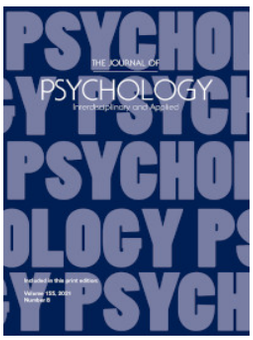
Understanding emotion regulation and humor styles in individuals with Callous-Unemotional traits and Alexithymic traits



The Journal of Psychology
Interdisciplinary and Applied

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/vjrl20

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To cite this article: Alison Chow Young & Melina Nicole Kyranides (2022): Understanding Emotion Regulation and Humor Styles in Individuals with Callous-Unemotional Traits and Alexithymic Traits, The Journal of Psychology, DOI: 10.1080/00223980.2021.2017831

To link to this article: https://doi.org/10.1080/00223980.2021.2017831

Published online: 11 Jan 2022.

THE JOURNAL OF PSYCHOLOGY
https://doi.org/10.1080/00223980.2021.2017831

Understanding Emotion Regulation and Humor Styles in Individuals with Callous-Unemotional Traits and Alexithymic Traits

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ABSTRACT

Alexithymia is a personality trait which is characterized by impairments in identifying and describing emotions. Both psychopathic and alexithymic personality traits have been associated with impairments in emotion processing. This study aims to clarify the conceptual overlap between psychopathic traits (focusing on callous-unemotional traits) and alexithymic traits, with emotion regulation strategies and humor styles using a community sample. A battery of self-report measures was distributed through an online platform to 538 male and female participants between the ages of 18 to 65. Hierarchal linear regression analyses demonstrated that emotion regulation strategies were the strongest predictors and accounted for the largest variance of callous-unemotional traits and alexithymic traits. More specifically, expressive suppression arose as a positive predictor while cognitive reappraisal arose as a negative predictor for both personality traits. Aggressive humor (maladaptive) arose as a positive predictor while self-defeating humor (maladaptive) and affiliative humor (adaptive) arose as negative predictors for callous-unemotional traits. In contrast, self-defeating humor arose as a positive predictor for alexithymic traits while affiliative humor and self-enhancing humor arose as negative predictors. Findings indicate that there are similarities and differences between these personality traits. The implications regarding tailoring interventions that target specific deficits associated with each personality trait are discussed.

ARTICLE HISTORY
Received 1 February 2021
Accepted 3 December 2021

KEYWORDS
Callous-unemotional traits; alexithymia; humor styles; emotion regulation

Callous-Unemotional (CU) traits comprise a temperament dimension characterized by low empathy, interpersonal callousness, restricted affect, and lack of concern for performance (Frick, 2004). CU traits are considered the developmental hallmark of the affective feature of psychopathy and have been associated with more severe and stable antisocial behavior and emotional problems (Fanti et al., 2017; Frick, 2004). As a result, a specifier of limited prosocial emotions has been added to the fifth edition of the diagnostic and statistical manual of mental disorders (DSM-5) for diagnosing conduct disorder in youth (Fanti et al., 2018; Kimonis et al., 2014). CU traits typically emerge in early childhood and affect all aspects of the individual's life including relationships with family, friends, school performance and work in adulthood (Asscher

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et al., 2011), and have been associated with large societal costs (Kiehl & Hoffman, 2011). Psychopathic traits are more prevalent in incarcerated individuals (16%) but are also found in community samples (1-4.5%) (Kiehl & Hoffman, 2011; Sanz-García et al., 2021).

Alexithymia in Greek means "no words for emotions" (Nemiah & Sifneos, 1970). The term is defined by the subclinical inability to identify and express emotions in oneself and others and is associated with an externally oriented thinking style, and limited fantasy (Nemiah & Sifneos, 1970). Alexithymic traits are estimated to be prevalent in up to 9.9% of the general population (Mattila et al., 2007), and have been associated with interpersonal problems as individuals with these traits have difficulty connecting with others (Hamaideh, 2017). Unlike individuals with psychopathic traits, individuals with alexithymic traits do experience distress about these difficulties as alexithymia has been associated with depression, anxiety and low life satisfaction (Hamaideh, 2017; Mattila et al., 2007; Páez et al., 2013).

The two constructs (psychopathic and alexithymic traits) share similar impairments in emotion processing. These include difficulties in describing one's and others' feelings (Jonason & Krause, 2013; Kyranides et al., 2020), diminished ability of emotion regulation (Ridings & Lutz-Zois, 2014), and empathy deficits (Patil & Silani, 2014; Takamatsu & Takai, 2019). However, there are differences between the two constructs. Individuals with psychopathic traits are self-absorbed, disagreeable, and manipulative (Miller & Lynam, 2015), whereas individuals with alexithymic traits are submissive, socially conforming, and rigid (Haviland et al., 2004; Taylor et al., 1997). Although numerous studies have attempted to clarify the conceptual overlap between the two constructs (Cairncross et al., 2013; Jonason & Krause, 2013; Lander et al., 2012), the differences in emotion processing and regulation remain poorly understood. Humor has been theorized to be a form of emotion regulation (Samson & Gross, 2012) and studies investigating the relationship between personality traits and humor styles indicate a positive association between psychopathic traits and aggressive or dark humor (e.g. malicious humor that harms others (Proyer et al., 2012; Veselka et al., 2010)). However, the relationship between alexithymic traits and humor styles is more ambiguous with some studies showing a link with maladaptive humor styles, including not only aggressive but also self-defeating humor (e.g. Atkinson et al., 2015; Páez et al., 2013) and others showing a general impairment in humor appreciation (e.g. Patrikelis et al., 2017, 2019). Considering this, the differences in humor styles and emotion processing between the two constructs remains unclear and needs to be explored further.

Psychopathic and Alexithymic Traits

Most researchers agree that the psychopathy construct has three facets, the interpersonal, affective and behavioral dimensions (Hare, 1999; Sohn et al., 2020; Somma et al., 2018). The interpersonal dimension reflects grandiose, manipulative and domineering characteristics; the affective dimension which is closely related to callous-unemotional (CU) traits, reflects lack of guilt and empathy; and the behavioral dimension reflects impulsivity and irresponsibility (Hare, 1999). CU traits are present in up to 50% of adolescents with conduct disorder symptoms (Blair et al., 2014) and

can be identified in children as early as 4 years old (Dadds et al., 2016). Although some studies report CU traits declining with age (Golmaryami et al., 2021), other studies have shown that CU traits seem to be stable throughout life (Fanti et al., 2017). Additionally, there seem to be gender differences in the level of these traits with men consistently scoring higher than women (Byrd et al., 2013; Kyranides et al., 2020).

"Alexithymia" is a personality construct that includes impaired abilities in expressing and processing emotion (Nemiah & Sifneos, 1970). The current definition of alexithymia includes: (1) difficulty describing feelings (DDF), (2) difficulty identifying feelings (DIF), and (3) externally-oriented thinking style (EOT) (Bagby et al., 1994; Taylor et al., 1997). Nemiah and Sifneos (1970) first identified alexithymic traits in individuals with psychosomatic disorders, many of whom appeared unaware of their feelings and indicated a diminished capacity to verbalize their emotions. Alexithymia has been linked with a wide range of psychological conditions, including depression, somatoform and anxiety disorders, low life satisfaction and low well-being (Hamaideh, 2017; Mattila et al., 2007; Páez et al., 2013). Studies examining the relationship between alexithymic traits and age have yielded inconsistent results with some studies (e.g. Laloyaux et al., 2015) showing an increase of these traits with age, while other studies (Hamaideh, 2017; Moriguchi et al., 2007) reporting a decline. With regard to gender, some studies report no differences (Chung & Chen, 2020; Hamaideh, 2017; Moriguchi et al., 2007), while others report men displaying higher levels of these traits (e.g. O'Loughlin et al., 2018). The prominence of alexithymic traits in men may be a consequence of the traditional gender role socialization process, which discourages men from expressing their emotions and associates masculinity with restricted emotionality (Levant et al., 2009).

Empathy deficits are consistently reported to play a central role in psychopathic and alexithymic traits (Haviland et al., 2004; Jonason & Krause, 2013; Patil & Silani, 2014). Empathy refers to understanding and sharing others' emotional states by first acknowledging one's own emotions (Hooker et al., 2008). A deficit in facial affect recognition has been associated with both constructs (Kafetsios & Hess, 2019; Kyranides et al., 2020). As empathy is essential for social awareness (Jonason & Krause, 2013), this may cause individuals with psychopathic and alexithymic traits to experience interpersonal problems (Cairncross et al., 2013; Golmaryami et al., 2021). Although individuals with psychopathic traits appear able to form relationships, these relationships are typically short-term, self-serving and dominating; while individuals with alexithymic traits tend to be socially avoidant and hostile in their interactions with others (Golmaryami et al., 2021; Haviland et al., 2004; Jordan & Smith, 2017). Furthermore, psychopathic traits and alexithymic traits have been associated with similar causal factors including childhood trauma (Dargis et al., 2016; Grady et al., 2019), and both constructs have been linked with insecure attachment (Kyranides & Neofytou, 2021; O'Loughlin et al., 2018), and emotion regulation difficulties (Kyranides & Neofytou, 2021; Laloyaux et al., 2015; Ozsivadjian et al., 2021).

Emotion Regulation Strategies: Links with Psychopathic and Alexithymic Traits

According to Gross and John (2003), the two main strategies for emotion regulation are (1) cognitive reappraisal, which involves early cognitive intervention before an emotional response is generated; and (2) expressive suppression, which involves a late

response to emotional arousal and inhibits behavioral reactions. The use of reappraisal has been associated with an increase of positive affect, well-being and interpersonal functioning, while suppression has been negatively associated with these constructs (Gross & John, 2003; Páez et al., 2013). Both personality traits have been negatively associated with cognitive reappraisal and positively associated with emotional suppression (Chen et al., 2011; Kyranides et al., 2017; Laloyaux et al., 2015; Páez et al., 2013), which suggests similar deficits in emotion regulation. However, different emotion coping strategies have also been evidenced, as individuals with CU traits tend to externalize emotions, while individuals with alexithymic traits, internalize them (Brown et al., 2016; Kyranides & Neofytou, 2021; Muratori et al., 2017). Only one study to our knowledge has explored the differences in emotion regulation difficulties between psychopathic traits and alexithymic traits (Ridings & Lutz-Zois, 2014). Thus, it is clear that further research investigating the link between the two personality traits is needed to better understand the similarities and differences in emotion regulation difficulties.

Humor Styles: Links with Psychopathic and Alexithymic Traits

The concept of humor as a coping mechanism for regulating emotions dates back to Freud (1928), who suggested that humor may have medicinal effects on negative emotions. Using humor in response to stressful events has been found to improve emotional coping and reduce negative affect (Booth-Butterfield & Wanzer, 2016; Tagalidou et al., 2018), to help form and maintain relationships, and improve intimacy (Treger et al., 2013). However, the use of humor has also been found to have detrimental effects on mental health when used in a maladaptive way (e.g. with the intention to harm others or when negatively directed toward the self (Amjad & Dasti, 2020). Martin (2007) theorized that there are four distinct categories of humor: (1) affiliative (telling jokes for others amusement which tends to facilitate bonding); (2) self-enhancing (maintaining a humorous outlook on life in spite of adversity); (3) aggressive (making jokes at others' expense); (4) self-defeating (putting oneself down to achieve others' approval). The first two are considered adaptive, and have been positively associated with happiness and effective emotion regulation has been evidenced; while the latter are considered maladaptive, as they have been associated with increased vulnerability to various psychopathologies (Amjad & Dasti, 2020; Martin et al., 2003; Samson & Gross, 2012).

A few studies have examined the link between psychopathic traits and humor styles (Martin et al., 2012; Veselka et al., 2010; Zeigler-Hill et al., 2016) and findings indicate that individuals with psychopathic traits primarily use aggressive humor, which has been attributed to their lack of empathy and tendency to manipulate others (Proyer et al., 2012). It seems that individuals with these traits can be "witty and charming" conversationalists when it helps them achieve their goals, but researchers argue that they may not be able to understand the meaning of jokes, which include correctly differentiating "laughing at" from "laughing with" others (Hare, 1999; Proyer et al., 2012). In this respect, it is still unclear whether individuals with alexithymic traits use humor in the same manner. Alexithymic traits have been associated with maladaptive humor styles, but in contrast to individuals with psychopathic traits the deficit in individuals with alexithymic traits appears to be more extensive; as it is not only negatively directed

toward others (aggressive humor) but can also be directed negatively toward the self (self-defeating humor) (Atkinson et al., 2015; Páez et al., 2013; Stieger et al., 2011). Additionally, an overall impairment in appreciation of humor has been evidenced in individuals with alexithymic traits and has been attributed to an empathy deficit (Patrikelis et al., 2017, 2019). However, unlike psychopathic traits, these findings seem to stem from low self-esteem (Sasai et al., 2011). Examining how psychopathic and alexithymic personality traits associate with different humor styles may help better understand the conceptual overlap between these personality traits and also identify the differences.

Current Study

Although previous studies investigating impairments in emotion processing typically used clinical populations with psychopathic and alexithymic traits (Garofalo et al., 2018; Laloyaux et al., 2015; Patrikelis et al., 2017, 2019), both these personality traits exist sub-clinically in individuals within the community with lower levels of these traits (Byrd et al., 2013; Hamaideh, 2017; Li et al., 2015; Thomson et al., 2020). In light of this, the present study aims to investigate these two constructs within a non-clinical sample. Results from this study will help better understand the emotion regulation deficits among individuals with the personality traits in question, the relationship with humor styles, and may aid in the development of specialized treatment for individuals with the respective traits. To our knowledge, the emotion dysregulation in individuals with psychopathic traits and alexithymic traits has not been investigated through the affective dimension of psychopathy (CU traits), nor has it been examined through the dual use of emotion regulation strategies and humor styles. Therefore, the current study aims to examine the association between the two personality traits (CU and alexithymia) and the relationship with emotion regulation strategies (expressive suppression and cognitive reappraisal) and different adaptive (affiliative and self-enhancing) and maladaptive (aggressive and self-defeating) humor styles. Gender and age will also be considered when examining the relationship between these constructs.

It is hypothesized that: 1) men will show elevated levels of CU traits and alexithymic traits compared to women, as traditional gender roles discourage men from expressing their emotions (Levant et al., 2009). 2) There will be a negative association between age, CU traits and alexithymic traits as prior studies show these traits decrease with age (Golmaryami et al., 2021; Moriguchi et al., 2007). 3) CU and alexithymic traits will be correlated due to their conceptual overlap (Cairncross et al., 2013) and individuals with these traits will show similar emotion regulation difficulties. More specifically, individuals with these traits will show greater use of expressive suppression (a maladaptive emotion regulation strategy) and less use of cognitive reappraisal (an adaptive emotion regulation strategy) (Kyranides et al., 2017; Laloyaux et al., 2015). 4) With regard to humor styles, aggressive humor will be specifically positively associated with CU traits, as the literature has established an association between psychopathic traits and aggressive humor (Veselka et al., 2010; Zeigler-Hill et al., 2016) and it might also be associated with alexithymic traits. Based on the profile of individuals with psychopathic traits and due to an inflated sense of self, a positive association may arise with self-enhancing humor and a negative association may emerge with

self-defeating and affiliative humor. In contrast, self-defeating humor is hypothesized to show a positive association with alexithymic traits, as these traits have been associated with internalizing their emotions (Ozsivadjian et al., 2021; Páez et al., 2013) and will also show a negative association with the adaptive humor styles, affiliative and self-enhancing (Atkinson et al., 2015; Páez et al., 2013; Patrikelis et al., 2017).

Methods

Participants

A community sample of 538 participants were collected through the snowball sampling method. The advert regarding the study was advertised on various social media platforms through the research teams' social networks which included members from Madagascar, United Kingdom, Hong Kong, Russia and Turkey. Participants' age ranged from 18 to 65 ($M = 27.91$, SD 9.64) including 367 females (68.2%) and 162 males (35%). Nine participants (1.7%) did not want to reveal their gender and were excluded from further analysis. With regards to education, 18.4% of participants had completed a high school diploma, 3.2% had an Associate's degree or equivalent, 48% had a Bachelor's degree, 28.4% had a Master's degree and 2% had completed a Doctorate. With regards to employment, 5.2% of participants were unemployed, 46.8% were students, 11.2% were working part-time and 36.8% were working full-time. The sample was diverse with regards to gender, age, education and employment status. To take part in the study participants had to be: (1) over the age of 18 and (2) fluent in English.

Measures

Callous-Unemotional Traits

The Inventory for Callous-Unemotional traits (ICU; Frick, 2004) is a 24-item self-report questionnaire designed to assess psychopathic traits through the three dimensions of Callousness (11 items, e.g. *"the feelings of others are unimportant to me"*), Uncaring (8 items, e.g. *"I hide my feelings from others"*) and Unemotional traits (5 items, e.g. *"I do not show my emotions to others"*). Answers are ranked on a 4-point Likert scale from "*0 = Not at all true*" to "*3 = Definitely true*". After reverse coding 12 negatively worded items a total score was computed. The ICU has good reliability and sensitivity as it is able to discriminate between institutionalized and community groups (Kimonis et al., 2014; Kyranides et al., 2016). The internal consistency for the total score in the current sample was .81, which is consistent with what has been reported in other studies (.76-.82) (Dadds et al., 2016; Fanti et al., 2017, 2018).

Alexithymic Traits

The Toronto-Alexithymia Scale-20 (TAS-20; Bagby et al., 1994) is a 20-item questionnaire that assesses alexithymic traits. The TAS-20 includes three sub scales which assess: "Difficulty identifying feelings" (DIF; 7 items e.g. "*I often don't know why I am angry.*"), "Difficulty describing feelings" (DDF; 5 items e.g. "*I am able to describe my feelings easily.*") and "Externally oriented thinking" (EOT; 8 items; "*I prefer to analyze*

problems rather than just describe them.”). Each item is rated on a 5-point Likert scale (1 = *“strongly disagree”;* 5 = *“strongly agree”*). The total score was computed by summing all items together, after reverse coding 5 items. The TAS-20 has demonstrated good reliability and validity (Taylor et al., 1992) and is considered to be the best measure to assess alexithymia (Bagby et al.,1994). The internal consistency in the present study was .87 which is consistent with what is reported in other studies (.78-.82) (Atkinson et al.,2015; Lander et al., 2012; Moriguchi et al., 2007).

Emotion Regulation

The emotion regulation scale (ERQ; Gross & John, 2003) is a 10-item questionnaire that assesses the use of cognitive reappraisal (6 items; *“I control my emotions by changing the way I think about the situation I’m in*”) and expressive suppression (4 items; “*I keep my emotions to myself*”). Items are rated on a 7-point Likert scale (“*1 = strongly disagree*” to “*7 strongly agree*”). The ERQ has demonstrated good internal consistency and temporal stability (Gross & John, 2003). The internal consistency in the present study were .84 for cognitive reappraisal and .80 for suppression, which is congruent with other studies (.73-.86) (Gross & John, 2003; Kyranides et al., 2017).

Humor Styles

The humor styles questionnaire (HSQ; Martin et al., 2003) is a 32-item questionnaire and assesses the four different humor styles each including 8 items: (1) Affiliative: e.g. “*I enjoy making people laugh*”, (2) Self-enhancing: e.g. “*If I am feeling depressed, I can usually cheer myself up with humor*”, (3) Aggressive: e.g. “*If someone makes a mistake, I will often tease them about it*”, (4) Self-defeating: e.g. “*I let people laugh at me or make fun at my expense more than I should*”. Items on the HSQ are rated on a 7-point Likert scale (“*1 = strongly disagree*” to “*7 strongly agree*”). After reverse coding negative items, a total score for each humor style was computed with higher scores suggesting more frequent use of the scales. The HSQ has demonstrated good internal reliability and construct validity (Heintz & Ruch, 2015). The internal consistency in the present study ranged from .72 (aggressive) to .87 (affiliative), which is consistent with other studies (.70-.81) (Atkinson et al., 2015; Veselka et al., 2010).

Procedure

All procedures performed in the study were approved by the University of Edinburgh’s School of Health in Social Science. Data collection was conducted using the Bristol Online Survey (a secure web-based tool that could be accessed from any device according to participants’ preferences). Participants were informed of the research aims and provided consent prior to completing the questionnaires. Then participants provided some demographic information (including age, gender, education status and employment status) and then proceeded to complete a battery of questionnaires which were administered in the same order, to all participants. The study was advertised through online social networks and platforms (e.g. Facebook, Twitter, Instagram, WhatsApp). The total time for completing the questionnaires was around 30 min. Upon submission of their responses, participants were debriefed and thanked for their time.

Plan of Analysis

T-tests were conducted to examine gender differences in CU and alexithymic traits. Bivariate correlations were then conducted to assess associations between the main study variables (CU and alexithymic traits), emotion regulation strategies, humor styles and age (as preliminary studies demonstrated correlations between age and the main study variables). Finally, two hierarchical linear regression models were tested. The first model tested CU traits while the second tested alexithymic traits as the outcome variables. In the hierarchical linear regression models, the predictor variables were entered in the same way, to be consistent: Step 1 included demographic variables: gender and age. Step 2 included emotion regulation strategies: cognitive reappraisal and expressive suppression. Step 3 included humor styles: affiliative, self-enhancing, aggressive, and self-defeating humor.

Results

T-Tests – Gender Differences

Gender comparisons revealed differences between male and female participants in CU ratings $t(527) = 7.93$, $p < .001$ with males reporting higher levels ($M = 23.58$; $SD = 8.28$) compared to females ($M = 17.69$; $SD = 7.69$). CU traits reported in this study were similar to other studies using community samples (Byrd et al., 2013; Kyranides et al., 2020). However the difference in alexithymic traits between male and female participants were not significant $t(527) = .35$, $p = .73$, suggesting that women reported similar ratings ($M = 45.92$; $SD = 13.10$) to men ($M = 46.34$; $SD = 12.65$). The ratings of alexithymic traits reported in the current study are in the range of those reported in other studies using community samples (Moriguchi et al., 2007).

Correlational Analysis

CU traits and alexithymic traits positively correlated to each other ($r = .46$, $p<.001$), which may be due to the conceptual overlap between the two constructs (Table 1). Age was negatively correlated with alexithymic traits ($r = -.18$, $p<.001$) but not with CU traits. Both CU traits and alexithymic traits were positively associated with suppression ($r = .51$, $p<.001$ and $r = .46$, $p<.001$, respectively), and negatively associated

Table 1. Descriptive Statistics and Correlations for Study Variables.

	M	*SD*	α	1	2	3	4	5	6	7	8	9
1. Callous-Unemotional traits	19.44	8.34	.81	–								
2. Alexithymic traits	46.13	13.15	.87	.46**	–							
3. Age	27.91	9.64		-.06	-.18**	–						
4. Cognitive Reappraisal	28.75	6.92	.84	-.10*	-.17**	.10*	–					
5. Expressive Suppression	13.79	5.47	.80	.51**	.46**	-.15**	.06	–				
6. Affiliative Humor	44.22	8.85	.87	-.21**	-.18**	-.08	.16**	-.15**	–			
7. Self-Enhancing Humor	35.36	9.22	.81	-.06	-.18**	.08	.40**	-.01	.44**	–		
8. Aggressive Humor	28.14	8.31	.72	.31**	.10**	-.04	-.08	.08	.14**	.18**	–	
9. Self-Defeating Humor	30.33	9.95	.83	.09*	.33**	-.12**	-.07	.26**	.15**	.18**	.34**	–

Note. *M* = Mean; *SD* = Standard Deviation; α = Cronbach's alpha.
*$p < .05$. **$p < .001$.

with cognitive reappraisal *(r = −.10, p<.05* and *r = −.17, p<.001*, respectively*)*. With regard to humor styles both CU and alexithymic traits demonstrated significantly negative correlations with, affiliative humor *(r = −.21, p<.001* and *r = −.18, p<.001*, respectively*)*, and positive correlations with aggressive humor *(r = .31, p<.001* and *r = .10, p<.001*, respectively*)* and self-defeating humor *(r = .09, p<.05* and *r = .33, p<.001*, respectively*)*. Self-enhancing humor was significantly negatively correlated to alexithymic traits *(r = −.18, p<.001)* but not CU traits (*p*>.05).

Regression Analyses

To examine which variable(s) will have the largest impact on CU and alexithymic traits, hierarchical regression analysis were conducted to assess the unique contribution of the predictors, separately for each personality trait. Age and gender which were entered in step 1 accounted for a significant 10% of variance in CU traits, $F(2, 525) = 31.69$, $p < .001$ and accounted for 3% of variance of alexithymic traits $F(2, 525) = 7.32$, $p < .01$ (Table 2). The second model which included the emotion regulation strategies of suppression and reappraisal accounted for 32% of variance in CU traits $F(4, 525) = 62.20$, $p < .001$ and 26% for alexithymic traits $F(4, 525) = 46{,}80$, $p < .001$. From this overall variance, emotion regulation strategies explained 22% for CU traits and 24% for alexithymic traits. This additional variance was significant for both CU traits *F Change* $(2, 521) = 82.80$, $p < .001$ and alexithymic traits *F Change* $(2, 521) = 83.95$, $p < .001$. Finally when the humor style variables were added in step 3, the overall amount of explained variance in CU traits reached 42% $F(8, 525) = 47.03$, $p < .001$ and 34% for Alexithymic traits $F(8, 525) = 32.19$, $p < .001$. From this variance, the humor styles variables accounted for 10% of the variance of CU traits which was significant, *F Change* $(4, 517) = 13.21$, $p < .001$ and 7% of the variance of alexithymic traits which was also significant, *F Change* $(4, 517) = 13.21$, $p < .001$. Following from the above, emotion regulation strategies explained the largest variance of CU traits and alexithymic traits.

Examination of main effects for each variable in the final models (Table 2), revealed that age emerged as a negative predictor for alexithymic traits but not for CU traits, suggesting that as participants became older, they display less alexithymic traits. Gender arose as a significant predictor for both CU traits and alexithymic traits, but results suggest that males were more likely to show elevated CU traits while females were

Table 2. Hierarchical Regression Analysis.

	Callous Unemotional Traits						Alexithymic Traits					
	Model 1		Model 2		Model 3		Model 1		Model 2		Model 3	
Variable	*β*	ΔR^2	*β*	ΔR^2	*β*	ΔR^2	*β*	ΔR^2	*β*	ΔR^2	*β*	ΔR^2
		.10**		.22**		.10**		.03*		.24**		.07**
Age	-.06		.02		.00		-.17**		-.08*		-.07*	
Gender[a]	-.32**		-.21**		-.15**		-.01		.11*		.12*	
Cognitive Reappraisal			-.16**		-.13*				-.22**		-.13*	
Expressive Suppression			.47**		.45**				.47**		.39**	
Affiliative Humor					-.20**						-.13*	
Self-Enhancing Humor					.04						-.13*	
Aggressive Humor					.29**						.07	
Self-Defeating Humor					-.14**						.21**	

Note. *β* = Standardized Beta Coefficient, ΔR^2 = adjusted R^2, [a]Gender Coded as Male = 1 and Female = 2;.
*$p<.05$; **$p<.001$.

more likely to show elevated alexithymic traits. With regard to emotion regulation strategies, expressive suppression was a positive predictor (β = .45, p < .001 and β = .39, p < .001, respectively), while cognitive reappraisal was a negative predictor (β = −.13, p < .05 and β = −.13, p < .05 respectively) for both CU and alexithymic personality traits. With regard to humor, affiliative humor which is an adaptive humor style arose as a negative predictor for both CU and alexithymic personality traits (β = −.20, p < .001 and β = −.13, p < .05, respectively). Self-enhancing humor was a negative predictor for alexithymic traits (β = −.13, p < .001) but not for CU traits. Aggressive humor was a positive predictor for CU traits (β = .29, p < .001), but not for alexithymic traits. Finally self-defeating humor was a negative predictor for CU traits (β = −.14, p < .001) but a positive predictor for alexithymic traits (β = .21, p < .001). Overall results show similar associations between the two personality traits and emotion regulation strategies but differences in associations with humor styles.

Discussion

The present study contributes to the literature focused on understanding how individuals with different personality traits (psychopathic and alexithymic) use different emotion regulation strategies (reappraisal and suppression), and how these personality traits relate to different humor styles (adaptive and maladaptive). Findings specifically advance past work by clarifying how individuals with the respective traits use humor as a form of emotion regulation (Cairncross et al., 2013; Jordan & Smith, 2017) outlining similarities and differences between the two. Our work is consistent with previous work showing that both personality traits have been linked with emotion regulation difficulties (Kyranides & Neofytou, 2021; Laloyaux et al., 2015; Páez et al., 2013), which explains the poor interpersonal functioning found in individuals with either of these personality traits (Golmaryami et al., 2021; Holder et al., 2015). More specifically, the current findings show that individuals with high levels of the respective traits showed increased use of expressive suppression and less use of cognitive reappraisal (Chen et al., 2011; Kyranides et al., 2017; Laloyaux et al., 2015; Páez et al., 2013). CU traits and alexithymic traits were positively correlated (Cairncross et al., 2013) which suggest that the respective personality traits share a conceptual overlap tapping into the similarities found (emotion regulation difficulties, empathy deficits), but fundamentally measure different constructs (Lander et al., 2012) as differences were also found when examining the interaction with adaptive and maladaptive humor.

There were also notable differences between the two personality traits in relation to the demographic variables explored. Men reported higher levels of CU traits compared to women (Golmaryami et al., 2021), but no differences were identified with regards to alexithymic traits. This is partially aligned with our hypothesis as previous studies have found men to display higher levels of both personality traits (Byrd et al., 2013; Levant et al., 2009; O'Loughlin et al., 2018). The lack of gender differences found in relation to alexithymic traits in the current study might be attributed to the age of the sample, as the study that reported gender differences was older (O'Loughlin et al., 2018). Furthermore the findings of the current study seem to be aligned with others (Chung & Chen, 2020; Hamaideh, 2017; Moriguchi et al., 2007). Age was not

a predictor for CU traits, which may be because CU traits are considered stable traits (Fanti et al., 2017; Kyranides et al., 2016), and the sample used in this study included a wider age range of participants. In the case of alexithymic traits, age was a negative predictor which suggests that older participants were less likely to display these traits (Moriguchi et al., 2007).

Emotion Regulation Strategies and Links with Callous Unemotional Traits and Alexithymic Traits

The present study's findings are similar to other studies investigating CU traits and alexithymic traits and their relationship with emotion regulation strategies. The respective traits have both been reported to be positively associated with expressive suppression and negatively associated with cognitive reappraisal (Kyranides et al., 2017; Laloyaux et al., 2015; Páez et al., 2013). Effective emotion regulation involves the ability to identify and attend to physiological changes in response to emotionally arousing stimuli (Craig, 2015). Impairments in detecting and interpreting these bodily changes, or interoceptive awareness, may therefore interfere with the appropriate use of emotion regulation strategies (Price & Hooven, 2018). This is based on key theories of emotion, whereby physiological changes are inherently linked with affective experiences (e.g. Schachter & Singer, 1962). Studies assessing physiological reactivity (including heart rate, startle reactivity) in individuals with psychopathic traits demonstrate that they display restricted reactivity compared to controls (Kyranides et al., 2016, 2017), and this also seems to be the case for individuals with alexithymic traits (Constantinou et al., 2014). This suggests that individuals with these personality traits have learned to suppress their physiological reactions. In light of this, targeting improvements in interoceptive awareness (increasing awareness of physiological reactions and links with emotions), may therefore enhance their ability to engage in more appropriate emotion regulation strategies. This may reduce incidences of antisocial outbursts for individuals with CU traits (Asscher et al., 2011) and violent outbursts for individuals with alexithymic traits (Taylor & Bagby, 2000). Additionally, as somatization of symptoms present in individuals with alexithymic traits are argued to be the expression of psychological distress (Raffagnato et al., 2020), specifically targeting improvements in interoceptive awareness may therefore help them use adaptive emotion regulation strategies to reduce negative emotional experiences and somatising symptoms. Although the use of mindfulness awareness in body orientated therapy has been demonstrated to improve interoceptive awareness in a community sample (Price & Hooven, 2018), future studies may focus on investigating the efficacy of this approach to improve emotion regulation strategies in individuals with psychopathic traits and alexithymic personality traits more specifically.

Humor Styles and Links with Callous Unemotional Traits and Alexithymic Traits

Unsurprisingly, individuals with either CU traits or alexithymic traits used less affiliative humor (amusing other by making jokes) which has been found to help initiate

and maintain social support networks that foster and enhance wellbeing (Amjad & Dasti, 2020; Kuiper & McHale, 2009; Páez et al., 2013; Treger et al., 2013). Self-enhancing humor (finding amusement in the incongruities and absurdities of life to cope with stress and negative events) arose as a negative predictor for alexithymic traits but not CU traits. This indicates that individuals with alexithymic traits use comparatively less self-enhancing humor. Overall, these findings suggest that both personality traits were associated with deficits in using adaptive humor (Atkinson et al., 2015; Veselka et al., 2010) reporting less use of affiliative humor, but only low self-enhancing humor was associated with alexithymic traits. This suggests that the individuals with alexithymic traits showed more pronounced deficits in using adaptive humor (both affiliative and self-enhancing humor).

Although both personality traits were associated with maladaptive humor styles, aggressive humor was a positive predictor for CU traits but not alexithymic traits, suggesting that individuals with high psychopathic traits manipulate or minimize others by teasing and ridiculing them, findings which are aligned with prior work (Martin et al., 2012; Páez et al., 2013). Interestingly self-defeating humor arose as a predictor for both personality traits but findings suggest individuals with CU traits use this less while individuals with alexithymic traits use it more frequently. This suggests that individuals with high alexithymic traits amuse others by excessively using self-disparaging comments (Páez et al., 2013), but this is less likely to happen in individuals with high psychopathic traits. The differences in the use of maladaptive humor styles highlight the underlying processes of emotion regulation between the respective constructs – as aggressive humor regulates negative emotions toward others and self-defeating humor regulates negative emotions toward oneself (Martin et al., 2003). Therefore, it seems that individuals with CU traits use predominantly aggressive humor to achieve their goals (Proyer et al., 2012), because they have learned to externalize their emotions (Muratori et al., 2017). In contrast, individuals with alexithymic traits do not seem to use humor maliciously, instead, they respond by directing negative emotions internally (Ozsivadjian et al., 2021) which may explain the associations with low self-esteem and wellbeing (Páez et al., 2013; Stieger et al., 2011). These findings provide further empirical support to explain why individuals with psychopathic and alexithymic traits show poor psychosocial functioning, including difficulties in peer, family relationships (Essau et al., 2006; Jordan & Smith, 2017; Kafetsios & Hess, 2019) and romantic relationships (Golmaryami et al., 2021; Holder et al., 2015). To our knowledge, the present study remains the only one to assess the relationship between psychopathic and alexithymic personality traits using humor styles. Findings demonstrate unique differences in how individuals with these personality traits regulate their emotions using humor.

Typically, individuals with psychopathic traits do not seek treatment as they neither acknowledge nor accept that they have a problem and tend to blame others instead (Kyranides & Neofytou, 2021). In contrast, individuals with alexithymic traits are more likely to seek treatment due to the distress they experience as evident by the comorbidity with other psychopathologies (Hamaideh, 2017; Mattila et al., 2007; Páez et al., 2013). Although interventions delivered early in childhood produce more promising results for individuals with psychopathic traits (Kyranides et al., 2017), these personality traits are considered hard to treat as the individual becomes older, with some studies

suggesting that they become stable over time (Fanti et al., 2017) and more resistant to change. Similar to psychopathic traits, alexithymic traits have been associated with poor treatment outcomes, which may be attributed to difficulties in identifying feelings (Cameron et al., 2014). In spite of some studies reporting improvements in emotion labeling through mindfulness related exercises (Edwards et al., 2018), other studies show no improvements and suggest that a more interactive intervention approach may be necessary (Aaron et al., 2020). As adaptive humor (e.g. affiliative, self-enhancing) is associated with improved interpersonal functioning (Martin et al., 2003), incorporating adaptive humor in interventions may help improve interpersonal functioning and better manage alexithymic and CU traits.

The use of humor in therapy has been advocated by the Interdisciplinary American Association as it has been demonstrated to improve self-understanding, build rapport between the therapist and client, as well as enhance emotional connectedness (Bedi et al., 2005). Although humor can be used as an effective interpersonal tool to improve human social interactions, the current findings suggest that different interventions should be implemented for individuals with either CU or alexithymic traits and tailored to their needs. In view of positive associations between affiliative humor and empathy (Hampes, 2010), interventions which incorporate affiliative humor would be beneficial for either individuals with psychopathic or alexithymic traits, addressing empathetic deficits. Self-enhancing humor, may be particularly beneficial for individuals with alexithymic traits as it introduces a positive perspective that may aid in acceptance of negative emotions during stressful life events (Ramírez-Maestre et al., 2020). Although the co-occurrence of psychopathic traits and alexithymic traits has been reported (Lander et al., 2012), treatment incorporating self-enhancing humor for individuals high in CU traits should be used with caution, as this may perpetuate irresponsible behavior due to their grandiose sense of self (Frick, 2004). Previous studies which have incorporated adaptive humor have reported promising results in reducing state anxiety (Ford et al., 2017), lowering stress levels and improving mental health outcomes (Tagalidou et al., 2018). Although to date, no study has implemented a humor training program taking into account the different styles of humor (e.g. affiliative, self-enhancing, aggressive, self-defeating) and personality traits, the findings of Tagalidou et al. (2018) provide hope that positive outcomes found in community samples can be extended to individuals with the respective personality traits.

Furthermore, discouraging the use of maladaptive humor may improve social functioning in individuals with these personality traits, as these humor styles seem to affect social functioning and wellbeing (Kuiper & McHale, 2009; Páez et al., 2013). The current study shows that individuals with these personality traits, use maladaptive humor differently and this needs to be taken into account. Therapists and coaches often use the client–therapist relationship to help the individual learn new skills by providing feedback in the context of the therapeutic relationship. These skills may then be extended and used with other people in their social network, while receiving support and ongoing feedback regarding their progress. Aggressive humor should be especially discouraged in individuals with psychopathic traits. The use of self-defeating humor would not be beneficial for individuals with alexithymic traits, therefore they should be discouraged from using it, to reduce the development of maladaptive social

support networks which impede well-being (Kuiper & McHale, 2009). However, this does not seem to be an issue for individuals with psychopathic traits. Although Martens (2004) suggested that humor may be used to induce self-reflection in individuals with CU traits, to our knowledge no study has tested this by incorporating self-defeating humor for individuals with CU traits. All things considered; it is clear that further research is necessary to evaluate the efficacy of such an approach. Future research should be aware of the potential risks of using humor in therapy or a skill building training program, such as offending, re-traumatising or blurring client and patient boundaries. Factors such as the client's personality, gender, and mood should also be considered (Hussong & Micucci, 2021).

Limitations

The primary limitation of the current study was the exclusive use of self-report questionnaires. Considering dishonesty is regarded as one of the primary characteristics of individuals with psychopathic traits, and limited personal insight is associated with individuals with alexithymic traits; future research may benefit from including a physiological measure to assess emotional arousal (e.g. Kyranides et al., 2016, 2017) as well as self-report measures. It should be noted however that the study was conducted anonymously (no identifiable information was collected) so participants had no reason to be dishonest. Additionally, as the emotion regulation questionnaire (ERQ) only provides a general assessment of emotion regulation strategies (suppression and reappraisal), subsequent studies may use a self-report that assesses additional emotion regulation strategies (Kyranides & Neofytou, 2021). This would further clarify the relationship between emotion regulation, humor styles and personality traits. Additionally, the use of a clinical sample would further support the validity of these findings, by determining if these findings can be extended to individuals with higher levels of these personality traits. CU traits and alexithymic traits reported in this study were similar to other studies using community samples but were not as high as those reported in clinical samples (Byrd et al., 2013; Kyranides et al., 2020; Moriguchi et al., 2007). However, the external validity of this study remains high due to the use of a non-clinical sample, the wide age range of participants (18-65), and high internal consistency of the measures used. To date, this is the only study that investigates both CU traits and alexithymic traits in relation to emotion regulation strategies and humor styles.

Conclusion

The primary aim of this study was to investigate the relationship of CU traits and alexithymic traits with respect to humor styles to clarify their differences in impairments of emotion processing. Both constructs were positively associated with suppression and negatively associated with reappraisal, suggesting that these emotion regulation strategies are impaired in individuals with high levels of either personality traits. Affiliative humor was negatively associated with both personality traits, but self-enhancing humor was negatively associated with alexithymic traits, not CU traits. This is

congruent with the fact that CU traits are associated with a grandiose sense of self, and alexithymic traits have been associated with low self-esteem. Further differences in the use of maladaptive humor, suggest that individuals with CU traits use aggressive humor (externalised approach), while individuals with alexithymic traits use self-defeating humor (internalised approach). Interventions that address social functioning difficulties for individuals with either personality traits may incorporate adaptive emotion regulation strategies and use of affiliative humor, which may improve emotion connectedness and discourage maladaptive strategies (e.g. suppression, use of aggressive humor in individuals with CU traits; and reduce use of self-defeating humor in individuals with alexithymic traits). Future research is necessary to test the efficacy of emotion regulation training and the use of humor as a tool to improve social functioning in individuals with psychopathic and alexithymic traits.

Notes on contributors

Alison Chow Young is a postgraduate of the psychology of mental health from the University of Edinburgh. She is currently working as a social worker for homeless individuals struggling with drug addiction, and has research interests in personality traits, emotional coping, and substance abuse.

Dr. Melina Nicole Kyranides is a Career Development Fellow at the University of Edinburgh. She has applied Clinical experience as well as experience is the following fields: Developmental Psychopathology, Experimental Psychology, and Neuro-psychophysiology.

Ethical Approval

All procedures performed in the study involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent

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

Conflicts of Interest

The authors declare that they have no conflict of interest.

Funding

The author(s) reported there is no funding associated with the work featured in this article.

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