

Is it the Taste or the Buzz? Alexithymia, Caffeine, and Emotional Eating

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Published in:
Substance Use and Misuse

DOI:
[10.1080/10826084.2018.1524490](https://doi.org/10.1080/10826084.2018.1524490)

Published: 21/03/2019

Document Version:
Peer reviewed version

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Recommended citation(APA):
Lyvers, M., Brown, T., & Thorberg, F. A. (2019). Is it the Taste or the Buzz? Alexithymia, Caffeine, and Emotional Eating. *Substance Use and Misuse*, 54(4), 572-582. <https://doi.org/10.1080/10826084.2018.1524490>

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Is it the Taste or the Buzz? Alexithymia, Caffeine, and Emotional Eating

Abstract

Alexithymia, a relatively stable personality trait characterized by difficulties identifying and describing feelings and externally oriented thinking, has been linked to substance use disorders and eating disorders. In nonclinical samples, higher alexithymia is associated with heavier consumption of alcohol and caffeine. Both are psychoactive drugs, but unlike most drugs they are typically consumed in the context of palatable and calorie-rich products. Given the high prevalence of alexithymia in eating disorders, the present study evaluated the hypothesis that heavier consumption of caffeine by those who are highly alexithymic is primarily motivated by the palatable and caloric aspects of common caffeine products rather than drug-seeking. There were 224 university participants who completed instruments assessing demographics, alexithymia, emotional eating, caffeine consumption, alcohol consumption, negative moods, and reward sensitivity. Alexithymia was positively associated with emotional eating as well as consumption of caffeine and alcohol, and was a significant predictor in regression models. There was no support for mediation by emotional eating. Alexithymia is characterized by deficient emotion regulation and negative moods, hence use of drugs and/or foods to regulate emotions, combined with poor interoceptive awareness, may account for excessive consumption of drugs and/or foods by those with high levels of this trait.

Alexithymia is a personality trait characterized by persistent difficulties with identifying and describing feelings and an externally oriented thinking style (Nemiah, Freyberger, & Sifneos, 1976). High levels of alexithymia have been reported in approximately 10-13% of the general population (Franz et al., 2008; Mattila, Salimen, Nummi, & Joukamaa, 2006), with a prevalence of 30-40% or more in clinical samples of clients undergoing treatment for substance use disorders (Cruise & Becerra, 2018; Lyvers, Hinton, Edwards & Thorberg, 2015; Thorberg, Young, Sullivan & Lyvers, 2009). High levels of alexithymia have also been linked to a variety of other psychological disorders including depression (Li, Zhang, Guo, & Zhang, 2015), anxiety (Berthoz, Consoll, Perez-Diaz, & Jouvent, 1999; De Gucht, Fischler, & Heiser, 2004; de Timary, Luts, Hers & Luminet, Filee, 2008; Devine, Stewart, & Watt, 1999; Stewart Zvolensky, & Eifert, 2002; Tutkun, Savas, Zoroglu, Esgi, Herken, & Tiryaki, 2004), obsessive-compulsive disorder (Roh, Kim, & Kim, 2011), schizophrenia (O'Driscoll, Laing, & Mason, 2014), autism spectrum disorder (Berthoz & Hill, 2005), post-traumatic stress disorder (Frewen, Dozois, Neufeld, & Lanius, 2008), and – relevant to the present study - eating disorders (Gramaglia et al., 2016).

Recent research on substance use in non-clinical samples of young adults indicated that alexithymia was positively associated with risky drinking (Lyvers, Lysychka & Thorberg, 2014b) and risky cannabis use (Lyvers, Jamieson & Thorberg, 2013), but not cigarette smoking (Lyvers, Bremner, Edwards & Thorberg, 2018). In the case of the most widely used and accepted psychoactive drug in the world – caffeine - university students with high levels of alexithymia were found to regularly consume nearly twice as much caffeine as those with low or no alexithymia (Lyvers, Duric & Thorberg, 2014a). The basis of the alexithymia-caffeine relationship is unknown, as potential influences of frontal lobe dysfunction, impulsivity, reward sensitivity, and alcohol use on the relationship were all ruled out. A follow-up study indicated mediating influences of caffeine-related expectancies and caffeine craving on the alexithymia-caffeine relationship (Lyvers, Stafford, Edwards & Thorberg, 2017). The authors noted that, given the association of alexithymia with eating disorders, a craving for caffeine might conceivably reflect craving for palatable, calorie-rich

caffeine products rather than the drug per se. Coffee, tea, and chocolate are regarded as highly palatable by most consumers, and high levels of alexithymia are prevalent among those suffering from eating disorders (Pinna, Sanna, & Carpiniello, 2015; Quinton & Wagner, 2005; Taylor, 2000). As alexithymia is characterized by deficits in the ability to self-regulate emotions via cognitive processes (Stasiewicz et al., 2012), and often associated with negative moods such as anxiety and depression (Honkalampi, Hintikka, Laukkanen, & Viinamaki, 2001; Thorberg et al., 2009), highly alexithymic individuals may be especially prone to engage in concrete physical actions such as binge eating to regulate physiological arousal and undifferentiated dysphoric moods (O'Connell, 2002). The current study thus examined whether the tendency to engage in distress-induced or emotional eating (van Strien & Ouwens, 2007) might mediate the relationship between alexithymia and caffeine consumption, as opposed to assuming that the latter is simply stimulant drug use.

Recent evidence suggests that emotion regulation difficulties are prevalent across the entire spectrum of disordered eating behaviors (Harrison, Sullivan, Tchanturia, & Treasure, 2010). Effective emotion regulation requires the ability to observe and attend to emotions as they arise (Gratz & Roemer, 2004; Thompson & Calkins, 1996). Interoceptive awareness refers to the ability to identify internal states including emotions as well as hunger and satiety cues (Sim & Zeman, 2004) and is deficient in alexithymia (Brewer, Cook & Bird, 2016). Bruch (1962) was among the first to note an inability to clearly identify internal states in eating disorder patients. Termed interoceptive confusion, Bruch highlighted a disconnect in awareness of the interactions between physiological sensations, affective experiences, and cognitive appraisals. Since the seminal work of Bruch, researchers have emphasized the importance of interoceptive awareness as a risk factor for disordered eating. For example, poor interoceptive awareness was reported to predict continued disordered eating and explained the greatest amount of variance in eating disorder symptoms over time (Leon et al., 1995). Similar to alexithymia, disordered eating appears to be marked by cognitive and affective deficits that inhibit one's ability to attend to, accurately perceive, effectively interpret, and use information as to what is going on in their bodies. The pattern of negative affect

being ameliorated following disordered eating behavior has been frequently described (Lyubomisky, Dickerhoof, Boehm & Sheldon, 2011; Overton et al., 2005; Sim & Zeman, 2004). Binge eating thus likely reflects an affect regulation strategy deployed in the absence of more adaptive emotion regulation skills; that is, when an emotion is experienced as aversive and/or intolerable, individuals who lack adaptive and effective strategies to modulate emotions may resort to binge eating (Spoor, Bekker, Van Strien, & van Heck, 2007). Given the ubiquitous nature of alexithymia in mood and anxiety disorders and its association with deficits in both interoceptive awareness and emotion regulation, the tendency of highly alexithymic individuals to excessively consume palatable caffeine products may thus reflect their tendency to emotionally binge eat, rather than (or perhaps in addition to) seeking stimulant drug effects from caffeine.

Although caffeine is commonly ingested to improve alertness and counteract fatigue (Childs & De Wit, 2006; Van Duinen, Lorist, & Zijdewind, 2005), some consumers – even those who consume as little as 100 mg/day – may experience anxiety or other adverse drug effects of caffeine (Evans & Griffith, 1992; Lara, 2010; Lieberman, Wurtman, Emde, Roberts, & Covielle, 1987; Penolazzi, Natale, Leone, & Russo, 2012). High trait anxious individuals may thus learn to consume only low doses or even avoid caffeine entirely (Smith, 2002; Telch, Silverman, & Schmidt, 1996). As alexithymia has been consistently associated with elevated levels of trait anxiety and anxiety sensitivity, Lyvers, Duric and Thorberg (2014a) initially reasoned that highly alexithymic individuals might exhibit only low levels of caffeine consumption to avoid the drug's anxiogenic effects. However, results paradoxically showed that not only was alexithymia a positive predictor of caffeine consumption, but also that scores on an index of trait anxiety were significantly positively related to both caffeine consumption and alexithymia, indicating that many high trait anxious individuals were consuming caffeine at high levels despite the drug's anxiogenic effects. This apparent paradox could be interpreted as strengthening the hypothesis that the alexithymia-caffeine relationship reflects consumption of caffeine products for their palatable and caloric qualities more than for stimulant drug effects.

Research on personality traits associated with risky drinking or drug use supports the role of sensitivity to reward (SR) in promoting use of substances with primary rewarding or euphorogenic properties such as alcohol (Loxton & Dawe, 2001) and cocaine (Balconi, Finocchiaro & Campanella, 2014). Gray's (1982) theory of motivation posits distinct Behavioral Approach and Behavioral Inhibition systems mediated through different brain pathways. SR reflects the activity of the Behavioral Approach system (mesolimbic dopamine reward pathway) and refers to the tendency to be motivated by the prospect of primary rewards such as food, sex, and euphorogenic drugs. Thus although SR is known to be positively associated with use of certain drugs that have been demonstrated to have primary rewarding properties (unlike caffeine; e.g., Bradley, Sanders, Williams, & Palmatier, 2017), SR is perhaps unsurprisingly also positively associated with disordered eating (Eneva et al., 2017). Food, of course, is a basic primary reinforcer. In the present study's assessment of traits associated with emotional eating, SR was thus included as a predictor in the regression model along with alexithymia.

The present study assessed alexithymia in relation to caffeine consumption and emotional eating in a nonclinical university student sample. Other variables that were previously shown to be related to caffeine consumption and/or emotional eating, including demographic factors, alcohol use, and negative mood, were also assessed. Based on the evidence and arguments discussed earlier, alexithymia was expected to show positive relationships with both caffeine consumption and emotional eating. Most importantly, the hypothesis that emotional eating would mediate the relationship between alexithymia and caffeine consumption was assessed. Finally, predictors of emotional eating were examined in a regression model.

Method

Participants

The current study recruited prospective participants from two universities in southeast Queensland, Australia. Notices describing the study were posted electronically via campus websites and campus email, specifying inclusion criteria and incentives. To participate in the study,

participants had to be at least occasional consumers of caffeine products. Those who had previously sustained a serious head injury were excluded, as traumatic brain injury is linked to poor emotional awareness and higher rates of alexithymia (Williams & Wood, 2010). Those currently taking neurological or psychiatric medications were also excluded. After detection and removal of those who did not meet inclusion criteria, and six multivariate outliers identified via Mahalanobis distance ($p < .001$), the final sample consisted of 224 participants (184 females, 40 males) ranging in age from 17 to 63 years ($M = 27.17$, $SD = 9.56$).

Materials

Demographics Questionnaire. Participants were asked to specify their age and ethnicity with open responses, whereas closed questions were used to identify participants' gender, highest level of education, current occupational status, and whether or not they regularly consumed caffeine products. Participants also indicated whether they were currently taking medication for a psychiatric or neurological condition, and if they had ever suffered a serious brain injury, to which dichotomous "Yes-No" response options were provided.

Toronto Alexithymia Scale-20 (TAS-20; Bagby, Parker, & Taylor, 1994). The TAS- 20 is a 20-item self-report measure of the key facets of alexithymia, difficulty identifying feelings (DIF; e.g., "I am often confused about what emotion I am feeling"), difficulty describing feelings (DDF; e.g., "I find it hard to describe how I feel about people"), and externally-oriented thinking (EOT; e.g., "I prefer talking to people about their daily activities rather than their feelings"). Respondents rate their agreement with each statement on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). A total score ranging from 20 to 100 is obtained by summing all items. Scores greater than 61 indicate high alexithymia, scores less than 51 indicate low or no alexithymia, and scores in between suggest borderline high alexithymia (Bagby, Taylor & Parker, 1994). The psychometric properties of this measure have been well established by the test developers and others (Bagby, Parker & Taylor, 1994; Bagby, Taylor, Quilty & Parker, 2007;

Thorberg et al., 2010). The TAS-20 demonstrated good internal consistency in the current study with a Cronbach alpha coefficient of .87.

Depression Anxiety Stress Scales (DASS-21; Lovibond & Lovibond, 1995). The DASS-21 is a 21-item self-report measure consisting of seven items for each negative mood domain: depression (DASS-D; e.g., “I felt I had nothing to look forward to), anxiety (DASS-A; e.g., “I felt scared without any good reason”), and stress (DASS-S; e.g., “I found it hard to wind down”). The severity of each emotional state experienced in the past week, as perceived by the respondent, is assessed via 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*). Higher scores indicate higher levels of depression, anxiety or stress symptomatology. Reliability and validity of the DASS-21 has been supported in both clinical and non-clinical samples (e.g., Antony, Bieling, Cox, Enns, & Swinson, 1998; Brown, Chorpita, Korotitsch, & Barlow, 1997). In the current study the Cronbach alpha coefficients were .92, .84, and .88 for the Depression, Anxiety, and Stress subscales respectively. The three scales can be summed to provide an overall index of negative mood.

Sensitivity to Punishment and Sensitivity to Reward Questionnaire (SPSRQ; Torrubia et al., 2001). The SPSRQ is a 48-item self-report measure assessing the two behavioral domains of Gray’s (1982) reinforcement sensitivity theory, sensitivity to reward (SR) and sensitivity to punishment (SP). The two scales of SR (e.g., “Do you often do things to be praised?”) and SP (e.g., “Are you often afraid of new or unexpected situations?”) are each comprised of 24 items to which respondents provide a dichotomous response of either 1 (*yes*) or 0 (*no*). Total scores for SR or SP ranging from 0 to 24 are obtained by summing affirmative responses, with higher scores indicating higher sensitivity to the respective domain. Validity and reliability have been firmly established (O’Connor et al., 2004; Torrubia et al., 2001). In the current study, the Cronbach alpha coefficients were .86 and .76 for SP and SR respectively.

Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993). The AUDIT is a 10-item measure that assesses alcohol consumption

(items 1 to 3; e.g., “How often do you have a drink containing alcohol?”), alcohol dependence symptoms (items 4 to 6; e.g., “How often during the last year have you found that you were not able to stop drinking once you started?”), and alcohol-related harm (items 7 to 10; e.g., “How often during the last year have you had a feeling of guilt or remorse after drinking?”). Items are scored using a five-point Likert scale with various responses, ranging from 0 (*never*) to 4 (*4 or more times a week*) for Item 1, 0 (*1 or 2*) to 4 (*10 or more*) for Item 2, and 0 (*never*) to 4 (*Daily or almost daily*) for Items 3 to 10. Total scores are calculated by summing responses and can range from 0 to 40. Scores below 8 indicate low alcohol-related risk, scores of 8 to 15 indicate hazardous drinking, and scores of 16 and higher indicate harmful drinking. Psychometric properties of the AUDIT are well-established (Selin, 2003). The AUDIT yielded good internal consistency in the current study as evidenced by a Cronbach alpha of .82.

Dutch Eating Behavior Questionnaire – Emotional Eating Subscale (DEBQ- EE; van Strien, Fritjers, Bergers, & Defares, 1986). The DEBQ-EE is a 13-item subscale of the DEBQ that specifically measures emotional eating behaviors. Respondents are asked to rate the extent to which each statement (e.g., “Do you have a desire to eat when you are emotionally upset?”) applies to them on a five-point Likert scale ranging from 0 (*Never*) to 4 (*Very often*). Total mean scores are obtained by summing responses and dividing by 13, and thus range from 1 to 5 with higher scores indicating higher levels of emotional eating. The excellent psychometric properties of this subscale were supported by the authors in samples that were classified as obese and non-obese. The DEBQ-EE displayed excellent internal consistency in the current study as demonstrated by a Cronbach alpha of .94.

Caffeine Consumption Questionnaire (CCQ; Landrum, 1992). The CCQ contains a list of products of varying caffeine concentrations, including caffeinated drinks (e.g., coffee, tea, energy drinks) and over-the-counter drugs (e.g., No-Doz). Participants were required to specify the average amount of caffeine (in mg) that they consume on average each day from a variety of listed caffeine sources. Information on the average unit (in mg) is provided for each product. A total score on the

amount of caffeine consumed each day (in mg) is obtained by summing the recorded totals for each of the caffeinated products for which use is indicated.

Procedure

Prior to data collection, ethical approval was obtained from the human research ethics committees of both universities. Questionnaires were completed online via the survey hosting website Qualtrics. Participants were first presented with an explanatory statement describing the study as an investigation of relationships between personality traits, eating habits, and use of caffeine and alcohol. The statement indicated that the study would take approximately 30 minutes to complete. Participants were informed that participation was voluntary and that they could withdraw at any point without penalty, and were assured of the anonymity of all responses. After reading the explanatory statement participants indicated their consent by ticking “yes” to the question “Do you consent to participate in the study?” Participants then proceeded through the online questionnaire battery. All measures following the demographic questions were separated into blocks and uniquely randomized to minimize order and fatigue effects. The titles of each measure were omitted to reduce response bias. Following completion of the questionnaire battery, participants were required to email a screen shot of the final page to the researchers to either obtain partial credit for a first-year psychology subject or to be entered into the draw to win one of four gift cards valued at \$25.

Results

Of the final sample of 224 participants, 39 (17%) were highly alexithymic according to TAS-20 cut-off score. Chi square test indicated no association of alexithymia status with gender, $p = .17$. Men and women did not differ on their DEBQ-EE emotional eating scores in this sample, $p = .73$. Pearson bivariate correlations and means and standard deviations of continuous measures are shown in Table 1. As expected, the DEBQ-EE index of emotional eating was significantly positively correlated with the CCQ index of caffeine consumption, the AUDIT index of risky drinking, the SPSRQ-SR index of reward sensitivity, DASS-21 Anxiety and total negative mood

scores, and the TAS-20 index of alexithymia. Caffeine consumption was also significantly positively correlated with age, education, alcohol use and alexithymia. Risky drinking was also significantly positively correlated with reward sensitivity and alexithymia. Both reward and punishment sensitivity indices of the SPSRQ were significantly positively correlated with the DASS-21 indices of negative mood.

To test the hypothesis that the positive relationship between alexithymia and caffeine consumption was mediated by emotional eating – reflecting the palatable and caloric aspect of caffeine products rather than the drug aspect – the simple Steps Approach of Baron and Kenny (1986) was used. Demographic variables of age, gender and education were entered as control variables in step 1 of each regression. To meet Baron and Kenny's criteria for mediation, the first regression showed that after controlling for demographic variables, TAS-20 alexithymia scores predicted the CCQ index of caffeine consumption, $F_{change}(1, 219) = 31.03, p < .0001$. The second regression indicated that after again controlling for demographic variables, alexithymia predicted the presumed mediator, emotional eating, $F_{change}(1, 219) = 10.29, p = .002$. A hierarchical regression was then conducted with demographic variables at step 1, alexithymia at step 2 and emotional eating at step 3. Step 1 was significant with gender and education predicting caffeine consumption, $F(3, 220) = 5.67, p = .001$, accounting for 7.2% of variance. Entry of alexithymia at step 2 explained an additional 11.5% of variance, $F_{change}(1, 219) = 31.03, p < .0001$. Entry of the presumed mediator emotional eating at step 3 accounted for only an additional 1.5% of variance, which was marginally significant, $F_{change}(1, 218) = 4.07, p = .045$. Alexithymia remained highly significant at step 3 (see Table 2), and Sobel test (Sobel, 1982) was nonsignificant, $z = 1.71, p = .09$. Thus no support for mediation was indicated.

Although not a primary rationale for the current study, similar to the hypothesis tested above regarding caffeine, an argument could be made that, as alcoholic beverages are often pleasantly flavored and high in calories, perhaps the association of risky drinking with alexithymia reflects a tendency to engage in disordered eating as opposed to use of alcoholic beverages for sedative drug

effects. Given that AUDIT data were collected from the sample, the same mediation analysis as conducted above for the alexithymia-caffeine relationship was conducted for the alexithymia-alcohol relationship. Emotional eating did not contribute to prediction of risky drinking after controlling for the other variables, thus there was no evidence of mediation.

A final mediation analysis was undertaken to test the reverse of the first mediation hypothesis, i.e., to see if the association between emotional eating and caffeine consumption was mediated by alexithymia. After controlling for demographic variables at step 1, DEBQ-EE scores predicted CCQ caffeine consumption, $F_{change}(1, 219) = 8.97, p = .003$. The second regression indicated that demographic variables explained 5% of variance in the presumed mediator TAS-20 alexithymia scores, $F(3, 220) = 3.65, p = .01$, with gender the only significant predictor. At step 2, emotional eating accounted for an additional 4% of variance in alexithymia, $F_{change}(1, 219) = 10.29, p = .002$. A hierarchical regression was then conducted on caffeine consumption, with demographic variables at step 1, emotional eating at step 2 and alexithymia at step 3. Step 1 was significant as before with gender and education significant predictors of caffeine use, $F(3, 220) = 5.67, p = .001$, accounting for 7.2% of variance. Entry of emotional eating at step 2 explained an additional 4% of variance, $F_{change}(1, 219) = 8.97, p = .003$. Entry of the presumed mediator alexithymia at step 3 explained an additional 9.4% of variance, $F_{change}(1, 218) = 25.55, p < .0001$. Education, gender, emotional eating and alexithymia were significant predictors in the final model, with alexithymia the strongest predictor (see Table 3). Sobel test was significant, $z = 2.71, p = .007$, supporting partial mediation of the relationship between emotional eating and caffeine consumption by alexithymia.

A hierarchical regression was conducted to assess predictors of emotional eating. Demographic variables were entered at step 1, followed by the SPSRQ indices of reward sensitivity (SR) and punishment sensitivity (SP) at step 2, TAS-20 alexithymia at step 3, and the negative mood index of total DASS-21 at the final step (based on the theoretical assumption that negative mood is a proximate driver of emotional eating, or eating to regulate mood). At step 1, demographic

variables of age, gender and education accounted for less than 1% of variance and were not significant, $p = .76$. Addition of SR and SP at step 2 accounted for an additional 2.2% of variance but this was not significant, $p = .09$. At step 3 the addition of alexithymia explained another 5% of variance and was significant, $F_{change}(1, 217) = 11.10, p = .001$. In the final step, adding the negative mood index to the model explained less than 1% of additional variance and was nonsignificant, $p = .22$; however the overall model remained significant, $F(7, 216) = 2.73, p = .01$, accounting for 8% of variance in emotional eating. Alexithymia and reward sensitivity were the only significant predictors in the final model (see Table 4).

Discussion

The results of the present study were consistent with expectations. After controlling for the impacts of other relevant variables, alexithymia remained a significant positive predictor of both caffeine use and emotional eating, or eating in response to negative affect as an emotion regulation strategy. The alexithymia-caffeine relationship showed no evidence of mediation by emotional eating, and thus appears to reflect use of caffeine primarily as a stimulant drug rather than simply for the palatable and caloric aspects of common caffeine products. Indeed, a recent study (Burgalassi et al., 2009) found that eating disorder patients reported using caffeine products for drug reasons such as improved vigilance and attention. A similar outcome was evident for the alexithymia-alcohol relationship in the present study, that is, there was no evidence of mediation by emotional eating. Thus present results are consistent with the hypothesis that the positive associations of alexithymia - a relatively stable personality trait (Thorberg et al., 2016) - with heavier use of caffeine and alcohol primarily reflect drug use rather than being motivated by the palatability or caloric content of commonly consumed forms (e.g., cappuccinos, wine). Further, the ability of emotional eating to predict caffeine consumption showed evidence of mediation by alexithymia, suggesting that alexithymia is a trait that predisposes to both emotional eating and heavier use of caffeine – presumably reflecting alternative externalized emotion regulation strategies (drugs vs. food) in those with deficient emotional self-regulation abilities, in line with

those who drink alcohol to cope with negative emotions (e.g., Bruce, Curren, & Williams, 2012; Lyvers, Hasking, Albrecht & Thorberg, 2012). Finally, in a hierarchical regression model, alexithymia and reward sensitivity (SR) were the only significant predictors of emotional eating after the impacts of all other variables were controlled.

As food is a basic primary reinforcer, the positive association of SR with an index of disordered eating was not surprising and is consistent with previous work (e.g., Eneva et al., 2017). The role of alexithymia in disordered eating is less obvious. Alexithymia has been interpreted as a general deficit of interoception (Brewer et al., 2016), thus insensitivity to satiety cues is one plausible mechanism (though a general deficit of interoception should also logically extend to hunger cues as well). On the other hand, emotional eating involves using food to regulate negative affect (Sim & Zeman, 2004; Spoor et al., 2007); negative affective states are common in alexithymia (Thorberg et al., 2016); and evidence indicates that deficits in emotion regulation characterize both alexithymia (Lyvers, Kohlsdorf, Edwards & Thorberg, 2017) and eating disorders (Harrison et al., 2010). Emotional eating may thus represent a maladaptive emotion regulation strategy in alexithymia. Of course, insensitivity to satiety cues and use of food to regulate affect are not mutually exclusive interpretations of the relationship between alexithymia and disordered eating. Similar considerations may apply to the well-established relationships of alexithymia to risky substance use and alcohol or other substance use disorders (Cruise & Becerra, 2018; Lyvers, Hinton et al., 2014; Thorberg et al., 2009) – that is, both poor interoception and a reliance on drugs to regulate mood may contribute to the excessive or problematic substance use associated with high alexithymia.

The current findings have relevance for clinical practice. Given that those with high alexithymia tend to lack emotional and cognitive insight and instead focus on external factors and action, a behavioral approach to therapy is likely to be beneficial when working with such clients. Such an approach may help to create and integrate links between behaviors and cognitions related to expressing emotions that, over time, may assist with internalizing emotion regulation skills. This

appears to be very important given that alexithymia is a predictor of both emotional eating and elevated caffeine consumption as well as being a mediator of the association between the latter.

The present study used a cross-sectional design and recruited a mostly young adult university sample. Such a sample is obviously not representative of the general population, hence the external validity of the study was correspondingly limited. The use of a cross-sectional design does not allow conclusions regarding causation, however, the present study was not intended to show causation, but rather to tease out relationships among variables to illuminate theory. Future research investigations of the issues investigated here are advised to use more representative samples, prospective designs and include specific measures of emotion regulation such as the Negative Mood Regulation Expectancies Scale (Catanzaro & Mearns, 1990) to see if emotion regulation difficulties mediate the links of alexithymia with both disordered eating and use of drugs such as caffeine and alcohol, consistent with theory.

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