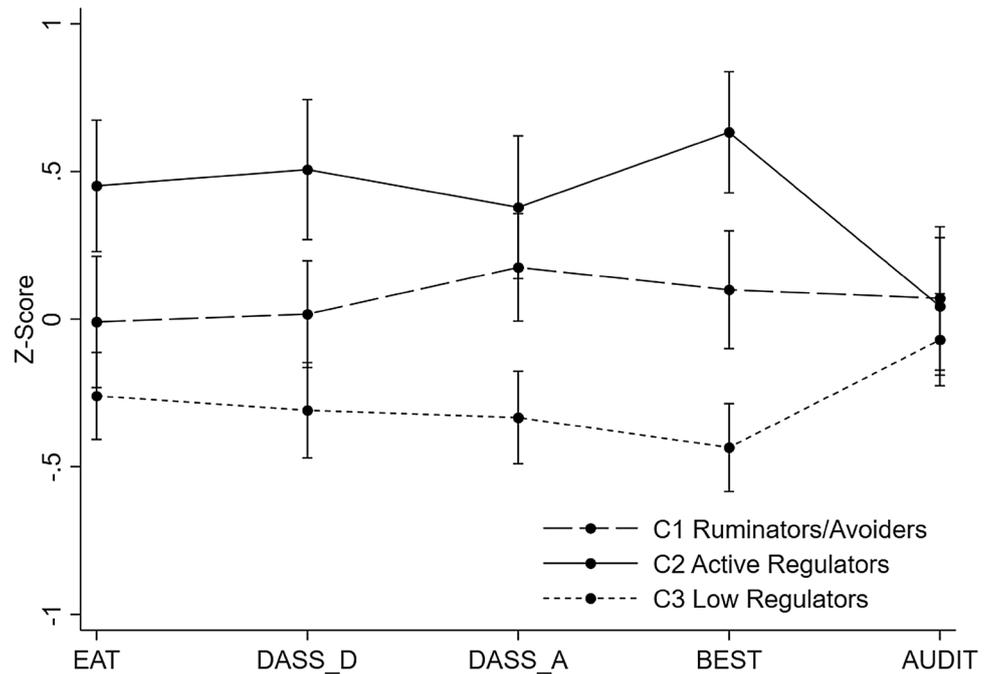
Depression

The *ruminators/avoiders* reported significantly more symptoms of depression than did both the *active p = .001* and the *low regulators p < .001*, while the *active regulators* reported significantly more symptoms of depression than the *low regulators p = .008*.

Anxiety

The *ruminators/avoiders, p < .001* and the *active regulators, p < .001* reported more symptoms of anxiety than the *low regulators*. There was no difference in anxiety between *ruminators/avoiders* and *active regulators, p = .19*.

Fig. 3 Levels of psychopathology across each class. The x-axes denotes the psychopathology measure and the y-axes denotes the severity of symptomatology. Different superscripts indicate statistically significant group differences. *DASS-D* Depression Anxiety and Stress Scale Depression Subscale; *DASS-A* Depression Anxiety and Stress Scale Anxiety Subscale; *EAT-26* Eating Attitudes Test; *BEST* Borderline Evaluation of Severity over Time; *AUDIT-C* Alcohol Use Disorders Identification Test-Consumption; *SDS* Severity of Dependence Scale

Disordered Eating

The *ruminators/avoiders* reported more symptoms of disordered eating than both the *active regulators* $p = .004$ and *low regulators* $p < .0001$, who did not differ, $p = .065$.

Borderline Personality Disorder

The *ruminators/avoiders* reported more symptoms of BPD than the *active regulators* $p < .001$ and *low regulators* ($p < .001$). Furthermore, the *active regulators* reported significantly more symptoms than the *low regulators*, $p < .001$.

Substance Use

There were no differences in alcohol use across the three classes of ER strategy use $p > .05$. A negative binomial regression indicated that there was a significant difference in substance use severity as a function of ER class, $\chi^2(2) = 12.21$, $p = .002$. Pairwise comparisons indicated that the *ruminators/avoiders* ($M_{marginal} = 4.10$, SE = 0.59; $p = .007$) and *active regulators* ($M_{marginal} = 4.32$, SE = 0.51; $p = .001$) engaged in significantly more substance use than individuals in the *low regulators* ($M_{marginal} = 2.39$, SE = 0.32) There was no difference in substance use between the *ruminators/avoiders* and the *active*, $p = .78$.

Discussion

The current study is the first to employ a person centred approach to examine profiles of ER in a sample of vulnerable young service users in order to examine the relationship between these unique ER profiles and psychopathology. The results supported three distinct profiles of ER strategies that young people employed in response to a single recalled emotionally eliciting event experienced when alone. These profiles included the: *ruminators/avoiders*, characterised by heightened use of rumination, avoidance and suppression and low use of adaptive ER strategies; *active regulators* characterised by relatively high engagement across all ER strategies; and *low regulators*, a pattern characterised by low use across all ER strategies. The severity of psychopathology across the five domains (depression, anxiety, disordered eating, BPD and substance use), was significantly different between the three ER profiles, offering a novel empirical perspective on the relationship between unique patterns of ER responding and symptoms of these disorders. Specifically, the *ruminators/avoiders* were generally associated with greater severity in psychopathology symptoms, while the *low regulators* were typically associated with the lower severity. The *active regulators* fell

between these two profiles on psychopathology severity, and were characterised by moderate levels of psychopathology compared to the other two ER profiles, across the five domains. To our knowledge, this is the first study to examine the relationship between patterns of ER and psychopathology in a sample of treatment seeking young people who evidenced high levels of clinical severity across multiple forms of psychopathology (see Fig. 1).

The Ruminators/Avoiders: A Particularly Deleterious Profile of Emotion Regulation

Individuals classified as *ruminators/avoiders* had arguably the most problematic pattern of ER use and associated psychopathology. Not only did this class of young people engage in a pattern of ER characterised by significantly higher levels of rumination, emotional avoidance and suppression when alone and responding to an emotionally eliciting event, but they also had the lowest engagement in adaptive ER strategies (e.g., reappraisal, problem solving, physical activity, connecting with others). These findings are comparable to previous research that has implicated ER profiles characterised by frequent use of these maladaptive strategies as having a higher association with PTSD symptoms (Chesney and Gordon 2017), depression, and NSSI (Burke et al. 2018). Unique to the *ruminators/avoiders* profile in the current study was the heightened use of maladaptive overt strategies, including behavioural avoidance, substance use, self-harm and arguing with others (see Fig. 2). This was the first study to include these strategies in the examination of ER profiles, and these findings suggest the combined effect of these strategies with rumination, suppression and avoidance, have important implications for disordered eating, depression, anxiety, BPD and substance use symptoms.

An additional notable feature of the *ruminators/avoiders* was their heightened engagement in rumination when alone and responding to emotionally arousing triggers, and the associated severity across psychopathology. Indeed, as highlighted in Fig. 2, engagement in rumination is one notable and defining feature in this class with 88% of young people reporting that they utilised this strategy as part of their ER profile. The relationship between rumination and psychopathology evident in this ER profile is consistent with, and supports the growing body of literature that conceptualises rumination as a particularly deleterious transdiagnostic process underpinning depression (Hsu et al. 2015), anxiety (McLaughlin and Nolen-Hoeksema 2011), substance misuse (Willem et al. 2011), disordered eating (Cowdrey and Park 2011), and BPD (Selby et al. 2015).

Active Regulation and Psychopathology

The current study identified a unique class of young people who employed a pattern of ER characterised by elevated engagement across both maladaptive and adaptive ER strategies (*active regulators*). This finding is consistent with previous research that implicates frequent engagement in multiple ER strategies as being associated with elevated psychopathological symptoms in community samples (Chesney and Gordon 2017; Dixon-Gordon et al. 2014; Eftekhari et al. 2009) and across multiple situations (Dixon-Gordon et al. 2014). The frequency and number of regulation strategies implemented in this profile may be a result of the magnitude of distress experienced, which required increased variation and magnitude of regulatory efforts to manage. Alternatively, the diverse range of ER strategies utilised in this ER profile may also reflect a reactive or non-purposeful pattern of regulation in response to an emotionally eliciting event. Although possible, that the elevated psychopathology evident in this cohort may reflect difficulties in synchronising ER strategies with a desired outcome or context, a more detailed investigation of the role of ER across different contexts is required. Future research examining multiple contexts and contextual factors such as situational demands and requirements, one's goals and the goals of others, and personal needs, in relation to ER profiles is warranted (for a review of contextual components of ER see Aldao 2013). This is particularly important in adolescence and young adulthood given that many of the challenges in this developmental period reflect the increasing complexity of social contexts and novel emotional demands.

Low Regulators: The Absence of Maladaptive Emotion Regulation is Protective

The third class of ER responding evident in the present study was characterised by low engagement across all ER strategies (*low regulators*). Engagement in this pattern of ER responding was associated with the lowest level of symptoms across all domains of psychopathology. Furthermore, this ER profile appeared comparable to the "low regulators" class identified in Dixon-Gordon et al. (2014) study of undergraduates. Unique to the present study however, was the markedly low use of maladaptive ER strategies, particularly those conceptualised as overt (e.g. self-harm, binge/purge and arguing with others; see Fig. 2). Indeed, this ER profile was characterised by the lowest use of all maladaptive strategies compared to both the *ruminators/avoiders* and *active regulators*. The relative absence of engagement in maladaptive strategies by individuals endorsing this profile, in combination with their low endorsement of mental health and substance use symptoms, is consistent with prior research implicating the absence of maladaptive ER

as protective in relation to psychopathology (Aldao and Nolen-Hoeksema 2010, 2012b; Aldao et al. 2010). However, future research examining the interactive and transactional influence of maladaptive ER strategies on the selection and implementation of other ER strategies within a profile is needed to further differentiate classes of ER responders based on the absence or presence of maladaptive strategies.

Clinical Implications

Delineating the specific patterns of ER responding associated with mental health disorders in treatment seeking young has the potential to inform more comprehensive and nuanced clinical responses in this population. For example, these findings suggest that young people with the greatest clinical severity across a range of disorders are likely to employ a pattern of ER characterised by high levels of rumination, avoidance and suppression, and low levels of adaptive ER strategies. This information can be used to assist clinicians to develop or select targeted treatments for a young person, based on their specific ER profile. This may represent a particular advantage in youth treatment settings, where the high rates of comorbidity make the selection and provision of disorder specific treatments increasingly difficult.

The findings from this study also affirm the deleterious impact of maladaptive ER strategies (as evident in both the *ruminators/avoiders* and *low regulators)* on psychopathology. Indeed, they may suggest that regardless of the number of strategies that an individual has at their disposal, it is the presence or absence of maladaptive ER strategies that has the greatest impact on severity of psychopathology. Hence, these findings suggest that ER skill development is likely to have a beneficial outcome for young people if it focuses on reducing the reliance on maladaptive ER strategies. To our knowledge, this is the first study to investigate maladaptive overt ER strategies in the examination of ER patterns. The absence of these strategies in the pattern of ER strategies employed by individuals who also had relatively low levels of psychopathology, highlights their significance in the maintenance of psychopathology, and points to the importance of addressing these behaviours conceptualised to serve an ER function in treatment.

Limitations

There were several limitations of the present investigation. Firstly, the use of an online survey may have contributed to the number of participants who responded carelessly and/ or randomly. While data was systematically screened and cleaned to identify and remove careless responders (Godinho et al. 2015), data quality may still have been impacted. A second limitation was the adapted use of Dixon-Gordon et al. (2014)'s ER measure. Though innovative, the measure

is reliant on retrospective self-report and may be compromised by limited recall or socially desirable responding. Furthermore, this retrospective method prevented examination of whether ER strategies were implemented simultaneously or in a sequence. Experience sampling methodology, though burdensome, would allow for a more accurate capture of ER strategy use in real time. The examination of ER in relation to only a single relevant context (on their own) represents an additional limitation that has precluded the examination of whether the selection and implementation of strategies from an individual's ER profile differs across context. With respect to the design, it is acknowledged that the cross-sectional nature of the project impedes inferences about the direction of causal relations between ER strategy use and symptom levels. As such, a cross-lagged regression design or ecological momentary assessment approach may be useful for future studies to ensure that the reciprocal causal relations between ER patterns and symptom levels can be deduced. Additionally, the sample size of 286 in this study also represents a limitation and thus the stability of the classes remain to be confirmed in independent samples. Although as noted in the discussion, our classes were consistent with previous studies. Finally, there was some conceptual overlap between items within the psychopathology measures and the ER strategies which may complicate interpretation of the current findings. For example, some of the symptom measures within the clinical disorders included reference to a specific ER strategy- i.e., "I have the impulse to vomit after foods" in the EAT-26, and the binge/purge ER strategy. We minimised this confound by assessing strategies in relation to a specific context (emotionally eliciting event) and function (i.e., affect regulation). Nonetheless, as highlighted by Aldao and Dixon-Gordon (2014), it is important that future research develops sophisticated methods of assessing the use and function of ER strategies.

Conclusions

This study provides a much-needed extension to the current ER literature by examining the relationship between a broad range of ER strategies and symptoms of anxiety, depression, substance use, disordered eating, and BPD, within a sample of young people seeking treatment in youth mental health, support and advocacy services. Results from this study contribute to a more nuanced and contextualised understanding of the patterns of ER that characterise mental disorders within this population. We found that engaging in a pattern of ER characterised by maladaptive ER strategies (particularly rumination and avoidance), in combination with an absence of adaptive strategies, is particularly deleterious in relation to mental health. Consequently, treatments developed for this population may be most efficacious when targeting these strategies. The examination of the role of

overt ER strategies was a further valuable contribution of this study, with the absence of substance use, binge/purge and arguing with others evident in the *low regulators*, being associated with the fewest symptoms of psychopathology. Such findings underscore the importance of examining a wide range of regulation strategies and symptoms in order to develop a more sophisticated understanding of the ER strategies that individuals utilise, and the relationships that these have with mental health and substance use disorders.

Compliance with Ethical Standards

Conflict of Interest Elise Sloan, Kate Hall, George J. Youssef, Richard Moulding, Helen Mildred and Petra K. Staiger declares that they have no conflict of interest.

Animal Rights This article does not contain any studies with animals performed by any of the authors.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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