Understanding the Interplay of Alexithymia, Emotion Regulation, and Emotion-Avoidant Behaviours: A Study of Young Adults Engaging in Self-Damaging Behaviours

by

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Bachelor of Arts (Honours Specialization), University of Western Ontario, 2019

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Abstract

Alexithymia, characterized by difficulties in identifying, describing, and attuning to internal emotional experiences, is consistently linked with emotion dysregulation and maladaptive behaviours such as non-suicidal self-injury (NSSI) and disordered eating (DE). While previous research has examined the relationship between alexithymia and emotion regulation (ER) abilities or strategies separately, few studies have integrated both to understand their combined influence on maladaptive behaviours. The present study aims to validate and extend existing findings by investigating the direct relationship between alexithymia and specific ER abilities and strategies in young adults oversampled for engagement in NSSI and DE. Additionally, it seeks to explore whether NSSI and DE function as maladaptive ER strategies and whether deficits in ER abilities mediate the relationship between alexithymia and maladaptive behaviours. Participants (N = 193, aged 17-30 years, 61.1% female) from a larger self-monitoring study on self-damaging behaviours completed self-reported assessments of alexithymia, ER abilities, ER strategies, lifetime NSSI frequency, and DE symptom severity. Correlation comparisons and confirmatory factor analysis (CFA) revealed significant overlaps in Deficits in Emotional Knowledge (DEK) measured by the Toronto Alexithymia Scale (TAS-20) and the Difficulties in Emotional Regulation Scale (DERS) measures, suggesting construct redundancy. A simplified measurement model of DEK was used to predict maladaptive outcomes through parallel mediation models specifying deficits in four ER abilities: impulse control, mobilization of goal-directed behaviours, access to ER strategies, and acceptance of emotions. The relationship between DEK and lifetime NSSI frequency was collectively mediated by the four ER ability deficits. Similarly, models predicting DE symptom severity and cognitive reappraisal revealed a total indirect effect through all four ER ability mediators. However, difficulties mobilizing goal-directed behaviours negatively mediated the relationship between DEK and DE symptom severity, suggesting a need to examine the orientation of goals among individuals engaging in DE. Consistent with previous research, a lack of access to adaptive ER strategies negatively mediated the relationship between DEK and cognitive reappraisal. Finally, only the mediation model for expressive suppression exhibited a direct effect of DEK, and impulsivity negatively mediated the relationship between DEK and expressive suppression, highlighting a potential difference in mechanisms driving the selection response-focused ER strategies. Findings from the present study support previous evidence of the potential affective regulation function of maladaptive behaviours, such as NSSI and DE. By elucidating the relationship between DEK, ER abilities, and the selection of ER strategies, targeted intervention can be better designed to help support individuals who frequently engage in maladaptive behaviours to regulate aversive emotional experiences.

Keywords: Alexithymia, Emotion Regulation, Emotion Dysregulation, NSSI, Disordered Eating

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Understanding the Interplay of Alexithymia, Emotion Regulation, and Emotion-Avoidant Behaviours: A Study of Young Adults Engaging in Self-Damaging Behaviours

Emotions serve an adaptive function in that they provide information to help us understand and respond to our environment. They play a vital role in guiding our behaviours in interacting with our environment and informing our understanding of the world, the context in which we exist, and our goals and values (Baumeister et al., 2007). Emotions also contextualize situational demands, and sometimes, we must modify our emotional reactions in both intensity and duration in a process called Emotion Regulation (ER) to ideally guide actions in line with our goals and values to meet these demands (Cole et al., 1994; Thompson, 1994). According to Gross's (2015) Extended Process Model of ER, ER unfolds over four stages: 1) *identification* (identifying the opportunity to regulate and deciding whether to regulate emotions); 2) *selection* (choosing the ER strategy to implement); 3) *implementation* (employment of strategy based on situation); and 4) *monitoring* (monitoring effect of regulation strategy to decide whether to continue, stop, or switch strategies). According to this model, successful regulation requires the mobilization of Emotional Knowledge, which comprises abilities to: 1) understand and recognize emotions in oneself and others, 2) accurately label emotions, and 3) understand the attributable causes and context of emotional experiences (Luminet & Zamariola, 2018). Together, the interpretation of emotional knowledge and process of emotion regulation are considered the two consecutive steps in the cognitive processing of emotions (Izard et al., 2011).

For some, emotional experiences tend to be well-defined and differentiated, forming vibrant and distinct representations across situations. Meanwhile, for others, representations of emotional experiences can be murky and confusing, leaving only dichotomous differentiation between pleasant or unpleasant experiences (Barrett et al., 2001). These individual differences

have implications for how a person understands and responds to their environment. In other words, the task of using our feelings to help inform actions and decisions in response to the current situation can become much more difficult when there is a lack of precise emotional information, which can sometimes lead us to act against our best interests. Over time, it can contribute to the presence of emotion dysregulation, which is characterized by the formation of maladaptive patterns of ER that interfere with goal-directed activities (Thompson et al., 1994).

In the 1970s, the concept of alexithymia, meaning "no word for mood," was introduced to describe an inability to recognize and express one's own emotions (Bagby et al., 1994; Sifneos, 1973). Alexithymia is characterized by: 1) difficulties identifying and distinguishing feelings and bodily sensations associated with emotional arousal; 2) difficulty describing feelings to other people; and 3) possessing an externally oriented thinking style, meaning a greater attendance to external events rather than internal experiences (Veirman et al., 2021). Considering that emotions play a fundamental role in interpreting situational demands and influencing value-driven behaviours, a lack of understanding of emotional nuances can lead to difficulties in interpreting and effectively responding to these demands. Moreover, it can complicate the task of effectively managing emotions themselves. Research investigating the influence of alexithymia on emotion regulation has predominantly followed two distinct theoretical approaches. One approach focuses on emotion-regulating *abilities*, which encompass skills and competencies that enable the functional use of emotions in the process of emotion regulation (Gratz & Roemer, 2003). Studies have consistently demonstrated that alexithymia is positively associated with deficits in various emotion regulation abilities, such as emotional clarity, impulse control, and access to emotion regulation strategies (Brown et al., 2018; Linn et al., 2021; Garofalo et al., 2018; Venta et al., 2013). The other approach emphasizes emotion regulation *strategies*,

referring to the specific techniques and approaches used to regulate or modify emotions (Gross, 2015). Research following this perspective indicates that alexithymia is positively associated with maladaptive emotion regulation strategies (Preece et al., 2023; Laloyaux et al., 2015), such as expressive suppression. These strategies are often associated with poorer psychosocial outcomes, including reduced life satisfaction, low self-esteem, and a lack of close social relationships (Cutuli, 2014). Consistent with this perspective, both alexithymia and problems in emotion regulation are linked to maladaptive behaviours such as non-suicidal self-injury (NSSI), defined as an engagement in deliberate self-injurious behaviours such as cutting, burning, and hitting without the intention of killing oneself (American Psychiatric Association, 2022; Nock, 2009), and disordered eating (DE) which refers to disordered relationships with food, exercise, and one's body that is characterized by a wide range of irregular eating behaviours that are either overly controlled or under-controlled, and which compromise one's ability to meet nutritional and physiological needs (Aldao et al., 2010; Hasking & Claes, 2020; Wolff et al., 2019). These dysregulated behaviours have been theorized to function as maladaptive ER strategies aimed at avoiding aversive emotional experiences and self-awareness (Heatherton & Baumeister, 1991; Klonsky & Glenn, 2009; Linn et al., 2021). While these behaviours may temporarily alleviate negative affect, they often result in long-term functional impairments (Daukantaitė et al., 2021; Kärkkäinen et al., 2018).

Considering the challenges in recognizing and expressing emotions associated with alexithymia, the consistent selection of maladaptive ER strategies to avoid aversive emotional experiences may be attributed to a lack of sophisticated understanding of one's thoughts and emotions. By contrast, the use of adaptive ER strategies, such as cognitive reappraisal, requires effective cultivation and functional use of emotional knowledge, which is likely challenging for

individuals high in alexithymia. It is evident that difficulties related to alexithymia can contribute to a cascade of negative outcomes impacting emotion regulation and potentially driving engagement in maladaptive behaviours. The combined role of emotion regulation abilities and strategies, however, has seldom been studied despite the fact that they are inextricably linked to one another (Gratz et al., 2018) and to both alexithymia and maladaptive behaviours. Therefore, there is a need for research to address how alexithymia influences one's ability to effectively utilize emotions and the subsequent selection of strategies to regulate emotions.

Alexithymia and the Emotion-Regulating Process

Assuming that all emotions serve important functional purposes, determining whether an emotional response requires regulation and how one chooses to regulate it will depend on the context in which the emotional experience is embedded (Cole et al., 1994). However, this process involves the mobilization of emotional knowledge, which is often impoverished among individuals with Alexithymia (Luminet & Zamariola, 2018). Recent developments in alexithymia research proposed that alexithymia may occur due to both an avoidance of emotional information and a deficit in the ability to attend to emotional information (Preece et al., 2017), which can contribute to disruptions in emotional processing due to difficulties in building and mobilizing emotional knowledge to modulate emotions effectively. Previous studies found that alexithymia, particularly DIF, impaired the neurocognitive processing of negative emotions associated with a lack of attendance to emotional experiences (Van Der Velde et al., 2013). Since ER is a context-dependent process, attention to emotional information will be crucial to deciding whether an emotion requires regulation, the direction of regulation, and whether a specific strategy should be continued or switched out for a more effective one (Aldao & Tull, 2015).

Often, bodily sensations serve as an important cue to attend to emotional information in response to our situational context. Betka and colleagues (2018) suggested that alexithymia, particularly difficulty identifying feelings (DIF), mediated the relationship between subjective sensitivity to bodily sensations and alcohol consumption. The authors also found that alexithymia is associated with heightened subjective sensitivity to bodily sensations. However, it is essential to distinguish between the ability to detect bodily sensations associated with emotional arousal and the ability to interpret them. Along with DIF, the difficulty describing feelings (DDF) component of alexithymia was also found to be associated with challenges in accurately interpreting internal bodily sensations, known as interoceptive accuracy (Herbert et al., 2011; Shah et al., 2016). Therefore, individuals with greater levels of alexithymia are more likely to experience challenges recognizing and understanding emotional experiences due to inaccurate interpretations of internal physiological cues that tend to accompany emotional arousal. Vaguely differentiated emotions, particularly in the negative spectrum, can be conflated with nonspecific unpleasant sensations of physiological arousal in people with alexithymia, resulting in general senses of unpleasantness such as agitation or restlessness (Betka et al., 2018; Mueller & Alpers, 2006). Therefore, alexithymia is unlikely to disrupt the identification stage of ER during aversive emotional events, as individuals with alexithymia seem to be aware of sensations associated with distress. However, higher levels of alexithymia can disturb the selection of adaptive ER strategies suited to one's needs, as clarity of emotional information and its associated context plays a vital role in determining whether a specific ER strategy will be effective (Sheppes et al., 2015). Habitual selection of maladaptive ER strategies due to impairments in one's ability to discern nuanced emotional states associated with alexithymia can

lead to cascading disruptions in the subsequent implementation and monitoring stages of the ER process.

Alexithymia and Emotion Regulation Abilities

Considering that the evaluation and skilled response to specific emotions can determine the trajectory of emotional experiences, alexithymia can hinder the development of various skills necessary for effective ER. Therefore, the ability to effectively regulate emotions is contingent on one's awareness, understanding, and interpretation of nuances in feelings and physiological sensations related to distinct emotional experiences (da Silva et al., 2017). With this understanding, Gratz and Roemer (2003) sought to develop a conceptualization of ER beyond just the modulation of emotional arousal. The multidimensional model of emotion regulation highlights six core domains of emotion-regulating abilities: 1) Emotional Awareness, which reflects one's tendency to attend to and acknowledge emotions; 2) Emotional Clarity, reflecting the extent to which an individual knows and is clear about the emotions they are experiencing; 3) Emotional Acceptance, which denotes an ability to experience emotions without judgement or need to change them; 4) Impulse Control, indicating an ability to resist the drive to perform emotion-congruent but ineffective actions, especially in the face of distressing emotions; 5) having access to adaptive Emotion Regulating Strategies; and 6) engagement in Goal-directed Behaviours that also meets situational demands (Gratz & Roemer, 2003). The six domains, therefore, capture skills that facilitate the functional use of emotional information in alignment with one's values and goals necessary for adaptive ER. This model of ER extends beyond simply managing or diminishing the intensity or frequency of emotional states by acknowledging the importance of emotional knowledge alongside the modulation of emotional arousal in the process of ER. Adaptive ER also includes the ability to monitor and evaluate emotions and to

effectively use emotional information, regardless of its nature or quality, to suit the situational context and guide behaviour (Cole et al., 1994; Thompson, 1994).

In a study comparing participants categorized as high scorers (upper 25%) and low scorers (lower 25%) of alexithymia across measures of ER difficulties and various mental health outcomes, alexithymia was found to be linked to deficits in five of the six specific ER ability domains, namely emotional acceptance, emotional clarity, impulse control, access to ER strategies, and engagement in goal-directed behaviours (Pandey et al., 2011). Although the authors did not find a significant difference in emotional awareness between high and low scorers of alexithymia, they found that the DIF dimension of alexithymia cross-loaded onto the component representing ER abilities and that the emotional awareness dimension of ER abilities cross-loaded onto the component representing alexithymia in a principal component analysis. This finding suggests a potential construct overlap between aspects of alexithymia and ER abilities that appear to measure emotional knowledge, necessitating further examination of content similarity and possible redundancy between these two constructs when exploring the predictive relationship between alexithymia and ER abilities.

Deficits in various ER abilities appear to play an important role in the association between alexithymia and poor mental health outcomes. Alexithymia was found to be indirectly associated with a host of adverse mental health outcomes such as depression, anxiety, insomnia, somatic complaints, and sexual problems through specific deficits in emotional clarity and acceptance of emotions (da Silva et al., 2017; Pandey et al., 2011). The mediating role of deficits in ER abilities in the relationship between alexithymia and various maladaptive behavioural outcomes has also been supported in studies exploring varied outcomes, such as problematic alcohol use (Linn et al., 2021; Stasiewicz et al., 2012), aggression (Edwards & Wupperman,

2017; Garofalo et al., 2018; Velotti et al., 2016), and gambling (Elmas et al., 2016). Additionally, alexithymia appears to be linked to disordered eating (Brown et al., 2018) and non-suicidal self-injury (Taş Torun et al., 2022) through specific impairments in emotional clarity, impulse control, and access to adaptive ER strategies. These findings suggest that a lack of clear emotional knowledge can contribute to engagement in unhealthy means of coping for immediate relief in response to distressing situational contexts.

Alexithymia and Maladaptive Emotion Regulation Strategies

Emotion regulation strategy selection has been a key area of research when examining the link between alexithymia and the ER process (Laloyaux et al., 2015; Preece et al., 2018; Preece et al., 2023; Swart et al., 2009). Expressive suppression and cognitive reappraisal are two ER strategies that receive considerable attention in research, and they are measured using the *Emotion Regulation Questionnaire* (ERQ; Gross & John, 2003). Expressive suppression is a response-focused, avoidant ER strategy aimed at down-regulating the outward expression of emotions by changing behavioural responses to an event (John & Gross, 2004). Examples could include holding back tears, suppressing laughter, or trying to maintain a neutral facial expression while experiencing intense irritation. Expressive suppression is considered a maladaptive ER strategy as it's been shown to decrease positive but not negative emotional experiences and often requires more physiological arousal and cognitive demand than not regulating emotions at all (Gross & John, 2003). Cognitive reappraisal, on the other hand, is an antecedent-focused ER strategy that aims to reconstrue an emotion-eliciting event in non-emotional terms (Gross, 2002). Examples might include positive reframing, whereby negative events are reinterpreted as opportunities for personal growth or reflecting upon evidence or assumptions to gain a more balanced perspective on a situation. Reappraisal is considered an adaptive ER strategy and is

associated with decreases in negative emotional experiences, better interpersonal functioning, and greater overall well-being (Gross, 2015; Luminet & Zamariola, 2018).

Studies exploring the relationship between alexithymia and ER strategy selection found that alexithymia is associated with greater use of expressive suppression and less use of cognitive reappraisal (Laloyaux et al., 2015; Preece et al., 2018; Swart et al., 2009), indicating that alexithymia is associated with greater use of maladaptive ER strategies. Adaptive strategies like reappraisal are likely ER strategies that are unavailable to those with high levels of alexithymia as they require a more sophisticated understanding of one's emotional knowledge (Gross, 2015). In addition to replicating their findings demonstrating the preferential selection of maladaptive ER strategies among alexithymic individuals, a recent study by Preece and colleagues (2023) found that whilst people with high levels of alexithymia used fewer adaptive *cognitive reappraisal-type* strategies (e.g., cognitive reappraisal, positive refocusing, refocus on planning, positive reappraisal, and putting into perspective) than those with medium and low levels of alexithymia, they did not select more maladaptive *cognitive* strategies such as rumination, blaming, and catastrophizing. However, individuals with high levels of alexithymia did appear to favour maladaptive *avoidant behavioural* ER strategies such as expressive suppression, ignoring, and withdrawing (Preece et al., 2018). The lack of reliance on cognitive maladaptive strategies appears to reflect a lack of introspection common among alexithymic individuals (Preece et al., 2023; Taylor et al., 1999). Maladaptive behavioural ER strategies, therefore, likely function to avoid poorly differentiated unpleasant emotional experiences due to a lack of emotional knowledge (Gross & John, 2003).

Alexithymia and Avoidant Emotion Regulation Strategies

Alexithymia has traditionally been considered a stable trait-based construct, portending long-term deficits in abilities to attend to emotional experiences (Salminen et al., 1994). However, emerging research suggests that alexithymia is also associated with deliberate avoidance of focus on emotional responses and linking available emotional information with existing emotional schema, which can contribute to a pervasive sense of distress that necessitates urgent relief (Betka et al., 2018; Preece et al., 2017). Therefore, the immediate relief from distress obtained through emotion-avoidant behaviours can strengthen the tendency to rely on these behaviours as an ER strategy, which reinforces the link between alexithymia and psychopathology (Panayiotou et al., 2015). Together, the current literature underscores how an unwillingness to accept emotional experiences associated with alexithymia may contribute to the inappropriate selection of regulation strategies that misalign with situational demands and personal values (Cole et al., 1994). Moreover, avoidant ER strategies, such as withdrawing, ignoring or engaging in maladaptive behaviours like self-injury or disordered eating, can paradoxically amplify the salience of negative emotional experiences, leading to a narrowed range of behaviours considered "successful" at reducing unwanted experiences (Hayes et al., 2006). Therefore, when avoidant behaviours are activated as ER strategies to manage unpleasant emotions, they can impede the attention and appraisal of emotional information by diminishing acceptance of these emotions or confidence in effectively managing them (Hayes et al., 2006; Gratz et al., 2018). This decrease in attention to and evaluation of emotional information will likely exacerbate alexithymia by further impairing the ability to identify and describe emotions as a paradoxical consequence. Considering the role emotional avoidance plays in the relationship between alexithymia and deficits in ER abilities and how this relationship is believed to drive a

range of maladaptive behaviours, it is important to explore how alexithymia contributes to the selection of these behaviours as coping mechanisms within the emotion regulation process to avoid aversive emotional experiences.

Non-Suicidal Self-Injury (NSSI) as an Emotion Avoidance Strategy

The drive to avoid aversive thoughts and experiences associated with alexithymia can result in the selection of risky or maladaptive behaviours that, despite negative long-term consequences, can be effective in immediately downregulating those aversive thoughts and experiences. Non-suicidal self-injury (NSSI) has often been considered an indicator of maladaptive coping. According to the Experiential Avoidance Model of deliberate self-harm, NSSI is viewed as an avoidant maladaptive ER strategy that is negatively reinforced through the immediate reduction or alleviation of unwanted emotional experiences (Chapman et al., 2006). According to this model, factors contributing to using NSSI to escape undesired emotional experiences consist of high emotional intensity, low distress tolerance, and poor ER abilities (Brereton & McGlinchey, 2020; Chapman et al., 2006). Supporting this model, although research shows that people who engage in NSSI report many reasons for this behaviour (Klonsky & Glenn, 2009), by far the most commonly and strongly endorsed is the desire to decrease negative affect and other aversive internal states (Dixon-Gordon et al., 2022; Klonsky, 2007; Klonsky & Glenn, 2009; Robillard et al., 2022). Previous research has also found that acute negative affect tends to precede incidences of NSSI, and self-injury often results in a decrease in negative affect and a sense of relief (Coid, 1993; Kemperman et al., 1997; Klonsky, 2007). In a meta-analysis conducted by Wolff and colleagues (2019), NSSI was found to be positively associated with the use of other maladaptive ER strategies, such as expressive suppression and rumination, while it was negatively associated with reappraisal and acceptance of emotions.

Multiple deficits in ER abilities also appear to be associated with NSSI (Wolff et al., 2019). Some studies have found NSSI to be associated with deficits in all six domains of Gratz and Roemer's (2004) multidimensional model of ER abilities (Buckholdt et al., 2015; Muehlenkamp et al., 2010), while other studies have found deficits in specific domains such as acceptance of emotions, impulse control, and access to ER strategies (Anderson & Crowther, 2012; Wolff et al., 2019). Anderson and Crowther (2012) also found that those with recent or past histories of NSSI report more intense emotional experiences, difficulties identifying emotions, and greater engagement in cognitive avoidance than those without a history of NSSI. Seeing that alexithymia may arise due to either a deficit in the ability to attend to emotions or deliberate avoidance of emotional information (Preece et al., 2017), resulting in difficulties identifying emotions (Bagby et al., 1994), a link between NSSI and alexithymia has been hypothesized and, indeed, supported by a wealth of research evidence across the developmental lifespan (Iskric et al., 2020). Among adolescents, habitual self-injury was associated with greater alexithymia and general difficulty managing emotions when compared to those who engage in occasional self-injury and case-matched controls (Gatta et al., 2016). Similarly, among adolescents with major depression, difficulties identifying feelings (DIF) were positively related to NSSI frequency, deficits in emotional awareness, clarity, and impulse control (Taş Torun et al., 2022). Together, these findings suggest that deficits in emotional knowledge may contribute to the use of NSSI, as outlined by NSSI's association with a lack of emotional awareness and clarity, as well as difficulties identifying emotions (Anderson & Crowther, 2012; Iskric et al., 2020; Taş Torun et al., 2022). While alexithymia and NSSI are associated with global ER difficulties, deficits in abilities to control impulses appear to mediate the relationship between alexithymia and NSSI (Taş Torun et al., 2022), suggesting that the frequent use of NSSI may

serve to down-regulate the distress associated with experiencing intense and ambiguous feelings of distress.

Disordered Eating Cognition as an Emotion Avoidance Strategy

Although many people who engage in Disordered Eating (DE) do not meet the diagnostic criteria for an eating disorder, DE behaviours such as restriction, binge eating, and purging (e.g., compensatory vomiting, use of laxatives, and excessive exercise) are core symptoms of eating disorders (American Psychiatric Association, 2022). DE has long been suggested to be a maladaptive method of avoiding difficult emotions (Lavender et al., 2015). Previous research has identified negative affect as an antecedent to episodes of binge eating (Dingemans et al., 2017; Lavender et al., 2015). While binge eating provides immediate temporary relief of negative emotions, it also induces additional aversive emotions, such as anxiety, shame, and guilt, sometimes leading to compensatory purging behaviours to alleviate the resulting distress (Racine & Wildes, 2013), suggesting that DE may serve an affect regulatory function. People who engage in a clinical level of DE are not only more inclined to employ maladaptive suppression-based ER strategies, they are also less likely to have access to adaptive ER strategies such as cognitive reappraisal and problem-solving (Aldao et al., 2010; Lavender et al., 2015; Mallorquí-Bagué et al., 2018; Oldershaw et al., 2015; Svaldi et al., 2012) compared to non-clinical populations (Danner et al., 2014).

Alexithymia, particularly DIF and DDF, and global deficits in ER abilities are consistently associated with DE (Brown et al., 2018; Nowakowski et al., 2013; Westwood et al., 2017). Racine and Wildes (2013) highlighted impulse control difficulties as a major deficit in ER abilities among individuals who engage in recurrent binge eating and purging behaviour. Relative to healthy controls, people who engage in clinical levels of DE also tend to experience

greater deficits in emotional awareness and understanding of emotions in both the self and others (Harrison et al., 2010; Oldershaw et al., 2015). Further, deficits in ER abilities, such as a lack of emotional clarity, poor emotional awareness, and lack of emotional acceptance, were strongly associated with DE cognitions (e.g., concerns with eating, weight, and shape) but not DE behaviours (e.g., binge eating and purging) among patients diagnosed with anorexia nervosa (Racine & Wildes, 2013). Among these deficits, only a lack of emotional awareness predicted the severity of DE cognitions, and given that DE cognitions encompass a wide range of DE behaviours, it may be a more suitable indicator of DE severity. Similar to NSSI, the prominence of association between DE cognitions and aspects of emotional knowledge, represented by DIF, DDF, emotional awareness, and emotional clarity, suggests that deficits in emotional knowledge may impact the severity of DE. It is possible that alexithymia may impact DE through both global deficits in ER abilities (Brown et al., 2018; Nowakowski et al., 2013; Westwood et al., 2017) and specific ER difficulties such as lack of emotional acceptance and impulse control difficulties (Racine & Wildes, 2013). Thus, an amplified mental focus on weight, shape, and eating may be used as a means of avoiding ambiguous experiences of emotional distress (Schmidt & Treasure, 2006; Wildes et al., 2010).

Assessing Construct Redundancy and Defining Deficits in Emotional Knowledge (DEK)

Previous research examining the relationship between alexithymia, ER abilities, and maladaptive outcomes has highlighted the association between facets of alexithymia and ER that appear to represent emotional knowledge (Nowakowski et al., 2013; Pandey et al., 2011; Taş Torun et al., 2022; Westwood et al., 2017). However, when interpreting the associations within a hypothesized process-based relationship, it is vital to consider whether these associations can be accounted for by construct and definitional similarities.

An aforementioned study identified a construct overlap between the DIF dimension of alexithymia and the emotional awareness dimension of ER abilities (Pandey et al., 2011). These two constructs appear to represent aspects of emotional knowledge assessed by both measures of alexithymia and ER abilities. Alexithymia is typically measured through the 20-item Toronto Alexithymia Scale (TAS-20), which includes three subscales assessing DIF, DDF, and EOT (Bagby et al., 1994), and ER abilities are often measured using the Difficulty in Emotion Regulation Scale (DERS; Gratz & Roemer, 2003). The DERS is sometimes used to determine the concurrent validity of the TAS-20, and recent findings suggest that TAS-20 measures are highly associated with the clarity and awareness measures of the DERS (Greene et al., 2020; Khosravani et al., 2021; Statovci, 2021).

Dimensions of emotional awareness and clarity within the DERS were found to be more strongly associated with the TAS-20 than other DERS subscales (Khosravani et al., 2021). Emotional clarity, in particular, appears to be highly correlated with both the DIF ($r = .69$ - $.75$) and DDF ($r = .70$ - $.72$) components of the TAS-20 (Greene et al., 2020). Together, these findings suggest a content similarity between these measures, assessing a shared dimension of emotional knowledge in both alexithymia and ER.

Since the core emotional components of alexithymia—DIF and DDF—were originally conceptualized as components of affective awareness (Bagby et al., 2005), it is likely that this shared dimension with the DERS measure capturing emotional knowledge is driven more by these affective awareness components rather than EOT. However, it is also important to note that the EOT subscale of the TAS-20 has consistently demonstrated poor internal consistency across studies (Greene et al., 2020; Nowakowski et al., 2013; Preece et al., 2017; Statovci, 2021; Westwood et al., 2017). Although factors such as the error variances of reverse-coded items can

impact internal consistency, removing these items did not improve the reliability of this subscale, as the remaining items do not directly address emotions (Preece et al., 2018). This suggests the presence of content validity issues within the EOT subscale and its poor internal consistency could explain the inconsistent association with emotional knowledge when compared to DIF and DDF (Luminet & Zamariola, 2018).

Therefore, the present study introduces the concept of Deficits in Emotional Knowledge (DEK), which encapsulates the shared difficulties in attending to and understanding emotional information as measured by the TAS-20 DIF and DDF subscales and the DERS emotional awareness and clarity subscales. To appropriately operationalize DEK within the context of exploring the process-based relationship between alexithymia, ER abilities, and associated maladaptive outcomes, it is essential to assess and address any construct redundancy between these measures.

The Present Study

Existing research consistently highlights the detrimental impact of alexithymia on the ER process. First, studies frequently link alexithymia with deficits in the six ER *abilities* defined by Gratz and Roemer's (2004) multidimensional model of ER difficulties. Second, in line with Gross' (2015) Extended Process theory of ER, recent findings suggest that alexithymia appears to interfere with the *selection*, *implementation*, and *monitoring* stages of ER, contributing to the formation of emotion dysregulation, which is outlined by maladaptive patterns of ER (Preece et al., 2023). Third, alexithymia, particularly DIF and DDF, is associated with inefficient or ineffective ER *strategies,* such as expressive suppression (Laloyaux et al., 2015; Preece et al., 2023b) and maladaptive behaviours, such as NSSI and DE. Together, these results suggest a process model whereby alexithymia is linked to maladaptive ER through problems in ER

abilities. Yet, testing such a model requires two gaps in knowledge to be addressed. First, available evidence suggests considerable conceptual and measurement overlap between components of alexithymia (i.e., DIF and DDF) and ER abilities (i.e., emotional awareness and emotional clarity). These shared construct similarities highlight underlying DEK, which ER abilities are contingent on. Therefore, there is a need to explore conceptual redundancies between the four subscale items prior to assessing alexithymia's impact on ER abilities and their associated outcomes. The first aim of this study is to assess the conceptual similarities shared by the TAS-20 (DIF & DDF) and the DERS (Awareness & Clarity) measures. With this aim, the present study has two hypotheses:

H1: The TAS-20 DIF and DDF subscales will be more strongly related to the DERS Awareness and Clarity subscales as compared to the remaining four subscales of the DERS (Acceptance, Impulse Control, Access to ER Strategies, & Goal-Directed Behaviours).

H2: In a latent measurement model, the second-order latent-DEK factor consisting of the TAS-20 DIF and DDF subscales will be significantly and positively correlated with the second-order latent DEK factor consisting of the DERS Awareness and Clarity subscales, demonstrating a high degree of overlap between constructs. To test this hypothesis, two second-order latent factors were compared out of consideration for the measurement integrity and differences between the TAS-20 and the DERS.

A second gap in the literature arises because, even as studies linking alexithymia to behavioural outcomes accumulate, few studies have integrated both ER abilities and strategies. Although ER abilities and strategies are developed in tandem throughout an individual's lifespan and are inextricably linked to one another (Gratz et al., 2018), they are studied as distinct models

of ER. By clearly conceptualizing how alexithymia affects specific ER abilities and subsequent selection of appropriate ER strategies, treatment and interventions can be better designed to support individuals who frequently engage in maladaptive behaviours to regulate aversive emotions. Therefore, the second aim of this study is to test whether the relationship between DEK associated with alexithymia and the use of maladaptive (i.e., expressive suppression, NSSI and DE) and adaptive ER strategies (i.e., cognitive reappraisal) are mediated by deficits in specific ER abilities contingent on emotional knowledge (Acceptance of Emotions, Impulse Control, Access to ER Strategies, & Goal-Directed Behaviours).

H3: The relationship between DEK and lifetime NSSI frequency will be significantly mediated by a total indirect association through all four ER abilities and a specific indirect association through deficits in Impulse Control.

H4: The relationship between DEK and DE symptom severity will be significantly mediated by a total indirect association through all four ER abilities and specific indirect associations through deficits in Impulse Control and Acceptance of Emotions.

H5: The relationship between DEK and Expressive Suppression will be positively and significantly mediated by a total indirect association through all four ER abilities. Conversely, the relationship between alexithymia and cognitive reappraisal will be significantly and negatively mediated by a total indirect association through all four ER abilities.

Methods

Participants

Participants were 193 young adults between 17 – 30 years old (*M* = 22.28, *SD* = 3.08; 61.1% female) who were recruited for a larger 21-day self-monitoring study investigating young adults with Self-Damaging Behaviours (SDBs), particularly NSSI and DE. Participants were recruited for one of three groups: current SDBs (reporting ≥ 10 episodes of NSSI *or* DE within the past year, with at least two episodes occurring in the past month), historical NSSI (reporting 10 lifetime episodes of NSSI but none within the past year), or current depression (scoring above clinical threshold on the Patient Health Questionnaire-9 [Kroenke et al., 2011], without any lifetime history of SDBs). Participants were also required to have access to an internet-enabled home computer and smartphone, speak/read English fluently, and live in one of the following greater metropolitan areas: Victoria, Vancouver, Toronto, Montreal, or Calgary. Participants were excluded if they reported: a) any level of suicidal intent in the past month (i.e., suicidal thoughts and at least some intention to act upon them), or b) a suicide attempt in the past two years, as reported in the Self-Injurious Thoughts and Behaviours Interview (Fox, 2009). Those excluded from the study were referred to appropriate crisis and mental health services. Participants were recruited through advertisements posted on community forums (e.g., online advertisements on social media, community websites, and the Psychology Research Participation System [SONA]).

Procedure

As a component of the overarching study, participants underwent an eligibility screening process and were subsequently invited to attend an interview session conducted via Zoom. During this session, two semi-structured interviews were administered to assess participants'

experiences with self-damaging behaviours. Participants also completed two sets of baseline self-report questionnaires: the first, pertaining to their personality and emotions, which includes measures of alexithymia, ER abilities, and ER strategies, and was completed by all participants. The second block of questionnaires addressing engagement in various self-damaging behaviours, including measures of lifetime NSSI and DE cognition, was completed by participants who had been deemed eligible to proceed with the larger study or who elected to continue completing interview procedures after they were notified of their study ineligibility. Eligible participants proceeded to complete 23 days of ecological momentary assessments as well as two follow-up surveys three and six months after their interview. The present study, however, uses data from the interview session only. Participants were eligible to receive up to $238.00 in total compensation for completing the entire study, including $40 for participating in the interview.

Measures

Alexithymia

The ***Toronto Alexithymia Scale-20*** (**TAS-20**; Bagby et al., 1994) is a 20-item self-report instrument used to assess three domains of alexithymia (see Appendix A): 1) difficulty identifying feelings (DIF; e.g., "*I am often confused about what emotion I am feeling*); 2) difficulty describing feelings (DDF; e.g., "*It is difficult for me to find the right words for my feelings*"); and 3) externally oriented cognitive style of thinking (EOT; e.g., "*I prefer to just let things happen rather than to understand why they turned out that way*"). The items are rated on a 5-point Likert scale ranging from "*strongly disagree*" to "*strongly agree*". The DIF and DDF subscales demonstrated sound internal consistency with Cronbach's α of .86 and .80, respectively, in the present study, and item-total correlations > .45 on all items in both subscales. However, the internal consistency for the EOT subscale was poor, with a Cronbach's α of .66

and item-total correlations ranging from r = .15 - .50. Due to reports of poor factorial reliability and validity of the EOT subscale across studies assessing the TAS-20 (Khosravani et al., 2021; Kooiman et al., 2002; D. Preece et al., 2017), only the DIF and DDF subscales were included in the analyses.

Emotion Regulation Abilities.

The ***Difficulties in Emotion Regulation Scale*** **(DERS;** Gratz & Roemer, 2003; see Appendix B**)** is a widely used self-report measure of emotion regulation abilities, consisting of 36 items to assess six domains: 1) Lack of emotion regulation strategies (Strategies); 2) non-acceptance of emotional responses (Nonacceptance); 3) impulse control difficulties (Impulse); 4) difficulty engaging in goal-directed behaviour when distressed (Goals); 5) lack of emotional awareness (Awareness), and 6) lack of emotional clarity (Clarity). Items are rated on a five-point Likert scale ranging from "*almost never (0-10%)*" to "*almost always (91-100%)*". The DERS had alphas ranging from .80-.91 across all subscales in the present study. Item-total correlations ranged from r = .29 - .66.

Emotion Regulation Strategies.

The ***Emotion Regulation Questionnaire*** (**ERQ**; Gross & John, 2003; see Appendix C) is a 10-item scale assessing individual engagement in two ER strategies: 1) Cognitive Reappraisal (e.g., "*When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm"*) and 2) Expressive Suppression (e.g., "*I control my emotions by not expressing them")*. Responses are rated on a 7-point Likert scale ranging from "*strongly disagree*" to "*strongly agree"*. In the present study, Cronbach's α for the Cognitive Reappraisal subscale is .86, with item-total correlations ranging from r = .48 - .75, demonstrating good internal consistency. Similarly, the internal consistency for the Expressive Suppression subscale is also

sound in this study, with a Cronbach's α of .80, and item-total correlations ranging from r = .41 - .78.

Lifetime Frequency of Non-Suicidal Self-Injury (NSSI)

The ***Self-Injurious Thoughts and Behaviours Interview*** (**SITBI-R**; Fox et al., 2020) is a semi-structured interview assessing participants' history of: 1) Suicidal Ideation, 2) Suicide Attempts, and 3) Non-suicidal self-injury (NSSI). An initial screening item is used to determine if participants have ever experienced each thought or behaviour (see Appendix D). Those who answered affirmatively to screening items completed additional questions regarding: the ages of first and most recent thought/behaviours; the number of times they engaged in the behaviour in their lifetime, the past year, and in the past month; the method(s) used; the duration of relevant thoughts or urges; and, the average intensity of the experience. To index NSSI engagement, the present study used participants' self-reported lifetime frequency of engagement in NSSI behaviours as a measure of NSSI severity. Participants' lifetime frequency of engagement in NSSI was reported through an open-ended interview question, whereby participants were asked to report the number of times they had engaged in NSSI in their lives as a whole number.

Disordered Eating (DE)

Eating Attitudes Test-26 (**EAT-26**; Garner et al., 1982;)**.** The EAT-26 is a widely used measure that assesses DE cognitions across various problematic eating behaviours such as restriction, bingeing and purging, as well as concerns about weight and dieting that might drive various DE behaviours (see Appendix E). Therefore, to capture the dimensions of DE across varying behavioural presentations, DE cognition may be a more representative measure of DE severity. While the measure is comprised of three scales (Dieting [e.g., food restriction & obsession with weight loss], Bulimia and Food Preoccupation [e.g., binge eating, purging,

obsessive thinking about food], and oral control [self-control over food consumption, perceived social pressures related to weight gain]). The present study used the total score to index the overall severity of DE symptoms. Items are rated on a 6-point Likert scale ranging from "*never*" to "*always*". A total score of > 20 signifies a high level of concern about dieting, weight, or problematic eating behaviours. The Cronbach's α of the EAT-26 total score was .91 in this study, with item-total correlations ranging from r = .14 -.76.

Statistical Analysis

Data Preparation

Preliminary analyses (e.g., descriptive statistics and zero-order correlations) for all study variables were conducted in SPSS Version 28.01.1 (IBM Corporation, 2017). Prior to analyzing the mediation model with lifetime NSSI as the outcome, participants were excluded if they reported any forms of body-focused repetitive behaviours (BFRBs), a cluster of compulsive behaviours in which people repeatedly and often unconsciously damage their own bodies (e.g., trichotillomania [hair pulling] or excoriation [skin picking]) and are classified under Obsessive-Compulsive and Related Disorders (APA, 2022). Although functions and frequencies of BFRBs tend to differ from NSSI, behaviours such as hair-pulling, skin-picking, and nail-biting are sometimes included in assessments of NSSI (Mathew et al., 2020). Within the present study, participants were asked about their engagement in specific NSSI behaviours, and some participants had self-generated responses of behaviours that are more consistent with definitions of BFRBs. Participants reporting repetitive body-focused NSSI behaviours tend to report higher than average counts of lifetime NSSI, which can increase the skew of count data and contribute to conceptual drift. Given that participants in this study were asked to report how many times in their lives they engaged in *any* NSSI behaviour, regardless of the specific type of behaviour, we

expected participants who interpreted NSSI as inclusive of BFRBs would report inflated frequencies that might not match the conceptual construct of interest. Therefore, 21 participants (10.9%) reporting repetitive body-focused NSSI behaviours were excluded, leaving a sample size of 172 for the NSSI analyses. A Shapiro-Wilk's test of univariate normality was also conducted on this sample to assess assumptions of univariate normality of lifetime NSSI frequency. The results indicated a significant deviation from normality ($W = 0.58$, $p < .001$), suggesting that the remaining data were still not normally distributed. A log transformation was then applied prior to analysis to address the non-normal distribution of lifetime NSSI frequency, with the aim of normalizing data distribution, stabilizing variance, and reducing the influence of outliers.

Prior to analyzing the parallel mediation model with DE cognition as the outcome, 14 out of the initial sample of 193 participants who opted not to complete the self-report questionnaire containing measures regarding DE cognition were excluded from the analysis.

Statistical Comparison of DEK and ER Ability Correlations

To explore the first study aim, zero-order correlations outlining the relationship between the alexithymia DIF and DDF subscales and ER abilities (Awareness, Clarity, Acceptance, Impulse, Strategy, and Goals subscales of the DERS) were examined. To test the first hypothesis, correlation coefficients describing associations of the DERS subscales and DIF and DDF scores were transformed into z-scores through Fisher's r-to-z transformation (Eid et al., 2011). Z-values corresponding to the correlation coefficients are obtained and compared for statistical significance by determining if the observed z-value was greater than the critical value ($\alpha = .05$) to investigate which ER abilities were more strongly correlated with DIF or DDF.

Equation:

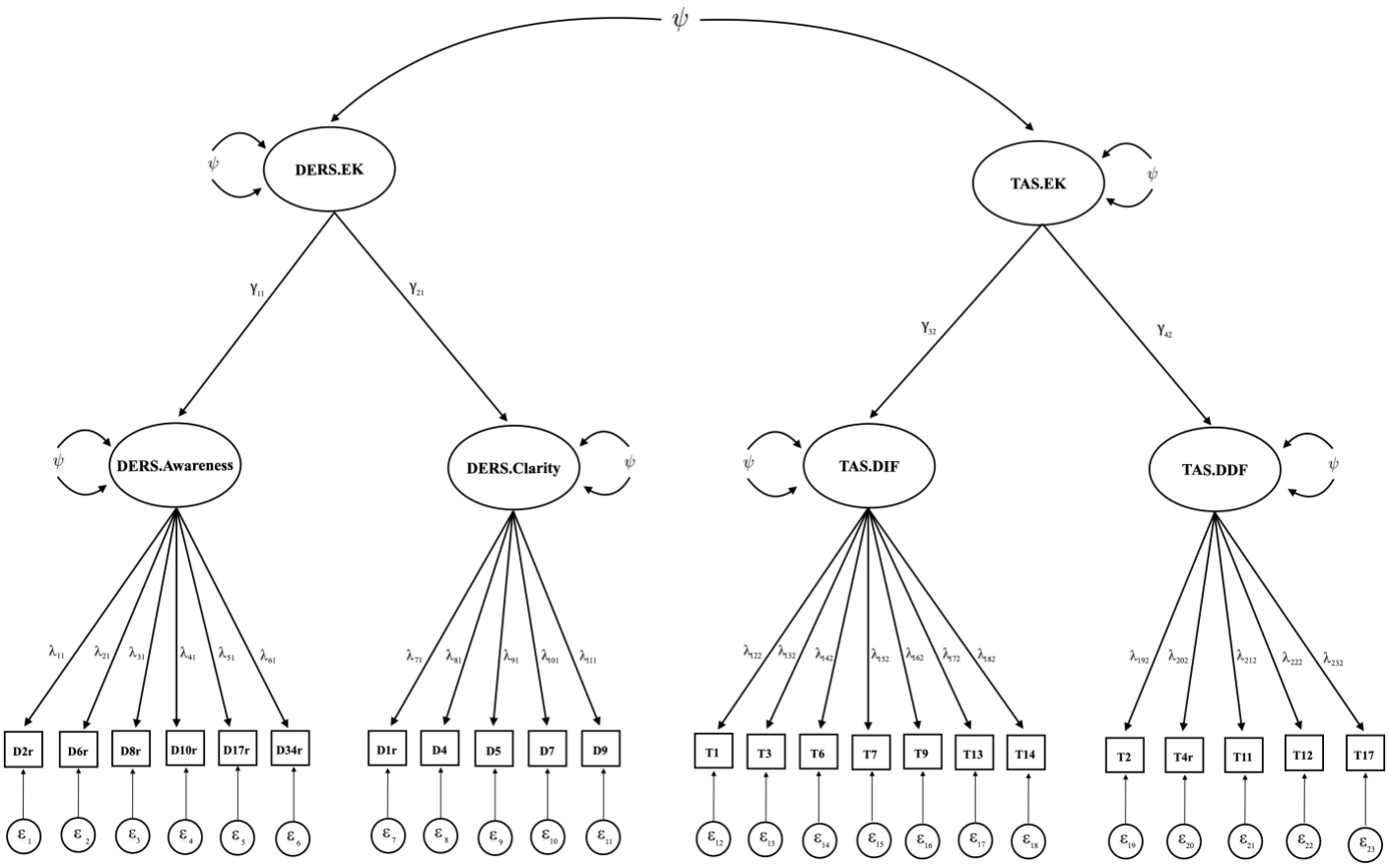
$$Z_{observed} = \frac{z_1 - z_2}{\sqrt{\frac{1}{N_1 - 3} + \frac{1}{N_2 - 3}}}$$

Structural Equation Model Estimation Techniques

To test hypotheses two to five, confirmatory factor and structural equation modelling (SEM) analyses were conducted using the 'Laavan' package in R (R Studio version 4.3.1). Specifically, to test hypothesis two, correlation between the hypothesized latent TAS-20 DEK and latent DERS DEK constructs was examined. Considering one previous study suggested that the DIF subscale of the TAS-20 and the Awareness subscale of the DERS cross-loaded on a single latent factor (Pandey et al., 2011), I expected conceptual and measurement overlap between the DERS Clarity, DERS awareness, TAS-20 DIF and TAS-20 DDF subscales. To maintain the original measurement integrity and to respect measurement differences between the TAS-20 and DERS, however, the original factor structure of each subscale was used in the second-order confirmatory factor analysis (CFA). The second-order model was constructed such that items loaded onto their measure-specific subscales, which in term loaded on to a measure-specific DEK score (see Figure 1). One latent construct was comprised of the first-order latent factors of DERS Clarity and Awareness, and the second latent construct was composed of the first-order latent TAS-20 DIF and DDF factors. The correlation between latent second-order factors was assessed to determine construct similarity and redundancy. Prior to analysis, the assumption of multivariate normality was tested via Mardia's test. Where violations of normality were detected, the maximum likelihood robust (MLR) estimator was used to account for the violation of assumptions of normality. To address missing data in both the measurement and structural models, Full Information Maximum Likelihood (FIML) estimation was applied to utilize available data to estimate model parameters.

Figure 1

Model of Second-Order CFA Assessing Construct Overlap Between the Hypothesized Latent TAS-20 and DERS DEK Constructs



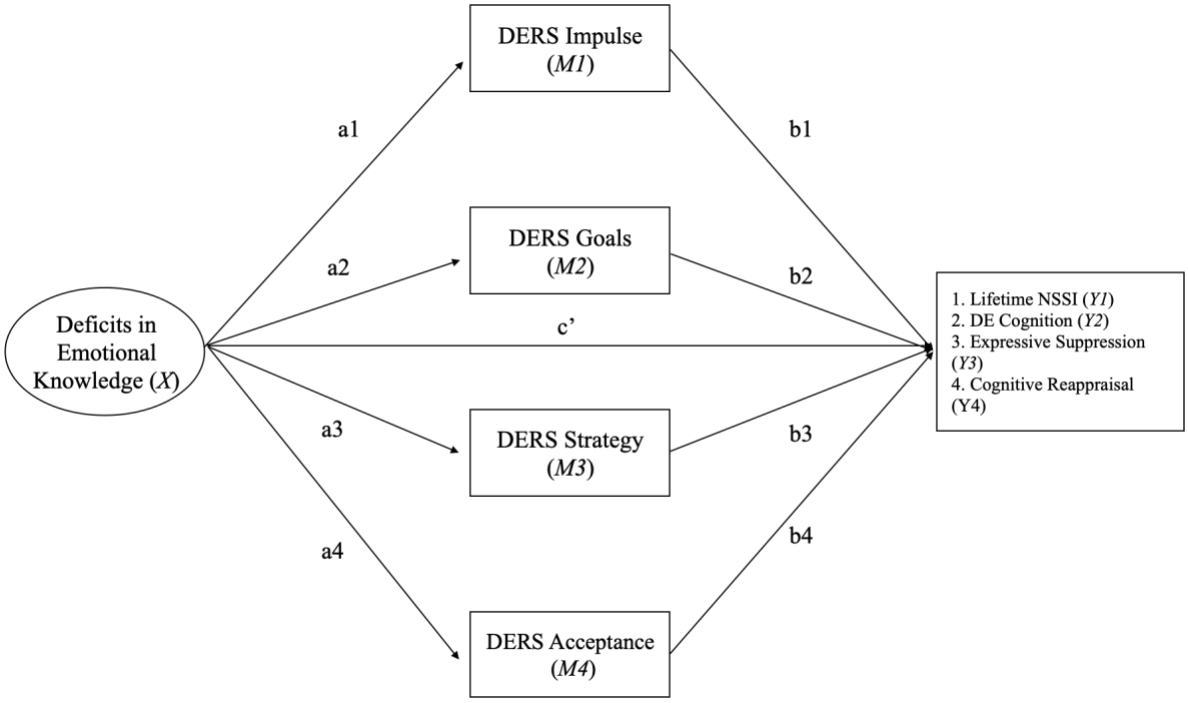
Note. The latent Emotion Regulation EK construct (DERS.EK) comprises the Clarity and Awareness Subscales of the DERS. The latent Alexithymia EK construct (TAS.EK) is composed of the Difficulty Identifying Feelings (DIF) and Difficulty Describing Feelings (DDF) subscales of the TAS-20.

To test hypotheses three to five, parallel analysis and another second-order CFA of the retained latent DEK construct were conducted to determine the finalized measurement model to test the hypothesized parallel mediations (see Figure 2) using Structural Equation Modeling (SEM). All structural models were estimated using the Maximum Likelihood (ML) estimator and

the bootstrap resampling technique with 5,000 samples to ensure the robustness of parameter estimates. To further assess the robustness of structural models under conditions of multivariate non-normality, Monte Carlo simulations using 10,000 simulated datasets were conducted to facilitate meaningful interpretations of the mediated relationship between DEK, ER abilities, and their associated outcome variables. The comparative fit index (CFI), Tucker-Lewis Index (TLI), root-mean-square error of approximation (RMSEA), and standardized root mean squared residual (SRMR) were used to consider both measurement and structural model fit indices. The CFI compares the fit of the proposed model with a null baseline model to observe the goodness of fit with the observed data, with values above 0.90 and 0.95 indicating acceptable and excellent fit, respectively (Hu & Bentler, 1999). Similarly, higher TLI indicates better fit of the model with values above 0.90 indicating acceptable fit and 0.95 indicating excellent fit. The SRMR assesses the average standardized difference between observed and predicted correlations, and the RMSEA assesses the discrepancy between model-implied and observed covariance matrices. For both SRMR and RMSEA indices, lower values suggest a better fit between the model and observed data, and the following cut-off criteria were used to indicate an acceptable fit: $SRMR \leqslant 0.08$, $RMSEA \leqslant 0.06$ (Hu & Bentler, 1999).

Figure 2

Proposed Parallel Mediation Model of the Relationship between Latent DEK and Four ER Strategies Through Four ER Abilities



Note. Proposed parallel mediation model structure for the indirect effect of latent Emotional Knowledge construct on ER strategy and behaviours via four ER abilities: impulse control, goal-directed behaviours, access to ER strategies, and acceptance of emotions measured through the DERS *Impulse, Goals, Strategy,* and *Acceptance* subscales. Within the model c' is the direct effect of independent variable X (Emotional Knowledge) on dependent variables Y1 (lifetime NSSI), Y2 (DE cognition), Y3 (expressive suppression), and Y4 (cognitive reappraisal) while controlling for indirect effects through mediator variables. The specific indirect effects of Deficits in Emotional Knowledge (DEK) on the dependent variables via the mediators M1 (Impulse), M2 (Goals), M3 (Strategy), and M4 (Acceptance) are labelled through paths *b1, b2, b3,* and *b4*. The total effect of Emotional Knowledge on each outcome variable will be accounted for through the combined direct and specific indirect effects.

Results

Descriptive Statistics

Table 1 includes participant characteristics and descriptive statistics of variables used in the correlation comparison and the SEM.

Table 1

Participant Characteristics and Descriptive Statistics

N = 193	***M* (SD) or *N* (%)**
Age	22.28 (3.08)
Female	159 (82.4%)
Ethnicity	
White or Caucasian	141 (73.1%)
Black, African, or Afro-Caribbean	3 (1.6%)
Hispanic or Latinx	8 (4.1%)
East Asian or Southeast Asian	32 (16.6%)
First Nations, Métis, or Inuit	7 (3.6%)
Other	12 (6.2%)
DERS Composite Scores	
Awareness	16.39 (4.72)
Clarity	14.47 (4.32)
Acceptance	17.66 (6.52)
Strategies	24.47 (6.94)

Table 1 (Continued)

Participant Characteristics and Descriptive Statistics

N = 193	***M* (SD) or *N* (%)**
Impulse	15.33 (5.34)
Goals	18.83 (4.57)
Lifetime NSSI Frequency (SEM n = 172)	180.58 (335.00)
EAT-26 Total Score (SEM n = 179)	12.00 (12.24)
ERQ Expressive Suppression	3.92 (1.39)
ERQ Cognitive Reappraisal	4.27 (1.16)

Note. DEK represents the composite score made up of the sum of all DIF and DDF items of the TAS-20. The descriptive statistics for the lifetime NSSI frequency and EAT-26 total score are based on data and sample size from their respective samples in the SEM after participant exclusion.

Correlation Comparison

DIF scores were significantly correlated with all six DERS subscale scores at the $p < .05$ - .001 level (2-tailed), but DDF was only significantly correlated with the Awareness ($r = .553$, $p < .001$), Clarity ($r = .568$, $p < .001$), Acceptance ($r = .253$, $p < .001$), and Strategies ($r = .174$, $p < .05$) subscales. Findings from the present study consistently revealed that the Clarity subscale of the DERS generally exhibits stronger correlations with both the DIF and DDF subscales of the TAS-20 compared to other DERS subscales (see Tables 2 & 3). Specifically, the strength of correlation between the DIF and the Clarity subscale of the DERS is significantly higher than its correlations with the Awareness ($z = 5.19$, $p < .001$), Acceptance ($z = 3.64$, $p < .001$), Goals ($z = 5.88$, $p < .001$), Impulse Control ($z = 4.81$, $p < .001$), and Strategies ($z = 4.12$, $p < .001$)

subscales. The strength of correlations between DDF and the Clarity subscale was also significantly higher than its correlations with Acceptance ($z = 4.50$, $p < .001$), Goals ($z = 5.84$, $p < .001$), Impulse Control ($z = 6.38$, $p < .001$), and Strategies ($z = 5.49$, $p < .001$) subscales, but not Awareness ($z = 0.28$, $p = .390$). Awareness, however, only demonstrated stronger correlations with the DDF subscale of the TAS-20. Except for Clarity, the strength of correlations between DDF and the Awareness subscale is significantly higher than the correlation of DDF with the Acceptance ($z = 4.05$, $p < .001$), Goals ($z = 5.44$, $p < .001$), Impulse Control ($z = 5.64$, $p < .001$), and Strategies ($z = 4.93$, $p < .001$) subscales of the DERS.

Table 2

Table of Correlation Comparison Between DIF and DERS subscales

	r_{13}	r_{23}	Z-Score for r12 vs. r13	P-Value
r_1* DIF to *r_2* DERS Aware = .392**				
r_3DERS Clarity	.673***	.552***	-5.191	**<.001****
r_3DERS NA	.452***	.310***	-0.808	0.21
r_3DERS Goal	.241***	.156*	1.735	.156
r_3DERS Impulse	.352***	.167*	0.477	.167
r_3DERS Strategy	.417***	.282**	1.187	.118
r_1*DIF to *r_2* DERS Clarity = .673**				
r_3DERS NA	.452***	.380***	3.638	**<.001****
r_3DERS Goal	.241***	.211**	5.882	**<.001****
r_3DERS Impulse	.352***	.304***	4.807	**<.001****
r_3DERS Strategy	.417***	.372***	4.121	**<.001****

Table 2 (Continued)

	r_{13}	r_{23}	Z-Score for r12 vs. r13	P-Value
r_1* DIF to *r_2* DERS NA = .452 **				
r_3DERS Goal	.241***	.299***	2.701	**.003****
r_3DERS Impulse	.352***	.364***	1.380	.084
r_3DERS Strategy	.417***	.599***	0.613	.270
r_1* DIF to *r_2* DERS Goal = .241 **				
r_3DERS Impulse	.352***	.497***	-1.620	.053
r_3DERS Strategy	.417***	.534***	-2.711	**.003****
r_1* DEK to *r_2* DERS Impulse = .352 **				
r_3DERS Strategy	.417***	.635**	-1.155	.124

Note. *. Correlation is significant at the 0.05 level (2-tailed); **. Correlation is significant at the 0.01 level (2-tailed); ***. Correlation is significant at the 0.001 level (2-tailed)

Table 3

Table of Correlation Comparison Between DDF and DERS Subscales

	r_{13}	r_{23}	Z-Score for r12 vs. r13	P-Value
r_1* DDF to *r_2* DERS Aware = .553 **				
r_3DERS Clarity	.568***	.552***	-0.278	.390
r_3DERS NA	.253***	.310***	4.047	**<.001*****
r_3DERS Goal	.094	.156*	5.441	**<.001*****
r_3DERS Impulse	.079	.167*	5.639	**<.001*****
r_3DERS Strategy	.174*	.282**	4.925	**<.001*****

Table 3 (Continued)

	r_{13}	r_{23}	Z-Score for r12 vs. r13	P-Value
r_1* DDF to *r_2* DERS Clarity = .568 **				
r_3DERS NA	.253***	.380***	4.500	**<.001*** **
r_3DERS Goal	.094	.211**	5.841	**<.001*** **
r_3DERS Impulse	.079	.304***	6.382	**<.001*** **
r_3DERS Strategy	.174*	.372***	5.494	**<.001*** **
r_1* DDF to *r_2* DERS NA = .253 **				
r_3DERS Goal	.094	.299***	1.894	**.029***
r_3DERS Impulse	.079	.364***	2.173	**.015***
r_3DERS Strategy	.174*	.599***	1.251	.105
***r_1* DDF to *r_2* DERS Goal = .094**				
r_3DERS Impulse	.079	.497***	0.207	.418
r_3DERS Strategy	.174*	.534***	0.124	.124
***r_1* DDF to *r_2* DERS Impulse = .079**				
r_3DERS Strategy	.174*	.635**	-1.549	.061

Note. *. Correlation is significant at the 0.05 level (2-tailed); **. Correlation is significant at the 0.01 level (2-tailed); ***. Correlation is significant at the 0.001 level (2-tailed)

Assessing Construct Overlap in Latent DEK Constructs

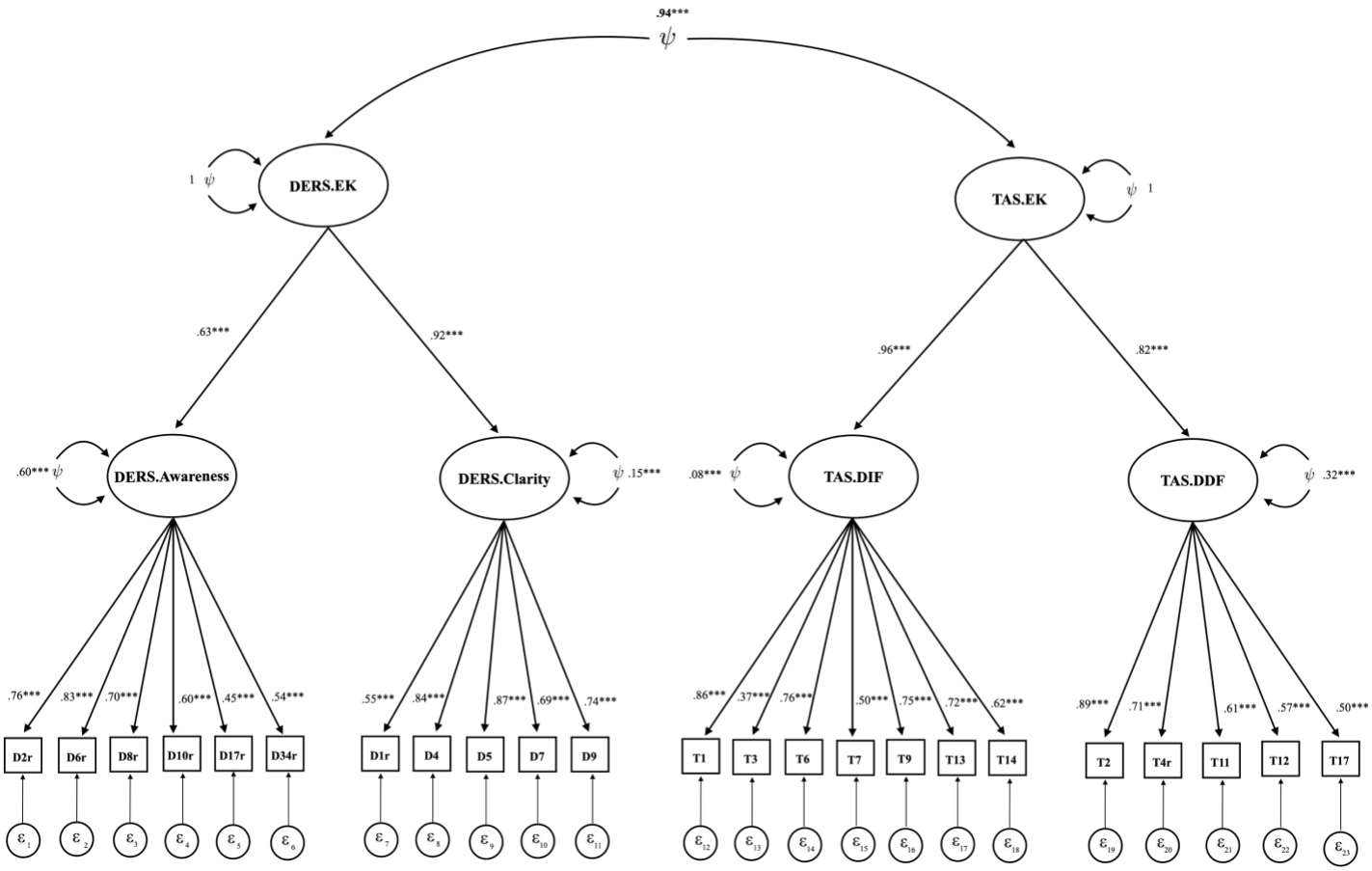
The initial second-order CFA revealed less than adequate fit: Robust CFI = .84, Robust TLI = 0.82, Robust RMSEA = .09, SRMR = .08. The poor model fit could be explained by the retention of the original factor structures of the DERS Awareness and Clarity subscales as well

as the TAS-20 DIF and DDF subscales to preserve measurement integrity and account for differences between these measures. The model demonstrated a high correlation (r = .94; see Figure 3) between the latent DERS-DEK and TAS-DEK constructs, indicating a high level of similarity between the two latent DEK constructs, which points to possible content redundancy. Examination of modification indices revealed several parameters with high values (MI > 10), indicating aspects of the model that could be improved by allowing additional parameters to be freely estimated. Specifically, DERS Clarity items (1. "*I am clear about my feelings"*; 7. "*I know exactly how I am feeling*"; & 9. "*I am confused about how I feel*") showed high MIs, indicating the DERS Awareness first-order factor, suggesting potential cross-loadings. Some TAS DIF items (1. *"I am often confused about what emotions I am* feeling"; 7. "*I am often puzzled by sensations in my body*") and DERS Clarity item 7 revealed high MIs as direct indicators of the alexithymia second-order DEK (TAS.DEK) construct. The TAS-20 item 1 and DERS item 7 also showed high MIs for directly indicating the ER abilities second-order DEK (DERS.DEK) construct. These findings suggest that DEK as a construct may be more strongly represented by difficulties in identifying and having a clear understanding of one's feelings, as demonstrated by the potential model improvement if larger DEK constructs were directly indicated by items in the DIF and Clarity subscales. Additionally, multiple items between subscales yielded high MIs for residual covariance, which may be attributed to shared measurement errors or unspecified constructs. For example, there was an extremely high value (MI = 63.72) for the residual covariance of TAS items 3 ("*I have physical sensations that even doctors don't understand"*) and 7 ("*I am often puzzled by sensations in my body"*). Examination of the item content suggests that these two items appear to represent difficulties associated with interoceptive accuracy that is differentiated from the rest of the DIF subscale items. Overall, these modification indices suggest

a misspecification of the model. Together, the poor model fit and construct redundancy, demonstrated by the high correlation between second-order DEK constructs, suggest that the measurement model for the SEM of the parallel mediation testing hypotheses 3-5 should be simplified to account for redundancy in the larger DEK construct.

Figure 3

Factor Loading of Second-Order CFA Assessing Overlap Between Latent DEK Constructs



Note. This figure illustrates the factor loadings of items indicating the first-order latent constructs of Awareness, Clarity, DIF, and DDF, and their factor loadings indicating the second-order latent DEK constructs. Standardized covariance between latent DEK constructs was assessed. *** $p < .001$.

Specification of the Measurement Model

To simplify the measurement model used to test the hypothesized parallel mediations, only the latent TAS-DEK factor was retained to stay consistent with existing literature, as well as to account for interoceptive accuracy present in items 3 and 7 of the TAS-20, which is not accounted for in the DERS Awareness and Clarity subscales. The retained second-order confirmatory factor model with preserved factor structure of the original DIF and DDF constructs also revealed poor model fit: CFI =.89, TLI = .86, RMSEA = .11, and SRMR = .07. To optimize the measurement model, a parallel analysis was first conducted to determine the appropriate number of factors using all of the DIF and DDF subscale items. Eigenvalues from 1,000 randomly generated datasets with the same number of variables and observations as the present study were compared with actual data from the present study. The parallel analysis revealed a three-factor structure based on items from the DIF and DDF subscales (see Table 4). Exploratory factor analysis (EFA) of three specified factors with Direct Oblimin rotation was conducted to account for the non-orthogonality of these related subscale items. The EFA revealed factors representing DIF, DDF, and Poor Interoceptive Accuracy (see Table 5).

Table 4

Parallel Analysis of DIF & DDF Subscale Items

Factors Retained	Original Factors Eigenvalue	Resampled Data Eigenvalue	Simulated Data Eigenvalue
1	4.85	0.51	0.50
2	0.98	0.39	0.38
3	0.38	0.29	0.28

Note. Factor retained if observed eigenvalues exceed those from random datasets.

Table 5

Factor Loadings of Three-Factor Structure EFA with Oblimin Rotation

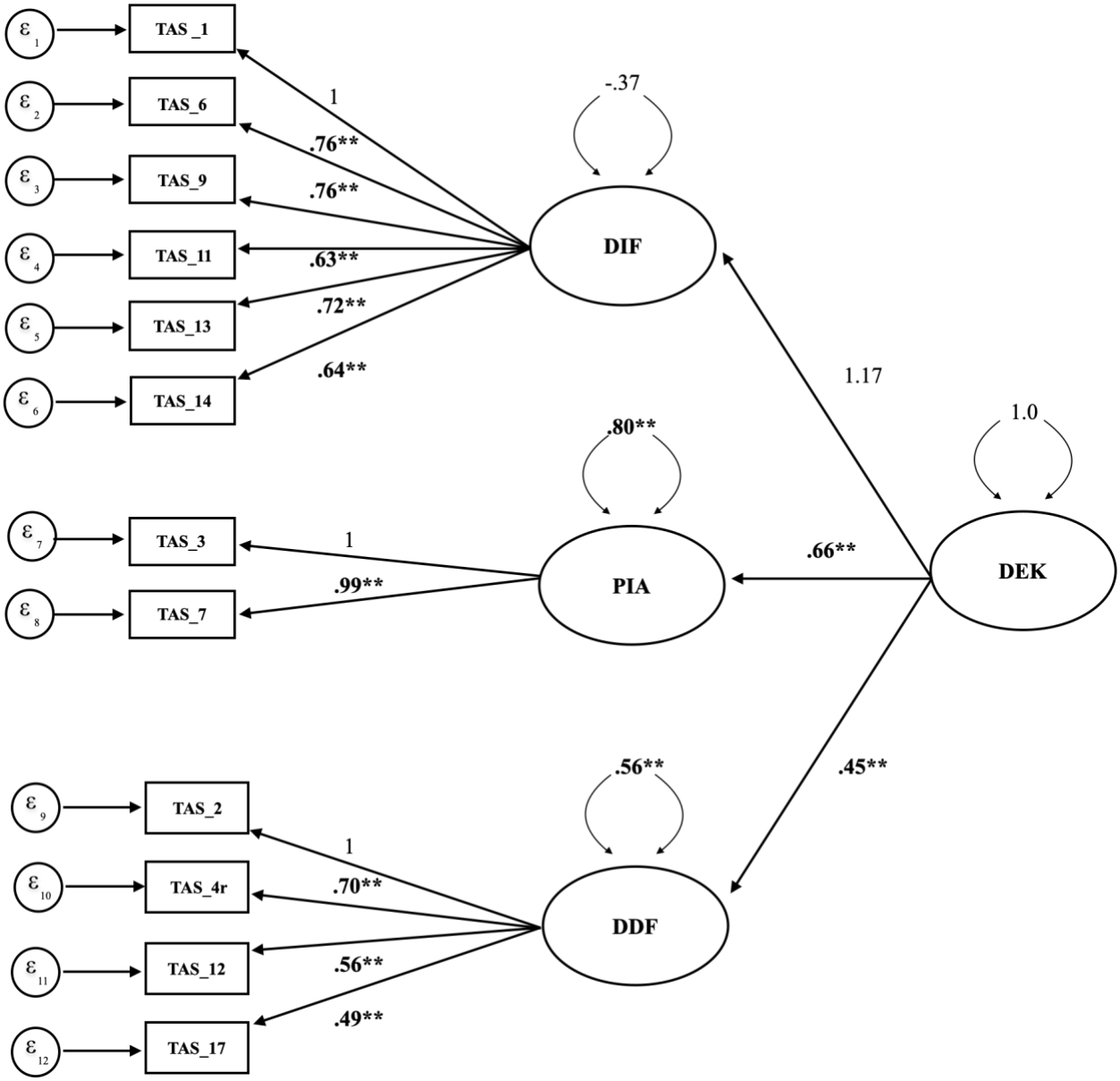
	Difficulty Identifying Feelings (DIF)	Difficulty Describing Feelings (DDF)	Poor Interoceptive Accuracy (PIA)
TAS_1	.75		
TAS_2		.91	
TAS_3			.72
TAS_4r		.58	
TAS_6	.80		
TAS_7			.90
TAS_9	.51		
TAS_11	.43		
TAS_12		.57	
TAS_13	.56		
TAS_14	.76		
TAS_17		.54	

Note. Factor loading > .40 indicates a robust relationship between the observed variable and the underlying latent factor.

The measurement model (see Figure 4) specified according to the exploratory factor analysis provided a good model fit: Robust CFI = 0.98, Robust TLI = 0.97, Robust RMSEA = 0.05, and SRMR = 0.04. However, a standard estimate of 1.17 and negative variances were detected in the latent first-order DIF factor, indicating a Heywood case. Heywood cases occur when one or more variance estimates for latent variables become negative or exceed the permissible range, indicating potential problems with model specification or data quality (Farooq, 2022). Therefore, to diagnose and rectify the Heywood Case, the measurement model was respecified.

Figure 4

Second-Order Factor Structure of Measurement Model with EFA-Suggested First-Order Latent Factors



Note. The standardized variance of the first indicator of each factor is fixed to 1. **. $p < .001$. Negative variance and standardized estimate above 1 in the first-order DIF latent construct indicates the presence of a Heywood case, suggesting potential issues with model specification.

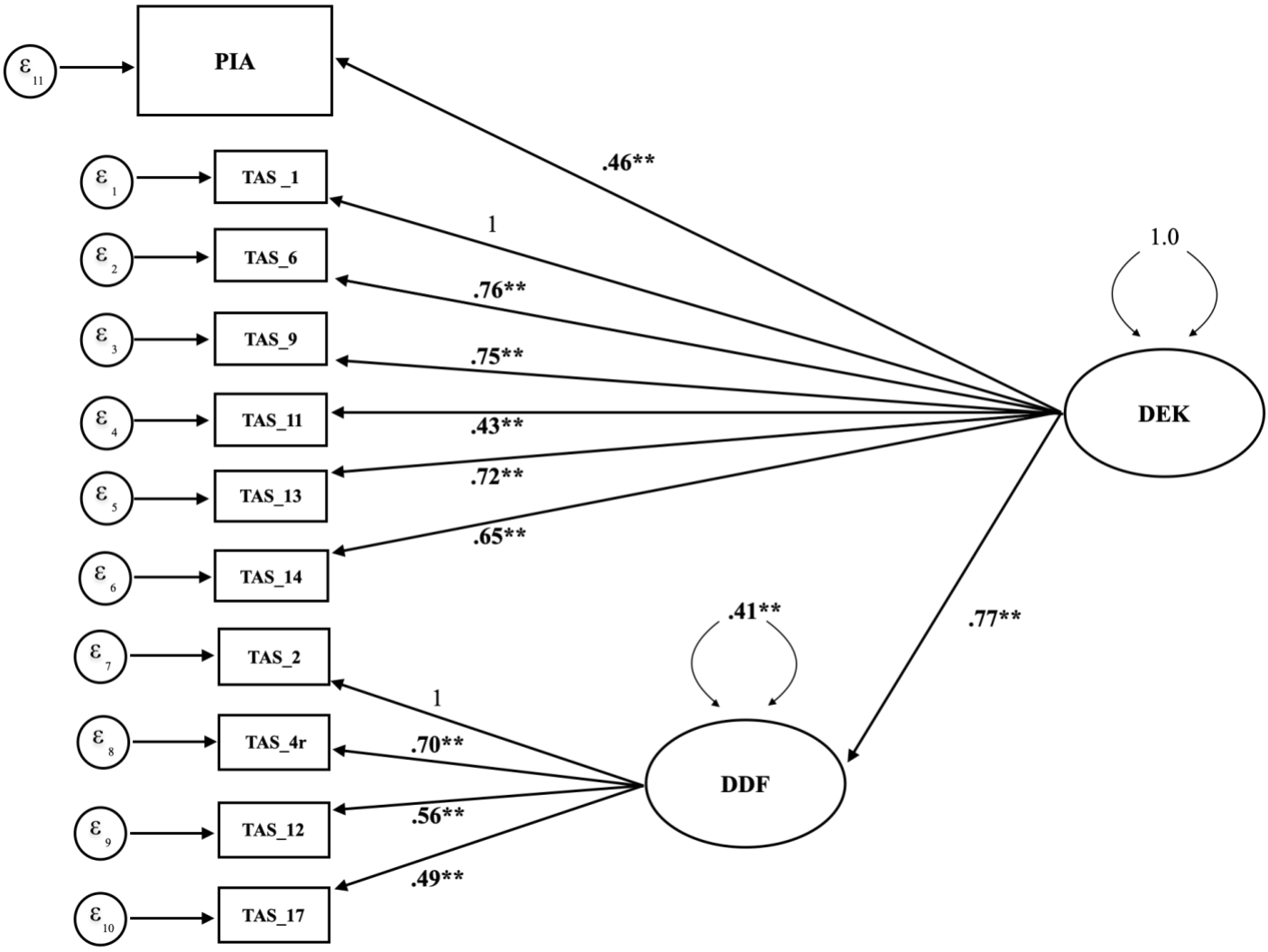
The first-order latent PIA factor is under-identified as it was measured by only two indicators, thus has fewer observations than parameters to be estimated (Tabachnick et al., 2019). Under-identification of this latent factor may affect the parameter estimation, model fit, and interpretability of the factor. To address this issue, the summed scores of items corresponding to the PIA latent factor (items 3 & 7 of the DIF subscale in the TAS-20) were used to create a composite observed variable from the two indicators. This new composite observed variable was then used to indicate the larger second-order factor, DEK, directly. This approach allowed the inclusion of information from the two indicators while addressing the identification issue.

Upon inspecting the respecified model, the standardized estimate for DIF exceeding the permissible range appears to indicate this construct's disproportional influence on the DEK second-order construct, suggesting over-representation. To address this issue, items corresponding to the first-order latent DIF factor were directly used to indicate the larger DEK second-order construct. Instead of examining DIF as a separate construct, its items are now included without the intermediary of a first-order latent factor. Meanwhile, the DDF first-order latent factor remained unchanged in this process, functioning as an intermediary latent factor indicating the larger DEK construct.

The final respecified measurement model (see Figure 5) still demonstrated good model fit as indicated by Robust CFI = 0.97, Robust TLI = 0.96, Robust RMSEA = 0.05, and SRMR = 0.04. By addressing both the under-identification of the PIA construct and over-representation of the DIF first-order latent factor on the larger second-order DEK construct, the negative variance (Heywood case) associated with the DIF factor was resolved. The retention of the DDF first-order latent factor allowed the model to maintain the integrity of the original measurement model, allowing the DEK construct to be represented by the DIF, DDF, and PIA components.

Figure 5

Finalized Measurement Model of DEK



Note. The standardized variance of the first indicator of each factor is fixed to 1. **. $p < .001$. All factor variances are positive, indicating a resolved Heywood case.

Structural Equation Modelling

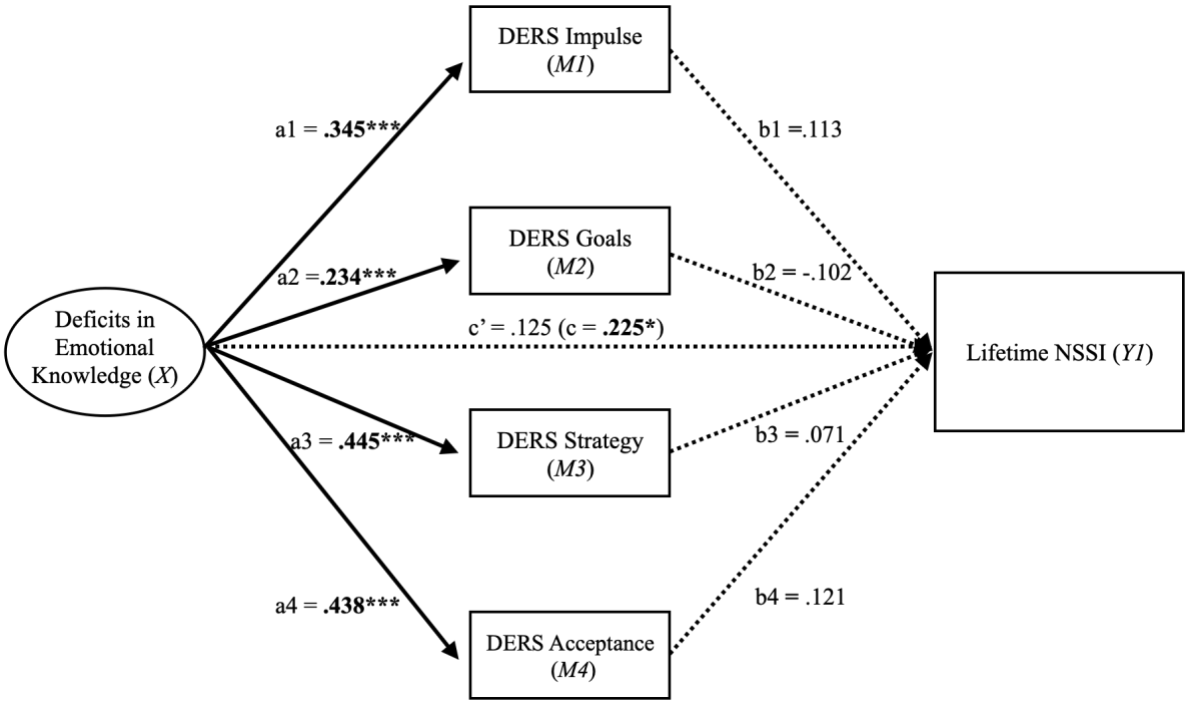
Structural Model of DEK's Parallel Mediation via ER Abilities to Predict Lifetime NSSI

The structural parallel mediation model demonstrated an acceptable fit with a CFI of 0.95 and SRMR of 0.06 but a less than adequate fit with a TLI of 0.89 and RMSEA of 0.08, according

to the cut-off criteria suggested by Hu and Bentler (1999). As shown in Figure 6, the model revealed a significant total indirect effect of DEK on NSSI mediated through the four pathways in ER abilities: impulse control, engagement in goal-directed behaviours, access to adaptive ER strategies, and acceptance of emotions (β = .10, 95% CI [0.01, 0.20]). However, no significant indirect effects were found through any individual pathway from DEK to lifetime NSSI via deficits in the four ER abilities. Similarly, there was no significant direct effect of DEK on lifetime NSSI, indicating a lack of direct relationship between DEK and lifetime NSSI when accounting for other variables. Despite this, a significant total effect of DEK on lifetime NSSI was found (β = .23, 95% CI [0.05, 0.39]), suggesting that DEK influences NSSI through a combination of direct and indirect pathways, even though individual pathways were not significant.

Figure 6

Parallel Mediation Model Predicting Lifetime NSSI Frequency as an Outcome



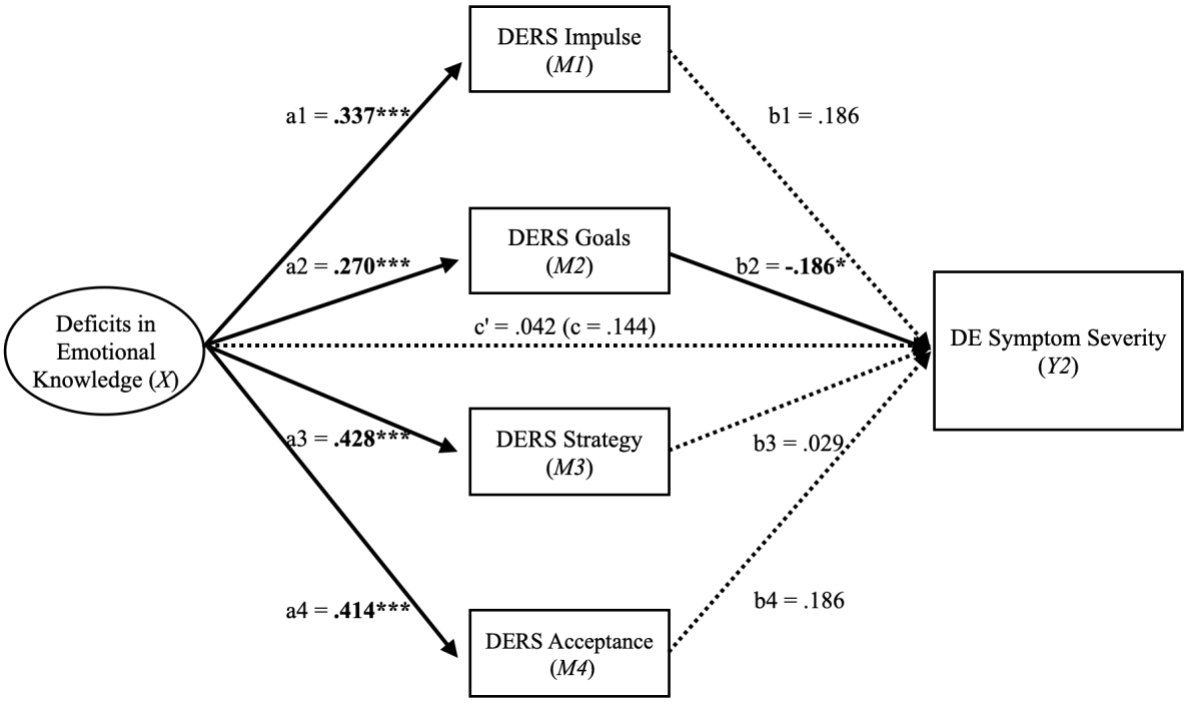
Note. $N = 172$, *** $p < .001$, ** $p < .01$, *$p < .05$.

Structural Model of DEK's Parallel Mediation via ER Abilities to Predict Severity of DE Symptoms

With exception of RMSEA = .07, all other fit indices of the structural parallel mediation model demonstrated an acceptable fit: CFI = .93, TLI = .91, and SRMR = .06. There was a significant positive total indirect effect (β = .10, 95% CI [0.01, 0.20]), indicating that deficits in the four ER abilities collectively mediated the relationship between DEK and DE symptom severity (see Figure 7). Among individual indirect pathways, only difficulties engaging in goal-directed behaviours significantly mediated the relationship between DEK and DE symptoms (β = - .05, 95% CI [-0.11, - 0.002]). The direction of the mediation also appears to be contrary to paths signified by other deficits in ER abilities, whereby DEK appears to be associated with greater difficulties engaging in goal-directed behaviours, and this difficulty is, in turn, associated with fewer DE symptoms. No significant direct or total relationship between DEK and DE symptoms was found, indicating that the impact of DEK on DE symptom severity operates primarily through the indirect pathways in the parallel mediation model.

Figure 7

Parallel Mediation Model Predicting DE Symptom Severity as an Outcome



Note. $N = 172$, *** $p < .001$, ** $p < .01$, *$p < .05$.

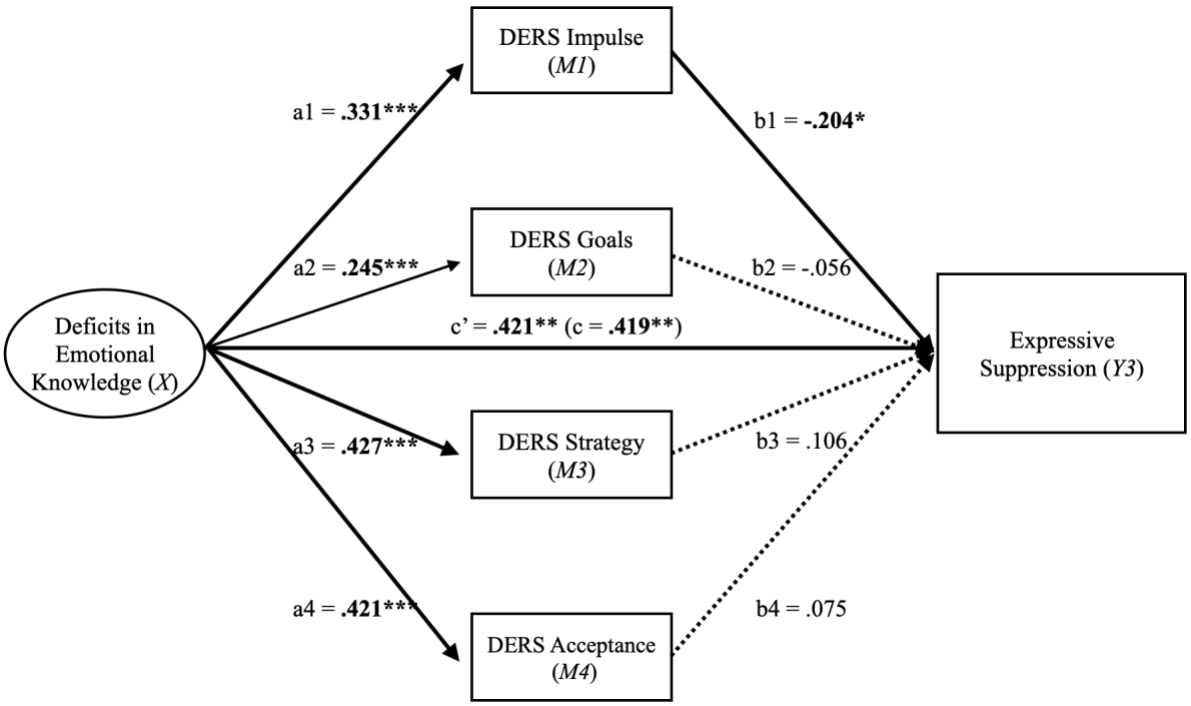
Structural Model of DEK's Parallel Mediation via ER Abilities to Predict the Use of Expressive Suppression

The structural parallel mediation model of DEK predicting Expressive Suppression demonstrated an overall less-than-acceptable model fit: CFI = .88, TLI = .84, RMSEA = .09, and SRMR = .08. As shown in Figure 8, only one indirect relationship was found, whereby impulse control difficulties negatively mediated the relationship between DEK and Expressive suppression (β = - .07, 95% CI [-0.10, - 0.01]). No other specific or total indirect effects were observed, suggesting that impulse control difficulties alone appear to mediate the relationship between DEK and Expressive Suppression. Within the same model, a significant positive direct effect of DEK on Expressive Suppression was found (β = .42, 95% CI [0.25, 0.59]), suggesting that DEK directly and positively contributes to the selection of this maladaptive ER strategy. A

significant total effect was also found (β = .42, 95% CI [0.28, 0.56]), indicating that DEK has an overall positive influence on Expression Suppression when considering both direct and indirect pathways. However, with a minimal difference of .002 between the standardized estimates of the direct (.421) and total effect (.419), it appears that Expressive Suppression is predominantly influenced by the direct effects of DEK.

Figure 8

Parallel Mediation Model Predicting Expressive Suppression as an Outcome



Note. $N = 172$, *** $p < .001$, ** $p < .01$, *$p < .05$.

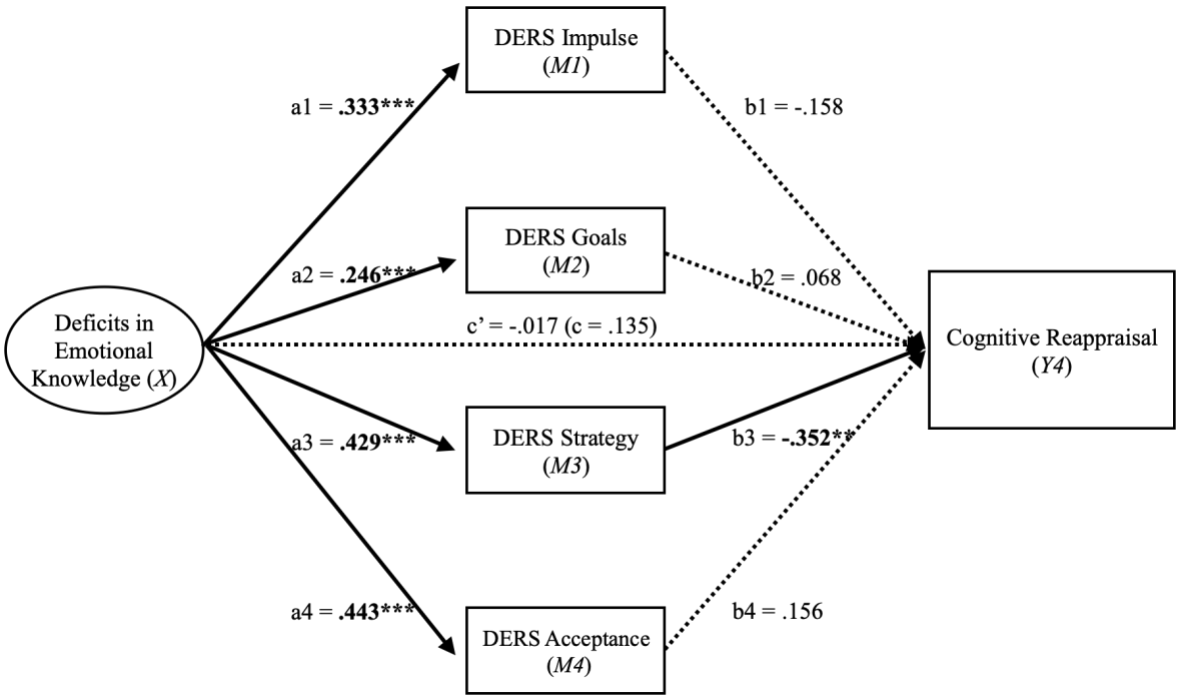
Structural Model of DEK's Parallel Mediation via ER Abilities to Predict the Use of Cognitive Reappraisal

The structural parallel mediation model of DEK, used to predict Cognitive Reappraisal scores on the ERQ (Gross & John, 2003), revealed an overall good model fit: CFI = .94, TLI = .93, RMSEA = .06, and SRMR = .06. Collectively, as shown in Figure 9, all four mediators significantly and negatively mediated the relationship between DEK and Cognitive reappraisal,

as indicated by the significant total indirect effect found in this model (β = - .118, 95% CI [-0.21, -0.03]). There was a significant indirect effect through the lack of access to adaptive ER strategies (β = - .151, 95% CI [-0.27, -0.05]), such that DEK is significantly associated with greater difficulty accessing adaptive ER strategies, which was in turn negatively associated with the use of Cognitive Reappraisal. This finding suggests that difficulty accessing adaptive ER strategies negatively mediated the relationship between DEK and the use of Cognitive Reappraisal to regulate emotions. No significant direct effect (β = - .017, 95% CI [-0.18, 0.15]) or total effect (β = .135, 95% CI [-0.31, 0.04]) was found between DEK and Cognitive Reappraisal, indicating that the impact between the predictor and outcome variables operates primarily through the indirect pathways involving ER abilities.

Figure 9

Parallel Mediation Model Predicting Cognitive Reappraisal as an Outcome



Note. N = 172, *** $p < .001$, ** $p < .01$, *$p < .05$.

Discussion

The aims of this study were twofold: first, it examined the extent of conceptual and measurement overlap between Lack of Emotion Clarity and Limited Emotional Awareness, assessed by the DERS (Gratz & Roemer, 2003), and Difficulties Identifying Feelings and Difficulties Describing Feelings, as measured by the TAS-20 (Bagby et al., 1994); second, it examined whether specific ER abilities mediated the relationships between deficits in emotional knowledge and four emotion regulation strategies, namely NSSI, DE, expressive suppression and cognitive reappraisal. Supporting the first hypothesis, the DDF subscale items were more strongly related to the Clarity and Awareness subscale, respectively, when compared to other subscales of the DERS. This finding indicates that individuals who experience deficits in clarity and awareness of emotions also tend to exhibit difficulties describing emotions. The DIF subscale was only more strongly associated with the Clarity subscale when compared to other subscales of the DERS, suggesting a lack of emotional clarity and difficulties identifying feelings are closely related to one another and may assess similar facets of emotional knowledge. Together, these findings suggest a potential overlap in the measured constructs. Further aligning with the first finding and the existing literature, the second-order latent Deficits in Emotional Knowledge (DEK) constructs comprised of either lack of emotional Clarity and Awareness, or DIF and DDF, revealed a very strong correlation (r = .94). The magnitude of this correlation suggests substantial content redundancy between these two constructs (Hypothesis 2). The substantial overlap in construct implies a broader difficulty in cultivating *Emotional Knowledge*, which encompasses the ability to recognize emotions in oneself and others, accurately label emotional experiences, and accurately attribute causes of various emotions (Luminet & Zamarioloa, 2018). Emotional knowledge is critical for developing various ER abilities as they

depend heavily on understanding and utilizing emotional information (da Silva et al., 2017; Luminet & Zamariola, 2018).

Elucidating the conceptual overlap between alexithymia and measures of ER abilities is essential for investigating the hypothesized process-based relationships between alexithymia, ER abilities, and the subsequent selection of ER strategies, which the current study aimed to address. If the DIF and DDF measures of alexithymia and the Awareness and Clarity measures of ER abilities highlight the same underlying deficits in emotional knowledge, it would be redundant to examine the same construct within the hypothesized ER process. To optimize the measurement model for assessing this process-based relationship, deficits in emotional knowledge (DEK) were entered as a latent construct measured only by two TAS-20 subscales, the DIF and DDF, rather than a consolidation of the TAS-20 and DERS items measuring emotional knowledge. This decision was informed by considerations for parsimony, consistency with the current literature exploring the relationship between alexithymia and ER (Brown et al., 2018; Laloyaux et al., 2015; D. A. Preece et al., 2023b; Taş Torun et al., 2022), and allowing for the inclusion of interoceptive accuracy in the construct. Since the interpretation of bodily sensations associated with emotional arousal plays an important role in translating emotional knowledge and driving maladaptive behaviours (Betka et al., 2018; Mueller & Alpers, 2006), the retention of the alexithymia DEK construct made stronger conceptual sense as only items in the TAS-20 assessed bodily sensations associated with emotions. Accurately representing the DEK construct is crucial for investigating how deficits in emotional knowledge may contribute to deficits in ER abilities and selection of ER strategies, as previous research has consistently found DIF, a key driver of DEK, to be predictive of maladaptive coping (Laloyaux et al., 2015; Nowakowski et al., 2013; D. A. Preece et al., 2023b; Taş Torun et al., 2022; Westwood et al., 2017).

Deficits in emotional knowledge appear to play an important role in how often individuals engage in NSSI over their lifetime through global impairments in ER (Buckholdt et al., 2015; Muehlenkamp et al., 2010). The present study, however, did not find specific mediating pathways between DEK and lifetime NSSI frequency through deficits in acceptance of emotions, impulse control, access to ER strategies, or goal-directed behaviours. This finding was surprising as previous research emphasized the role of impulse control difficulties as a driver of NSSI, which often functions to regulate adverse emotional experiences (Chapman et al., 2006; Taş Torun et al., 2022). However, this finding can be explained by the total effect and total indirect effect found in the parallel mediation model investigating this relationship, outlining a collective mediation effect of all four ER abilities between DEK and lifetime NSSI, partly supporting hypothesis 3. Another factor to consider is the relationship between alexithymia and depression. Research has consistently shown that alexithymia is associated with depression (Boden & Thompson, 2015; Honkalampi et al., 2001; Vine & Aldao, 2014). In the present study, participants with depression who exhibit no self-damaging behaviours were included as controls, but the prevalence of depression among those who engage in self-damaging behaviours was not controlled for. Therefore, depression symptoms could potentially account for differences in the observed and hypothesized relationship between DEK, ER abilities, and engagement in NSSI. Considering that affect regulation is one of the most commonly and strongly endorsed motivators of NSSI (Chapam et al., 2006; Dixon-Gordon et al., 2022; Klonsky, 2007; Klonsky & Glenn, 2009; Robillard et al., 2022), the mediating effect of multiple ER deficits in the relationship between DEK and NSSI found this in this study appears to support the potential function of NSSI as a form of avoidant ER strategy. As deficits in emotional knowledge can contribute to a general sense of distress when people struggle to process emotions effectively (Betka et al.,

2018; Liminet & Zamariola, 2018; Mueller & Alpers, 2006), NSSI can serve as a quick and effective means of avoiding emotional discomfort from unresolved emotional states. However, the temporal precedence in the relationship between the onset of emotional distress associated with DEK, ER difficulties, and engagement of NSSI has to be further probed to establish the direction of causality.

Similar to NSSI frequency, the present study also found that global deficits in ER abilities mediated the relationship between DEK and DE symptoms, suggesting that greater difficulties across multiple domains of emotion regulation associated with DEK are, in turn, collectively associated with elevated DE severity. Inconsistent with the study hypothesis, deficits in abilities to accept one's emotions or control impulses did not uniquely mediate the relationship between DEK and DE symptoms. This finding could be attributed to the use of the EAT-26 total score rather than symptom-specific scores, as ER difficulties associated with DE, particularly impulse control, were more specifically outlined to be associated with binge eating (Racine & Wildes, 2013). Interestingly, findings revealed that difficulties engaging in goal-directed behaviours when a person is experiencing negative emotion is the only significant independent indirect effect, and it acts as a competing mediator whereby its direction of association is contrary to the other mediating paths. Despite being positively associated with DEK, greater difficulty engaging in goal-directed behaviour when upset was negatively associated with DE symptom severity. Goals and values are often strongly tied to our learned emotional experiences, sense of self-concept, and self-identity (Bagozzi & Pieters, 1998; Baumeister et al., 2007; Hayes et al., 2006; Uğurlar & Wulff, 2022). Considering that our personal goals and values are often informed by our emotional experiences, the process of developing meaningful intrapersonal goals may also be hampered if one experiences difficulties forming and mobilizing emotional

knowledge. Self-concept clarity refers to the extent to which one's perceived personal attributes and viewpoints are confidently defined and consistent across time (Campbell, 1990) and thus serves as a measure of certainty and consistency about the self. When one's self-concept is unclear, goals and values may be more strongly informed by extrinsic sources of validation and motivation, particularly ones that are socioculturally ingrained (Butzer & Kuiper, 2006). Internalized sociocultural appearance attitudes such as weight stigma, characterized by cognitive integration of anti-fat attitudes and common negative weight-based stereotypes into one's view of self and directing negative attitudes about weight gain and body size toward self (Puhl & King, 2013), and cognitive integration of thin/muscular ideals into one's standards for the self (Thompson & Stice, 2001) can contribute to the developing goals and values that promote DE, dysfunctional exercise behaviours, and overvaluation of weight and shape (Grabe, Ward, & Hyde, 2008; Pearl & Puhl, 2013; Puhl & Suh, 2015; Thompson & Stice, 2001; Vartanian & Shaprow, 2008; Vartanian & Novak, 2011). Therefore, when one's goals and values are informed by these external factors, deficits in this specific domain may actively hinder goal and value-driven behaviours informed by various sociocultural pressures as a by-product of general difficulties in motivating goal-directed behaviours. Considering the overall positive relationship between DEK and DE symptom severity as mediated by deficits in multiple domains of ER difficulties, findings appear to support the theory that individuals experiencing distress may engage in DE cognitions regarding weight, shape, and diet to avoid or distract from aversive emotional experiences (Racine & Wildes, 2013). However, similar to NSSI as a maladaptive outcome, the relationship between alexithymia and depression may also play a role in the interpretation of the relationship between DEK, ER difficulties, and DE. Additionally, specific DE cognitions and their behavioural presentations (e.g., undercontrolled behaviours such as

binge eating, versus overcontrolled behaviours such as restriction, dieting, and fasting) need to be assessed to understand how various components of DE are related to DEK and the emotion regulation process in general. Temporal precedence of emotional distress and the use of various DE behaviours and cognition must also be established to provide further evidence for the affect regulation functions of DE.

Consistent with existing evidence, individuals with greater difficulties identifying, detecting, and recognizing emotions in themselves and others are more prone to select maladaptive ER strategies over adaptive ones (Laloyaux et al., 2015; Luminet & Zamariola, 2018; Preece et al., 2023). Specifically, deficits across ER abilities associated with DEK are associated with a decreased likelihood of selecting adaptive ER strategies such as cognitive reappraisal (Laloyaux et al., 2015; Preece et al., 2023). Unsurprisingly, a lack of access to adaptive ER abilities, in particular, significantly and negatively mediated the relationship between DEK and cognitive reappraisal. This finding suggests that adaptive ER strategies such as cognitive reappraisal may not be easily available to individuals who experience greater deficits in emotional knowledge as these strategies require a more sophisticated understanding of one's emotional experience.

The analysis examining expressive suppression revealed some unexpected findings. First, only one indirect effect was significant, highlighting a negative mediating relationship of impulse control difficulties in the relationship between DEK and the selection of expressive suppression in the face of aversive emotions. This finding signifies that individuals experiencing greater impulsivity associated with DEK are less likely to use suppression to modulate their emotions. Although expressive suppression does not require depth of understanding in one's emotional experience, it is an ER strategy that requires significant effort as it involves

sequestering emotional expression but does not provide relief from aversive emotional experiences (Cutuli, 2014; Gross & John, 2003). Expressive suppression, therefore, is less appealing or less accessible as a form of ER strategy for individuals with greater difficulty controlling impulses. This finding suggests that suppression is a maladaptive ER strategy employed without the presence of urgency to avoid aversive emotions, highlighting a difference in mechanisms that drive the form of response-focused maladaptive ER strategies used within the sample. Findings from the present study reinforce that suppression-based strategies are functionally distinct from avoidance-based strategies, such that avoidance-based strategies likely serve the function of providing immediate temporary relief from aversive emotional experiences, whereas suppression aims at dampening the outward expression of emotions.

Apart from expressive suppression, there were no other direct effects of DEK on the outcome variables, suggesting that DEK's relationship with NSSI, DE, and cognitive reappraisal operates through global deficits in ER abilities. On the other hand, the selection of expressive suppression appears to be more directly predicted by DEK rather than through the presence of ER abilities other than impulse control. This is also highlighted by the discrepancy in model fit between the identical parallel mediation models examining the ERQ expressive suppression and cognitive reappraisal as outcomes, suggesting a difference in conceptual alignment in how these ER strategies function in the process of ER. It is possible that skills required to dampen emotions associated with expressive suppression may be prioritized as a form of ER ability or that individuals utilizing suppression-based strategies may not have access to emotional knowledge to develop adaptive ER abilities in the first place (Preece et al., 2017). Preece and colleagues (2017) distinguished between ability deficit alexithymia, which is represented by deficits in one's ability to attend to emotional information, and avoidance alexithymia, characterized by a

deliberate avoidance of emotional information, in their attention-appraisal model. Therefore, it is possible that alexithymia represents DEK through a combination of deficits in one's ability to attend to emotional information needed to develop the emotional schemas and ER abilities, as well as through defensive responses to avoid distressing emotions driven by heightened somatosensory sensitivity (Cucchi et al., 2012; Kano et al., 2007; Nyklíček & Vingerhoets, 2000). Therefore, individuals with varying levels and combined sources of DEK may choose different methods to regulate emotions in response to emotional distress associated with DEK. Further investigation into the sources of DEK and the function and consequences of various cognitive and behaviour ER strategies should be implemented to elucidate their qualitative differences further.

Theoretical and Research Implications

The first aim of the present study was to examine the conceptual overlap between measures assessing emotional knowledge across two distinct measures and identify a simplified factor structure to prioritize parsimony. Considering that numerous ER and behavioural outcomes are regularly associated with the DIF and DDF constructs of the alexithymia and that the EOT subscale of the TAS-20 consistently demonstrates poor reliability and potential validity issues, future studies should consider adapting the TAS-20 DIF and DDF subscales using a similar measurement model as used in this study to represent latent deficits in emotional knowledge. This single latent construct captured difficulties in identifying and describing feelings as well as interpreting physiological sensations associated with emotional arousal. This adaptation allows the elucidation of DEK's impact on the ER process and associated behaviours. Moreover, findings from this study underscore the need to reduce redundancy and promote parsimony when examining the relationship between alexithymia and ER abilities using the

DERS. Specifically, when employing a process-oriented analytic strategy, it is crucial to appropriately select and structure the measures to avoid overlapping constructs and enhance the clarity of the relationships being studied.

Coupled with established affect regulation theories of maladaptive behaviours (Chapman et al., 2006; Heatherton & Baumeister, 1991), findings from this study provide support for maladaptive behaviours such as NSSI and DE as potential forms of behavioural avoidance-based ER strategies to circumvent distressing emotional experiences (Klonsky, 2007; Racine & Wildes, 2013). These behaviours are particularly evident in individuals with deficits in ER abilities associated with DEK. ER abilities are functional skills that require the mobilization of emotional knowledge, necessitating continuous practice to use and access effectively. Consistent with Hayes' (2006) conceptualization of experiential avoidance, engagement in behaviours that immediately alleviate aversive experiences through avoidance can paradoxically exacerbate distress and reinforce dysfunctional behaviours (Gratz et al., 2018; Panayiotou et al., 2015). Over time, the use of avoidant ER strategies can narrow the range of accessible behaviours and skills, further exacerbating difficulties in attending to emotional information and cultivating emotional knowledge. However, it is important to highlight that a deficit in emotional knowledge may have varying attributable sources, whereby one may be attributable to a lack of ability to attend to emotional information and the other is associated with the deliberate avoidance of such information (Preece et al., 2017).

Despite only finding a significant negative indirect effect of difficulties engaging in goal-directed behaviour in the model assessing DE, the identical indirect pathway in the NSSI model also exhibited the same directionality, albeit not statistically significant. This finding suggests a potential protective effect of this particular deficit. However, this is mainly attributable to the

orientation of one's goals, as general difficulties in engaging in goal-directed behaviours are still associated with long-term distress and dysfunction. Therefore, the present study also highlights the importance of assessing and identifying sources of goals when addressing behaviours used as ER strategies to alleviate emotional distress.

Findings regarding the selection of expressive suppression directly attributed to DEK and the negative mediation through impulse control difficulties suggest that expressive suppression functions differently from other behavioural ER strategies. While DEK is more directly associated with expressive suppression, behavioural maladaptive ER strategies like NSSI and DE are positively mediated by a combination of deficits in ER abilities. Unlike expressive suppression, behavioural maladaptive ER strategies are suggested to be motivated by a desire to avoid distress, offering immediate relief of aversive emotions. However, it is important to highlight that deficits in emotional knowledge associated with alexithymia can be attributed to both deficits in abilities to attend to emotional information as well as a deliberate avoidance of emotional information (Preece et al., 2017). Therefore, the study's findings highlight a need to assess the attributable source of the deficit in emotional knowledge to appropriately formulate targeted intervention that addresses the source of the deficit.

Clinical Implications

Findings from the present study also have several clinical implications. Considering that DEK appears to be associated with maladaptive coping through various deficits in ER abilities, therapists working with individuals with chronic presentations of NSSI or DE should consider the presence and contributing factors of DEK and ER abilities when addressing case conceptualization in an effort to formulate targeted interventions. Therapeutic interventions with an emphasis on enhancing emotional awareness, distress tolerance, and emotional acceptance,

such as Dialectical Behavior Therapy (DBT; Linehan, 1997) and Acceptance and Commitment Therapy (ACT; Hayes, 2006), may be particularly effective. Additionally, individual orientation of goals should be considered when addressing these behaviours, as the ability to operationalize goal-directed behaviours can play a vital role in influencing the frequency and severity of dysfunctional behavioural presentations. Although deficits in mobilizing goal-oriented behaviours appear to be negatively associated with DE and NSSI, factors such as a lack of clarity, misalignment, and lack of actionable means of achieving personal goals and values can all contribute to a greater overall sense of distress. In conjunction with ACT, Motivational Interviewing can also be implemented to help identify core values, set meaningful goals, commit to actions, and develop actionable plans and motivation to achieve goals aligned with one's core personal values (Hayes, 2006; Miller, 2013).

Limitations and Future Directions

The present study exhibits several strengths through its strong theoretical rationale and the use of robust statistical techniques to examine the complex relationship between conceptually nuanced variables. However, there are several limitations that should be addressed in future research. First, considering that participants from the present study are oversampled for the prevalence of NSSI and DE as well as being primarily White females, results from the present study may not be generalizable to other populations. Future studies should aim to replicate findings from the presentation with both clinical and non-clinical samples assessing a broader range of adaptive and maladaptive ER strategies.

Another major limitation is the use of cross-sectional data to assess mediation. Causal inference requires the independent variable to precede the mediator in time and the mediator to precede the outcome variable (Baron & Kenny, 1986). Although the present study sought to

investigate the process-based relationship between emotional knowledge, ER abilities, and ER strategies using robust analytic strategies, the study is limited by its cross-sectional design as it cannot infer the temporal order and directionality in the relationship between variables. Future research can aim to capture the relationship between these constructs by integrating traditional prospective or micro-longitudinal research designs. To examine the hypothesized relationship between variables, future research can examine how baseline levels of emotional knowledge can predict the awareness and interpretation of emotional events, the subsequent ER strategies selected, and fluctuations in various aspects of emotions, such as valence, intensity, granularity, and multiplicity.

The present study also relied on self-reports of emotional and behavioural outcomes, which are prone to recall bias. Lifetime NSSI frequency, in particular, may be prone to inaccuracy as participants are asked to recall or estimate engagement in a discrete behaviour, NSSI, over a very long period. For some participants, lifetime engagement in NSSI may span across a period of days to over a decade, with fluctuating patterns throughout reported periods, making it difficult to estimate. Alongside demand characteristics, this outcome may be susceptible to over- or under-reporting. Additionally, some behaviours consistent with body-focused repetitive behaviours (BFRB) are assessed as forms of NSSI. However, due to the NSSI-focused assessment strategy implemented in the study, participants may have experienced confusion and uncertainty regarding the use of BFRBs as a form of NSSI, thus making the estimation of lifetime NSSI difficult. Therefore, outcomes from this variable were severely non-normally distributed. Future studies indexing NSSI severity should utilize measures assessing multiple dimensions of NSSI severity, such as psychosocial impacts of NSSI (Burke et al., 2017), along with NSSI frequency and recency. Further, differences in NSSI and BFRBs should

be clearly defined if items, including repetitive body-focused forms of NSSI, are integrated into the measure. Similar to measures of NSSI severity, the present study's index of DE severity should also include other dimensions of DE, such as the engagement in specific DE behaviours and their functions and consequences. Another limitation related to measures within the present study is the use of the ERQ cognitive reappraisal and expressive suppressive subscales to define adaptive and maladaptive ER strategies. Other maladaptive ER strategies, such as withdrawal and rumination, as well as adaptive ER strategies, such as problem-solving and planning, should also be included in future studies to explore qualitative differences in a variety of cognitive and behavioural ER strategies.

Aspects of the present findings should also be interpreted with caution. Although a portion of participants were recruited as depressed controls with no history of self-damaging behaviours, the recruitment strategies within the present study did not account for the prevalence of depression among individuals who exhibit self-damaging behaviours. Considering that alexithymia has also been found to be associated with depression (Boden & Thompson, 2015; Honkalampi et al., 2001; Vine & Aldao, 2014), future studies examining the relationship between DEK and maladaptive behavioural outcomes should include depression as a covariate as it is also a common co-occurring disorder with various maladaptive behaviours (Santos et al., 2007; Zielinski et al., 2017).

Finally, although the TAS-20 is effective in assessing components of alexithymia that define DEK, it does not effectively distinguish the cause of this deficit, such as a deficit in abilities to attend to emotional information or deliberate avoidance of emotional information. Further, the dimension of DEK may also be influenced by the externally oriented thinking (EOT) component of alexithymia, which was not captured in this study due to unreliability and potential

validity issues of the EOT subscale in the TAS-20. Future studies should consider alternative models of assessing alexithymia, such as the attention-appraisal model of alexithymia, which adequately captures components of DIF, DDF, and EOT and attributable sources of DEK by assessing difficulties appraising and attending to emotional information (Preece et al., 2017). Future studies can also consider further probing the factor structures of the DERS Awareness and Clarity subscales to capture unique dimensions of emotional knowledge not accounted for by items measuring alexithymia. Perhaps a more comprehensive measure of emotional knowledge can be formed using techniques such as Multidimensional Item Response Theory (MIRT) to effectively integrate items from multiple measures of emotional awareness, emotional clarity, socio-emotional awareness, and emotional intelligence to form a comprehensive latent construct of emotional knowledge (Bru-Luna et al., 2021; Lane & Smith, 2021; O'Connor et al., 2019).

Conclusions

The findings of this study highlight a significant overlap between constructs measured by the Clarity and Awareness subscales of DERS and the DIF and DDF subscales of TAS-20. This overlap suggests that deficits in emotional clarity and awareness are closely related to difficulties in identifying and describing emotions, and this substantial redundancy between constructs underscores a broader Deficit in Emotional Knowledge (DEK). Emotional knowledge, which involves recognizing, labelling, and understanding emotions, is essential for the application of various ER abilities, and DEK can significantly impede the process of emotion regulation, particularly through the selection of maladaptive ER strategies. Findings from the study provide support for the affect regulation theory of NSSI and DE, highlighting the role of DEK in driving problems in emotion regulation, which in turn drives maladaptive coping. The parallel mediation effect of deficits in acceptance of emotions, impulse control, access to ER strategies, and goal-

directed behaviours between DEK and both lifetime NSSI frequency and DE symptom severity emphasizes the global impact of DEK on the ER process. Findings also revealed differences in the functions of expressive suppression and other hypothesized maladaptive behavioural ER strategies. However, the present study is limited by its cross-sectional design, and future research should investigate the direction of these relationships through longitudinal designs. The present study provides compelling evidence of the integral role of emotional knowledge in effective emotion regulation. By elucidating the relationship between DEK, ER abilities, and the selection of ER strategies, this study offers insights into both clinical practice and future research aimed at addressing maladaptive patterns of ER.

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Appendix A

Toronto Alexithymia Scale (TAS-20)

Using the scale provided as a guide, indicate how much you agree or disagree with each of the following statements by circling the corresponding number. Give only one answer for each statement.

Circle 1 if you STRONGLY DISAGREE
Circle 2 if you MODERATELY DISAGREE
Circle 3 if you NEITHER DISAGREE NOR AGREE
Circle 4 if you MODERATELY AGREE
Circle 5 if you STRONGLY AGREE

	Strongly Disagree	Moderately Disagree	Neither Disagree Nor Agree	Moderately Agree	Strongly Agree
1. I am often confused about what emotion I am feeling.	1	2	3	4	5
2. It is difficult for me to find the right words for my feelings.	1	2	3	4	5
3. I have physical sensations that even doctors don't understand.	1	2	3	4	5
4. I am able to describe my feelings easily.	1	2	3	4	5
5. I prefer to analyze problems rather than just describe them.	1	2	3	4	5
6. When I am upset, don't know if I am sad, frightened, or angry.	1	2	3	4	5
7. I am often puzzled by sensations in my body.	1	2	3	4	5
8. I prefer to just let things happen rather than to understand why they turned out that way.	1	2	3	4	5

9. I have feelings that I can't quite identify.	1	2	3	4	5
10. Being in touch with emotions is essential.	1	2	3	4	5
11. I find it hard to describe how I feel about people.	1	2	3	4	5
12. People tell me to describe my feelings.	1	2	3	4	5
13. I often don't know what's going on inside of me.	1	2	3	4	5
14. I often don't know why I am angry.	1	2	3	4	5
15. I prefer talking to people about their daily activities rather than their feelings.	1	2	3	4	5
16. I prefer to watch "light" entertainment shows rather than psychological dramas.	1	2	3	4	5
17. It is difficult for me to reveal my innermost feelings, even to close friends.	1	2	3	4	5
18. I can feel close to someone, even in moments of silence.	1	2	3	4	5
19. I find examination of my feelings useful in solving personal problems.	1	2	3	4	5
20. Looking for hidden meanings in movies or plays distracts form their enjoyment.	1	2	3	4	5

Appendix B

Difficulties in Emotion Regulation Scale (DERS)

Please rate how often the following statements reflect your feelings or perceptions about yourself.

	Almost never (0 – 10%)	Sometimes (11 – 35%)	About half the time (33 – 65%)	Most of the time (66 – 90%)	Almost always (91 – 100%)
1. I am clear about my feelings.	1	2	3	4	5
2. I pay attention to how I feel.	1	2	3	4	5
3. I experience my emotions as overwhelming and out of control.	1	2	3	4	5
4. I have no idea how I am feeling.	1	2	3	4	5
5. I have difficulty making sense out of my feelings.	1	2	3	4	5
6. I am attentive to my feelings.	1	2	3	4	5
7. I know exactly how I am feeling.	1	2	3	4	5
8. I care about what I am feeling.	1	2	3	4	5
9. I am confused about how I feel.	1	2	3	4	5
10. When I'm upset, I acknowledge my emotions.	1	2	3	4	5
11. When I'm upset, I become angry with myself for feeling that way.	1	2	3	4	5
12. When I'm upset, I become embarrassed for feeling that way.	1	2	3	4	5

13. When I'm upset, I have difficulty getting work done.	1	2	3	4	5
14. When I'm upset, I become out of control.	1	2	3	4	5
15. When I'm upset, I believe that I will remain that way for a long time.	1	2	3	4	5
16. When I'm upset, I believe that I'll end up feeling very depressed.	1	2	3	4	5
17. When I'm upset, I believe that my feelings are valid and important.	1	2	3	4	5
18. When I'm upset, I have difficulty focusing on other things.	1	2	3	4	5
19. When I'm upset, I feel out of control.	1	2	3	4	5
20. When I'm upset, I can still get things done.	1	2	3	4	5
21. When I'm upset, I feel ashamed with myself for feeling that way.	1	2	3	4	5
22. When I'm upset, I know that I can find a way to eventually feel better.	1	2	3	4	5
23. When I'm upset, I feel like I am weak.	1	2	3	4	5
24. When I'm upset, I feel like I can remain in control of my behaviors.	1	2	3	4	5
25. When I'm upset, I feel guilty for feeling that way.	1	2	3	4	5
26. When I'm upset, I have difficulty concentrating.	1	2	3	4	5

27. When I'm upset, I have difficulty controlling my behaviors.	1	2	3	4	5
28. When I'm upset, I believe that there is nothing I can do to make myself feel better.	1	2	3	4	5
29. When I'm upset, I become irritated with myself for feeling that way.	1	2	3	4	5
30. When I'm upset, I start to feel very bad about myself.	1	2	3	4	5
31. When I'm upset, I believe that wallowing in it is all I can do.	1	2	3	4	5
32. When I'm upset, I lose control over my behaviors.	1	2	3	4	5
33. When I'm upset, I have difficulty thinking about anything else.	1	2	3	4	5
34. When I'm upset, I take time to figure out what I'm really feeling.	1	2	3	4	5
35. When I'm upset, it takes me a long time to feel better.	1	2	3	4	5
36. When I'm upset, my emotions feel overwhelming.	1	2	3	4	5

Appendix C

Emotion Regulation Questionnaire (ERQ)

We would like to ask you some questions about your emotional life, in particular, how you control (that is, regulate and manage) your emotions. The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways. For each item, please answer using the following scale:

1 = Strongly Agree
2 = Agree
3 = Somewhat agree
4 = Neutral
5 = Somewhat disagree
6 = Disagree
7 = Strongly Disagree

	Strongly Agree	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree	Strongly Disagree
1. When I want to feel more positive emotion (such as joy or amusement), I change what I'm thinking about.	1	2	3	4	5	6	7
2. I keep my emotions to myself.	1	2	3	4	5	6	7
3. When I want to feel less negative emotion (such as sadness or anger), I change what I'm thinking about.	1	2	3	4	5	6	7
4. When I am feeling positive emotions, I am careful not to express them.	1	2	3	4	5	6	7

5. When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm.	1	2	3	4	5	6	7
6. I control my emotions by not expressing them.	1	2	3	4	5	6	7
7. When I want to feel more positive emotion, I change the way I'm thinking about the situation.	1	2	3	4	5	6	7
8. I control my emotions by changing the way I think about the situation I'm in.	1	2	3	4	5	6	7
9. When I am feeling negative emotions, I make sure not to express them.	1	2	3	4	5	6	7
10. When I want to feel less negative emotion, I change the way I'm thinking about the situation.	1	2	3	4	5	6	7

Appendix D

Self-Injurious Thoughts and Behaviours Interview-Revised (SITBI-R)

Items pertaining to NSSI:

The first questions ask about experience you may have had with self-injury. For these questions, we are referring to times where you have directly hurt yourself without wanting to die, for example cutting or burning your skin. We are not asking about times when you have indirectly hurt yourself, for example times where you starved yourself or overdosed.

Do you have questions about that definition?

1. Have you ever **purposefully** hurt yourself without wanting to die?
   - ☐ No
   - ☐ Yes

2. What are the ways in which you have purposely hurt yourself without wanting to die? Please select each of these that you have done.

	Yes	No
Cut or carved your skin	☐	☐
Hit yourself on purpose	☐	☐
Inserted objects into your skin or nails	☐	☐
Bit yourself	☐	☐
Scraped your skin to the point of drawing blood	☐	☐
Something else:_____	☐	☐

3. How old were you the first time you purposely hurt yourself without wanting to die?____

4. How old were you the last (or most recent) time?_____

5. Have you ever received medical (for example, getting stitches) and/or psychological treatment (for example, counselling) specifically related to purposely hurting yourself without wanting to die?
   - ☐ No
   - ☐ Yes

5a. What kind of treatment did you receive?

- Medical
- Psychological
- Both

For the following questions, we are curious about the number of times you have intentionally hurt yourself without wanting to die.

We realize it can be hard to know the exact number of times you've done these things, but please give your best estimate.

6. How many times **in the past year** have you hurt yourself without wanting to die?
   - 0
   - More than 0, write number here:____

7. How many times **in the past month** have you hurt yourself without wanting to die?
   - 0
   - More than 0, write number here:____

8. How many times **in the past week** have you hurt yourself without wanting to die?
   - 0
   - More than 0, write number here:____

9. How many times **in your life** have you hurt yourself without wanting to die? _____

10. On average, for how long have you **thought about** purposely hurting yourself without wanting to die **before** engaging in those behaviours? *(Interviewer: let participant respond, and then choose the option that most closely approximates their response. You do not need to read these options to them)*
    - 0 seconds
    - 1 – 59 seconds
    - 1 – 15 minutes
    - 16 – 60 minutes
    - Less than one day
    - 1 – 2 days
    - 3 – 6 days
    - 1 – 2 weeks
    - 2+ weeks
    - Wide range (spans more than two responses):_____

11. On a scale of 0 to 4, where 0 is Not at all and 4 is Extremely, how much do you **currently want to stop** purposely hurting yourself without wanting to die?

    If you have already stopped purposely hurting yourself, you can select 4.

- 0 – Not at all
- 1 – A little bit
- 2 – Somewhat
- 3 – Very much
- 4 – Extremely

Appendix E

Eating Attitudes Test (EAT-26)

Six-point scale ranging from 1 (always) to 6 (never)

1	2	3	4	5	6
Always	Usually	Often	Sometimes	Rarely	Never

Please fill out the below form as accurately, honestly and completely as possible. There are no right or wrong answers. Please tell us how much these concerns have been bothering you in the past month.

I.....

1. Am terrified about being overweight.
2. Avoid eating when I am hungry.
3. Find myself preoccupied with food.
4. Have gone on eating binges where I feel that I may not be able to stop.
5. Cut my food into small pieces.
6. Aware of the calorie content of foods that I eat.
7. Particularly avoid food with a high carbohydrate content (i.e. bread, rice, potatoes, etc.)
8. Feel that others would prefer if I ate more.
9. Vomit after I have eaten.
10. Feel extremely guilty after eating.
11. Am preoccupied with a desire to be thinner.
12. Think about burning up calories when I exercise.
13. Other people think that I am too thin.
14. Am preoccupied with the thought of having fat on my body.
15. Take longer than others to eat my meals.
16. Avoid foods with sugar in them.
17. Eat diet foods.
18. Feel that food controls my life.
19. Display self-control around food.
20. Feel that others pressure me to eat.
21. Give too much time and thought to food.
22. Feel uncomfortable after eating sweets.
23. Engage in dieting behavior.
24. Like my stomach to be empty.
25. Have the impulse to vomit after meals.
26. Enjoy trying new rich foods.