A retrospective study of childhood experiences of emotional neglect and self-compassion and their effects on the development of anhedonia and its subtypes.

Konstantinos Papakyriakou

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Abstract

Anhedonia is a construct that has not been adequately researched in general population. The majority of the research has investigated anhedonia in the context of psychological diagnoses such as MDD, Schizophrenia Spectrum Disorders, and PTSD. This dissertation aimed to identify whether childhood experiences of emotional neglect lead to the development of anhedonia in a general population sample. Furthermore, it investigated how those experiences specifically affected the four different types of anhedonia. The types were physical consummatory, anticipatory anhedonia, interpersonal consummatory and anticipatory anhedonia. In addition, it investigated whether the effect of emotional neglect and anhedonia was mediated by self-compassion.

This research aimed to fill a gap in the literature where focus was placed on specific subtypes of anhedonia and other subtypes were ignored. Furthermore, it investigated how emotional neglect can cause deficits in reward processing in healthy populations. Finally, it investigated whether these effects would be mediated by self-compassion.

These goals were tested through a quantitative survey study, which assessed the prevalence of experiences of emotional neglect retrospectively, while also measuring levels of anhedonia and self-compassion. Data was collected through online questionnaires and analyzed via correlations, simple linear regressions, hierarchical regressions, and mediation analyses using bootstrapping methodology.

The results displayed a small (2-2.8%) yet statistically significant effect of emotional neglect experiences on levels of anticipatory interpersonal and physical anhedonia. A similar trend was observed in the analysis of anticipatory physical anhedonia (2%) and consummatory

interpersonal anhedonia (1.1%). Self-compassion acted as a mediator between emotional neglect and both consummatory and anticipatory interpersonal anhedonia. This mediator relationship was not observed for the physical anhedonia variables.

This dissertation is one of the few that have studied anhedonia taking into account the complete conceptualization of the construct. It is also one of the few research projects that have investigated how emotional neglect affected anhedonia in a general population sample.

Keywords: Childhood Maltreatment, Consummatory Pleasure, Anticipatory Pleasure, Physical Anhedonia, Interpersonal Anhedonia, Self- compassion.

Dedication

Dedicated to long-time partner Marina Zarnomitrou, who supported me and provided me with encouragement at every step of the way. Also dedicated to my parents Kyriakos and Petroula who tolerated the many years I worked to complete my studies and helped me find the strength and the will to go through it. Finally I am dedicating this dissertation to my brother Tony, who always showed me that he was proud of me at every step of the way.

Declaration

I declare that the work in this thesis was carried out in accordance with the regulations of the University of Nicosia. This thesis has been composed solely by myself except where stated otherwise by reference or acknowledgment. It has not been previously submitted, in whole or in part, to this or any other institution for a degree, diploma or other qualifications

Signed:……. Date: 14/11/2023

Konstantinos Papakyriakou

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Introduction

This dissertation aimed to investigate how experiences of emotional neglect in childhood affect pleasure processing in an adult population and how that effect could be mediated by self-compassion.

Pleasure processing in this dissertation was operationally defined through the construct of anhedonia. Anhedonia refers to a significant reduction or absence of one's ability being able to gain pleasure from physical and interpersonal stimuli and the inability to expect pleasurable events or consume those pleasurable stimuli when they occur(Pizzagalli, 2022)

This topic was chosen for a number of reasons which will be detailed in the literature review section . The most significant amongst them being how anhedonia was operationalized in previous research. The majority of investigations concerning the symptom of anhedonia often operationalized it as a singular construct instead of a multidimensional construct. This conceptualization resulted in anhedonia frequently being assessed using single items from depression scales such as the CES-D and BDI-II rather than employing a more nuanced assess pleasure processing dysfunction (Carleton et al., 2013; Horan et al., 2006; Setterfield et al., 2016; Thomsen, 2015).

This dissertation employed a novel approach to studying this topic as it operationalized anhedonia as four distinct but related sub-constructs. The four sub-constructs are interpersonal deficits and physical reward processing as well as ,pleasure experienced in the moment and pleasure experienced when a future pleasurable event is anticipated (Kring & Barch, 2014; Treadway & Zald, 2012).

Motivation deficits in pleasure processing were not investigated in this study as investigating them in a reliable and valid method would require a different research paradigm, such as the Effort-Expenditure for Rewards Task (EEfRt) (Treadway et al., 2009).

The majority of the research on the topic, investigated populations that were suffering with Major Depressive Disorder and Schizophrenia. As such there are limited data on how anhedonia manifests outside of these diagnoses(Berrios & Olivares, 1995; Heinz et al., 1994).

The population researched in this dissertation was a Greek-speaking general population and did not distinguish between individuals with pleasure processing affecting psychopathology. This was done to identify the extent to which childhood emotional neglect affected pleasure processing in a population with no extant clinical diagnoses, which, to the authors knowledge, is a novel approach in this type of investigations.

The structure of this dissertation is as follows, the following section is the Literature review where the variables will be presented in detail. Addressing when the concepts were coined, past research and the various conceptualizations that occurred throughout time concluding with the ones that will be used as the experimental variables. Furthermore the clinical diagnoses wherein the symptom of anhedonia appears will be presented. In addition to how those deficits in reward processing affected the maintenance and treatment of those disorders. . Additionally the author will address how those constructs have been found to interact in past research and proposed how these constructs are expected to affect each other in this study. Finally this section presented the two hypotheses that were tested in this project.

In the "Methodology" section, participant characteristics were presented in addition to a power analysis explaining how the size of the sample was selected. Then the assessment tools

employed in this study are presented with explanations on the alterations that were conducted as well as their psychometric properties. Finally this section presented the procedure and the statistical analyses that took place.

In the "Results" section the findings of this dissertation were discussed beginning with descriptive statistics followed by the inferential statistical analyses presented at the end of the methodology section. When required those results were displayed in the relevant appendices at the end of the paper.

The final section of this dissertation is the "Discussion" section where the findings of the study will be summarized, followed by a portrayal as to how those findings fit into the extant literature. Then the clinical and research implications of said findings were discussed where the author presented how these findings may affect the future of research of the topic. As well as addressing how this research may affect clinical application when it comes to the understanding of factors affecting the function of reward processing. Finally the limitations of this study were addressed as well as the possible future directions of research on these constructs were discussed. Finally an overarching conclusion was drawn based on the findings of this dissertation.

Literature Review

Anhedonia

Brief History of Anhedonia and early conceptualizations

Anhedonia's first appearance in the literature was in 1809 when during an observation of a Schizophrenic patient, John Haslam, a physician described the symptom as the "neglect [of] those objects and pursuits which formerly proved sources of delight and instruction" (Haslam, 1809). In the following 90 years there was little to no discussion about this symptom until Theodule Armand Ribot (1896), a French psychologist, addressed the symptom in his seminal work the "Theory of Emotion" where he coined the term anhedonia. According to Ribot (1986), anhedonia was defined as a "Loss of pleasure". The term itself originated from the Greek suffix "an-" which means without and "hedone" which means pleasure. and was presented as the emotional equivalent of analgesia (Ribot, 1896).

Between 1896 and the mid-1900s anhedonia was only discussed in relation to schizophrenic symptomatology where clinical observations referred to anhedonia in the context of a progressive deterioration of a patient's emotional life (Kraepelin, 1921; Moskowitz & Heim, 2011).

Rado (1956) proposed that anhedonia was inheritable predisposition that acted as a precursor symptom signaling the development of schizophrenia later in life. This view on inheritability was also posited by Meehl (1962) who also included anhedonia as one of the four features of Schizophrenia. He described the symptom as "a marked, widespread, and refractory defect in pleasure capacity which, once you learn how to examine for it, is one of the most consistent and dramatic behavioral signs of the disease" (Meehl, 1962, p. 829).

Following the work of the psychologists above who posited the significance of anhedonia in the development of schizophrenia, there was a need to operationally define and measure the presence of this symptom. To that effect, the first psychometric tools were developed in order to provide a reliable and valid assessment of the symptom. Two of these tool were the Chapman Anhedonia Scales that measured both physical anhedonia and social anhedonia (Chapman et al., 1976).

With the understanding around anhedonia increasing, it was soon found to be present in other psychiatric disorders besides schizophrenia spectrum disorders, in particular in mood disorders or, as they were known at the time, Melancholia Disorders (American Psychiatric Association, 1980). This observation was initially made by Klein (1974) who proposed two types of depression, endogenomorphic depression that originated from internal factors and presented with stable levels of anhedonic symptoms, and a milder form of depressive dysphoria. Anhedonia first appeared in the DSM-III (1980) in relation to neurasthenia, a diagnosis that was reportedly caused by physical disease or by continuous emotional stress. This disorder was described as "A neurotic disorder characterized by fatigue, irritability, headache, depression, insomnia, difficulty in concentration, and lack of capacity for enjoyment [anhedonia]" (American Psychiatric Association, 1980, pp.425).

In the subsequent edition of the DSM and its text revision (DSM-IV and DSM-IV-TR), anhedonia was included in the associated features of Substance use and Substance withdrawal, the negative symptoms of schizophrenia, and as a diagnostic symptom in major depressive disorder (American Psychiatric Association, 1994; APA, 2000). More specifically, in the case of Substance Use disorders, it was associated with cannabis use as a symptom of prolonged use. In Substance Withdrawal, it appeared in the description of amphetamine, cocaine, and opioid

substances withdrawal. The difference between amphetamine, cocaine and opioid substance use/withdrawal is that in the case of the latter, anhedonia is presented as a long-term symptom whereas in the former it is associated with only regular use (American Psychiatric Association, 1994; America Psychiatric Association, 2000).

In the latest iteration of DSM, the DSM-5, American Psychiatric Association (2013), this symptom was associated with more diagnoses than in past iterations, however, not necessarily always using the term anhedonia. In this version, anhedonia was named as a part of the negative symptoms of Schizophrenia spectrum and other psychotic disorders. Once again, it was included in the substance related and addictive disorders, in relation to opioid withdrawal. Furthermore, it was included in the diagnosis classification of Avoidant personality disorder and was described as an expression of detachment. Defined as a " Lack of enjoyment from, engagement in, or energy for life's experiences; deficits in the capacity to feel pleasure or take interest in things" (American Psychiatric Association, 2013, pp. 766). In the case of Major Depressive Disorder, the manual no longer used the term anhedonia as it did in the DSM-IV. Instead, it employed an easier to understand description of the symptom presented in the diagnostic criteria as the "Markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day (as indicated by either subjective account or observation)" (American Psychiatric Association, 2013, pp. 160).

The definitions presented in the diagnostic manuals described above, reflect the evolution of the understanding of the construct since its inception. This increased understanding revealed that anhedonia is a much more complex and pervasive symptom than was originally understood by Ribot, Rado and Meehl. The conceptualization of anhedonia presented with significant difficulty due to it negatively defined construct. A negatively defined construct refers to the

absence of a quantifiable emotion rather than its presence (Ho & Sommers, 2013). Furthermore, since it is inversely related to the ability to gain pleasure, the mechanisms underlying it are identical to the one related to pleasure (Berrios & Olivares, 1995). Those underlying mechanisms are the anticipation of, experience and motivation\learning to gain further pleasure (McCarthy et al., 2015; Ritsner, 2014a; Treadway & Zald, 2012).

Research on anhedonia has been conducted focusing on a variety of factors ranging from neuroscientific research to studies focused on behavioral, emotional and cognitive research (Gard et al., 2006; Ho & Sommers, 2013; Loas, 2002; Thomsen, 2015). All of it has led to the current state of increased understanding of anhedonia as a multivariate construct which describes the decline in one's ability to experience pleasure, to learn how to gain pleasure, to anticipate pleasure and be motivated to behave in specific ways to gain more pleasure (Novick et al., 2018). Accordingly, the most current empirically supported definitions describes anhedonia as the reduction in the anticipation of gaining pleasure/reward and the reduced experience of a reward in the moment as well as a reduction in motivation to pursue it (Der-Avakian & Markou, 2012; Treadway & Zald, 2012).

Anhedonia and its Sub-Constructs

According to the extant literature, anhedonia is a multivariate construct with each of its sub-constructs interacting with each other. It appears to involve a cognitive component, a behavioral component, an emotional component, and a motivational component. Another distinction when referring to anhedonia is whether it is trait symptom or state symptom(Ritsner, 2014a). Trait anhedonia is a stable trait that is likely caused due to a genetic predisposition that inhibits one's ability to gain pleasure. Trait anhedonia is often present in individuals who meet the diagnosis of Schizophrenia spectrum disorders but can also appear in substance use disorders.

In contrast, state anhedonia refers to a more transient type of anhedonia that was observed temporarily. State anhedonia is often the type of anhedonia found in individuals suffering from Mood Disorders, substance use disorders and sometimes in PTSD(Ritsner, 2014b).

One aspect of anhedonia that is associated with a genetic predisposition is hedonic deficiency which refers to one's diminished ability to experience pleasure either through a sensory context or a social context (Garg et al., 2018; Ward et al., 2019) . Furthermore, this hedonic deficiency has been found to affect not only the quantity of pleasure gained from an otherwise pleasurable stimulus but also the tendency to anticipate pleasure (Gard et al., 2006)

Another aspect of anhedonia is the behavioral component, wherein individuals with this symptom tend to have difficulty learning behaviors that would guide them towards rewarding stimuli. It is likely that this is due to rewarding stimuli having carried the same value due to the reduced hedonic response (Kring & Barch, 2014). Anhedonia is also associated with a deficiency in motivation due to the tendency of individuals who suffer from anhedonia to expend lower effort regardless of how rewarding a stimulus is; as well as a cognitive component wherein someone learns to expect pleasure with certain activities/situations and thus experiences pleasure when they expect those activities/situations (Kring & Barch, 2014).

Social and Physical Anhedonia

One of the biggest contributions to research around anhedonia has been through the work of Chapman et al. (1976) and the development of psychometric tools as well as the tools following revisions. These tools are: the Chapman Physical Anhedonia Scale (CPAS) , the Chapman Social Anhedonia Scale (CSAS), the Revised Chapman Physical Anhedonia Scale (RPAS) and the Revised Chapman Social Anhedonia Scale (SAS) anhedonia (Chapman & Chapman, 1978; Eckblad et al., 1982). According to Chapman, anhedonia is separated into two separate sub-constructs, one assessing the lack of pleasure through interpersonal interactions or through physical interactions (Chapman et al., 1976). Chapman et al. (1976) employed the terms Physical Anhedonia and Social Anhedonia. The former refers to a reduction in physical (sensory) pleasures such as eating, music, touch, sexual activities, temperatures, and movement. The latter refers to a reduction in pleasure gained from interpersonal activities, like spending time with others, talking, expressing emotions to others, competing and in general any pleasure gained from socially interacting with others (Ritsner, 2014a).

Physical anhedonia has been negatively associated with the ability to create memories that contain positive emotions. In a brain imaging study, investigators looked at how physical anhedonia affected emotional memory in Schizophrenic population. They assessed the relationship by measuring the changes in activation of the Nucleus Accumbence (NAc) and the Hippocampus. They presented their participants with a word-image association and encoding task. Their results showed that when positive or neutral stimuli were presented, there was a negative correlation with Physical Anhedonia and the levels of activation of the NAc and Hippocampus. This relationship was not observed in the control group of healthy participants (Lee et al., 2012). These findings are representative of a trend observed in persons with

schizophrenia with physical anhedonia wherein positive emotional stimuli are not encoded into memory, even if they are experienced during the event (Herbener et al., 2007; Lee et al., 2012)

In another brain imaging study that used a healthy population sample, they used sensory stimuli (music) to identify brain activation in relation to trait physical anhedonia. They found that trait anhedonia was negatively correlated with pleasantness ratings of music as well as lower levels of activation of the NAc, the basal forebrain and the hypothalamus, which are linked to the Ventral Tegmental Area (VTA). These structures are involved with reward processing and as such their reduced activation levels explained the reduced pleasantness ratings reported by the participants (Naleid et al., 2005; Simon et al., 2010). Furthermore, there was also a negative correlation with the anterior insula and orbitofrontal cortex activation and trait anhedonia. The effective connectivity between NAc and VTA were also negatively correlated with trait physical anhedonia. These findings provide further support that the NAc is one of the brain structures most affected by trait physical anhedonia (Keller et al., 2013).

Anticipatory and Consummatory Anhedonia

In addition to the distinctions between trait/state anhedonia and physical and social anhedonia, the other sub-constructs of anhedonia are anticipatory and consummatory anhedonia. The former refers to an absence\significant reduction in pleasure gained from the anticipation of a reward. This is at its core a deficiency in an individual's ability to experience pleasure simply from the anticipation of receiving a reward or engaging in a pleasurable activity (Ritsner, 2014a). This inability or a reduced ability to experience that pleasure is termed anticipatory anhedonia. The latter, that is consummatory anhedonia, refers to the lack/reduced pleasure gained when an individual actually engages in the activity or receives a reward. This appeared to be a dysfunction of one's hedonic capacity or due to the interference of negative valenced affect that

reduces how enjoyable a reward is. These two sub-constructs are interconnected, as for the experience of anticipatory pleasure there must first be a reward that is experienced as pleasurable, that experience must be stored in memory and later recalled (Der-Avakian & Markou, 2012).

Consummatory Anhedonia

There is limited research on the topic of consummatory anhedonia as a separate construct. The majority of the research around this topic stems from a specific population who suffers from the negative symptoms of schizophrenia.

As stated earlier in this paper, consummatory pleasure refers to the experience of pleasure an individual feels from a pleasurable/reward stimulus in the moment. In the literature, it is often referred to as "liking"(Treadway & Zald, 2012).

Individuals suffering from Schizophrenia spectrum disorder often reported that they received less positive emotion in the moment when they engaged in a pleasurable activity (Horan et al., 2006). Later behavioral research contradicted these findings as their results pointed out that when presented with stimuli designed to evoke a positive emotion, individuals that suffered from schizophrenia spectrum disorders tended to report similar or marginally lower levels of positive emotion to healthy populations. This posited that hedonic capacity is somewhat intact (Pizzagalli, 2014; Ritsner, 2014b). Furthermore, when this population was presented with positive stimuli, they tended to also experience higher levels of negative emotions than healthy controls. These results supported the hypothesis that this population tended to report similar liking results to healthy controls. However, they also experienced more negative emotions when emotionally positive stimuli were presented to them (Ritsner, 2014b). According to Pizzagali (2014), this interference is caused by increased stress, resulting in a decreased experience of

positive emotions, which is believed to be one of the potential explanations for the existence of anhedonia.

Meta-analytic studies investigated the response of brain structures to positively valenced emotional stimuli. They found that in studies of amygdala activation, there was an over activation when participants were presented with neutral stimuli and an under activation when presented with evocative positive stimuli (Anticevic et al., 2012; Taylor et al., 2012). These findings are also in line with Pizzagalli's theory mentioned above. They also found reduced activation of the dorsomedial and dorsolateral Prefrontal Cortex (PFC), areas of the brain which have been associated with emotive and cognitive tasks (Taylor et al., 2012).

Anticipatory Anhedonia

Anticipatory pleasure does not refer to the actual hedonic experience, rather, it refers to pleasure that arose from the expectation of a previously experienced pleasurable stimulus/ event. Similarly, to consummatory pleasure having been termed colloquially as "liking", anticipatory pleasure has been named as "wanting". It represented a cognitive component to the experience of pleasure and employed the cognitive skills of memory, prediction and learning because prior to anticipatory pleasure being experienced, one must first experience consummatory pleasure (Der-Avakian & Markou, 2012; Kring & Barch, 2014).

Individuals suffering from schizophrenia are reportedly less likely to anticipate or predict pleasurable events in the future, as well experience pleasure in anticipation of pleasurable events in the future (Hallford & Sharma, 2019). Possibly as a result of this, they tend to have lower motivation to seek out pleasurable events in the future (Treadway et al., 2009). According to animal research on how the brain reacted to the anticipation and prediction of pleasure, it was found that the mid-brain dopamine system, especially its projections to the ventral and dorsal

striatum, acted as a mediator to this process (Heinz et al., 1994). Furthermore, dopamine neurons in the substantia nigra and the Ventral Tegmental Area (VTA) responded to both the prediction of and the reward of a stimulus. In human brain imaging studies with activations in the same areas, ventral and dorsal striatum and midbrain dopaminergic neurons have been observed to have higher levels of activation in response to predicted reward and prediction error responses (Der-Avakian & Markou, 2012).

Prediction Error Responses and Anticipatory Anhedonia

Prediction error responses are believed to be the process that caused anticipatory pleasure. They occurred because of dopaminergic neuron activation to predicted pleasure events even when that event does not take place. According to the literature, when a reward is not predicted but was still received, the dopamine neurons fired strongly (positive prediction error). However, if a predicted reward did not occur, there was a time-limited depression in the strength of the dopamine neuron activation, which is termed as a negative prediction error. Over time, the rewarding cues become associated with the reward itself. This leads to the activation of the dopaminergic neurons even when only the cues related to the rewarding stimuli were present (Dowd, 2015; Gradin et al., 2011; Kumar et al., 2018).

Motivational deficits and behavior in Anhedonia

One of the seminal works on human motivation was developed by Abraham Maslow (1943) where he proposed the motivational model of the hierarchy of needs. He placed motivational goals one may pursue in life into this model based on what needs they have fulfilled or are lacking. At the base of this model are physiological needs which involve the most basic conditions one must pursue to ensure baseline survival. Some examples are food, water, warmth, rest, and reproduction. According to Maslow, once one has achieved these baseline goals, one is

naturally motivated to pursue their safety needs like personal security, safety from harm, employment, and overall health. After one can fulfill their safety needs and physiological needs, they are motivated to fulfill their need for love and belonging. This need involves friendship, intimacy, a family, and sense of connection with other people in their environment. If these are all satisfied, the next step is their need for esteem. This involves respect, self-esteem from status, recognition, and strength in interpersonal surroundings. The final need one is motivated to fulfill is self-actualization in which one pursues the desire to become the most they can be – this may change depending on their environment, age and goals (Maslow, 1943). This model assumes the shape of a pyramid, which posits that one is not motivated to fulfill a need when a more basic one has not been fulfilled. This is due to the value of more basic needs deemed as more important when compared to one higher up in the hierarchy. For example, one will not seek to fulfil their need for belonging when their needs for safety or food are not fulfilled.

Motivation, Value Computation and Effort Computation and Anhedonia

Barch and Dowd (2010) have proposed two key components of motivation, value computation and effort computation. The former refers to whether an individual considered an outcome as rewarding; the latter refers to the mental calculation of how much effort one would need to expend in order to achieve a rewarding outcome (Barch & Dowd, 2010). According to Barch and Dowd (2010), these two components function as the guiding factors that promoted goal directed behavior, which refers to the behaviors one needed to engage in in order to achieve a desired goal.

Value Computation is a multifaceted cognitive process involving the evaluation of rewarding properties of a stimulus as well as ones perceived internal state. For example, when one felt thirsty, the value of drinking water was found to be much higher than when someone is

not thirsty. Other factors involved in value computation included the time delay before a rewarding outcome occurred, what rewarding stimuli are available, and the contingencies of having received a specific reward (Kring & Barch, 2014)

All of these cognitive tasks are mediated in the brain by the Orbitofrontal Cortex. This area of the brain had the function of updating, maintaining, and integrating information about the value of a reward over short periods of time. In one case where anhedonia was studied in the context of Schizophrenia, these deficits in value computations were observed (Padoa-Schioppa & Cai, 2011).

Effort Computation according to brain imaging studies involved the dorsal anterior cingulate cortex (dACC) with dopamine inputs from the nucleus accumbens and related forebrain neural circuity. Some of this was evidenced by animal lesion studies where they found that ACC lesions and depletions of accumbens dopamine levels, resulting in animal subjects preferring low effort, low reward rather than high effort, high reward options. When those computations were integrated into the process of anticipatory pleasure, they acted as a guide to the generation and execution of goal directed behavior (Croxson et al., 2009; Treadway & Zald, 2012).

Goal Directed behavior seemed to involve the Dorsolateral Prefrontal Cortex (DLPFC) in addition to the cortical structures mentioned previously. According to the literature on the function of the DLPFC, there were indications that it played a role in the top-down control of cognitive processing. It did so by providing a bias signal, which attended to reward related stimuli that aided in the facilitation of goal-directed behavior. This has been further supported by lesion studies where it has been found that lesions in the DLPFC seem to be related to impairments in the development of and following through with goal directed behavior.

Furthermore, brain-imaging studies show that increased activity of the DLPFC mediated the cognitive control of enhancements observed in both animals and humans. In individuals suffering from schizophrenia there is evidence of structural and functional changes in the orbitofrontal cortex (Kring & Barch, 2014).

Anhedonia in Depression

Major Depressive Disorder

Much of the literature presented up until this point has been based on individuals suffering from schizophrenia spectrum disorders. This was due to the fact that the prevalence of anhedonia in this disorder has allowed for it to historically receive more attention (Klein, 1974; Loas, 1996). This section reviewed how anhedonia presented itself in Major Depressive Disorder (MDD) as well as other clinical diagnoses, along with proposed theories and models describing how anhedonia presented itself in different diagnoses.

According to one literature review which investigated whether anhedonia in MDD and Schizophrenia Spectrum Disorders was a state or trait symptom, the preponderance of evidence pointed to anhedonia being both a trait and state symptom in Schizophrenia and MDD with melancholic features (Pelizza et al., 2012). MDD with melancholic features has in the past also been termed as endogenomorphic or melancholic depression (American Psychiatric Association, 2013; Klein, 1974). Furthermore, in its trait presentation it appeared to be a prodromal symptom and personality aspect that predisposed one to develop MDD later in life (Pelizza et al., 2012). In this literature review, it was posited that one became predisposed to MDD by exhibiting anhedonia symptoms earlier in life due to a reduced hedonic capacity, which involved a reduced experience of pleasure from otherwise pleasurable rewards (Loas et al., 1992). It was also the result of unfavorable environmental stressors during infancy which with the advent of life

stressors led to coping mechanisms that result in one being less positively/negatively reinforced to pursue rewarding stimuli (Loas, 1996). This then led to a reduced pursuit of rewards, possibly due to rewards devaluation and increased Negative Affective Interference, which in turn led to the development of unipolar endogenomorphic depression (Loas, 1996; Pizzagalli, 2014; Winer & Salem, 2016).

Reward Devaluation Hypothesis

The reward devaluation hypothesis posited that depressed and anxious individuals have the tendency to actively and automatically avoid positive stimuli (Frewen et al., 2008; Shane & Peterson, 2007). The reasoning for this tendency seemed to result from a variety of factors. Frewen et al. (2008) posited that individuals suffering from anxiety/depression actively avoided positive stimuli due to a lack of previous exposure to them during development. Furthermore, Shane and Peterson's (2008) posited that this is the result of an overactive withdrawal system and has its basis in biological diathesis.

Other researchers posited that the reason behind this tendency to avoid positively valenced stimuli was due to individual differences. Some people were more adept at approaching and received an increased benefit from positive experiences. Those individuals were said to be Vantage Sensitive. In contrast, individuals who were less likely to gain from positive experiences were described as Vantage Resistant. Both these differences are stated to originate during early personality development and specific endogenous neurodevelopmental factors that predicted different reactions to positive experiences (de Villiers et al., 2018; Pluess, 2017; Pluess & Belsky, 2013)

Winer and Salem (2016) in a meta-analysis found that individuals with depression were the only ones with tendency to devaluate rewarding stimuli. Furthermore, their findings also

suggested that reward devaluation came about because of a negative mood reducing the value held by a previously rewarding stimulus (Winer & Salem, 2016). This hypothesis was in line with the findings of Pizzagalli (2014) and Cohen et al (2020).

Overall pleasure deficits in anhedonia seem to differ depending on the type of depression. In the case of MDD with melancholic features, anhedonia presents very similarly to the anhedonia observed in schizophrenia. With deficits in both hedonic processing (consummatory anhedonia) as well as deficits in anticipatory hedonic processing, whereas in Depression without melancholic features, anhedonia presented with only anticipatory deficits (Hallford & Sharma, 2019; Ritsner, 2014a).

Anhedonia in Other Diagnoses

Anxiety Disorders

In the context of anxiety disorders, a debate existed as to whether social anhedonia and social anxiety were similar or identical constructs. According to the extant literature, social anxiety was found to separate construct from social anhedonia. This is due to differential presentation of the two symptoms. This is further evidenced by a study which employed an experience-sampling methodology through which they found that when an individual was suffering from higher levels of social anhedonia, they tended to present with lower positive affect, more time in solitude as well as a higher preference isolation. In contrast, in individuals with higher levels of social anxiety they observed a tendency of higher levels of negative affect, higher self-consciousness and a preference to be alone when engaged with unfamiliar people. However their participants did not present with a preference for isolation, or increased alone time (Brown et al., 2007).

Another study investigated the distinction of the two constructs by conducting a factor analysis on valid and reliable self-report psychometric tools designed to assess social anhedonia and social anxiety. They discovered that that the two constructs were disparate from each other and not significantly related (Cicero et al., 2016).

Post-Traumatic Stress Disorder

In the case of Post-Traumatic Stress Disorder, there is a symptom included in the DSM-5 that appeared to be similar to anhedonia "Markedly diminished interest or participation in significant activities, including constriction of play" ((American Psychiatric Association, 2013, pp. 273). However, in the literature this symptom has been termed as emotional numbing (Horowitz, 1986). In individuals suffering from PTSD, emotional numbing presented itself in two forms, hedonic deficit and negative affective interference, which are two of the factors that have been found to be at the core of anhedonia. However, whereas both emotional numbing and anhedonia showed deficiencies in hedonic capacity, in the case of emotional numbing there were additional factors that were not present in anhedonia (Cohen et al., 2018; Kashdan et al., 2006). These were feelings of detachment and estrangement from others and a limited expression of affect. As such, despite the two variables being moderately correlated, they are different (Eskelund et al., 2018; Kashdan et al., 2006). The other aspect similar to anhedonia in PTSD sufferers is Negative Affective Interference which has been described as the tendency to perceive both pleasant and unpleasant events as negative due to negative affect affecting being present when one experiences positively valenced or neutral stimuli (Armony et al., 2005; Orsillo et al., 2004; Ritsner, 2014b). Orsillo et al. (2005) investigated how a female population that were victims of interpersonal violence reacted to both aversive and positive video stimuli. In both cases, participants reported experiencing negative affect regardless of the valence of the stimuli.

At the neural level, negative affective interference was evidenced by findings that PTSD symptom severity was correlated with increased amygdala response. This response was present regardless of whether the stimulus was positively emotionally valenced or negatively valenced. Amygdala activation has been found to be associated with negative affect. As such, the activation levels found point to a pronounced experience of fear emotions even when a participant is presented with positively valenced stimuli (Armony et al., 2005).

Substance use

Anhedonia has also been observed in individuals who suffered from substance use disorders. There was limited evidence to trait anhedonia acting as a prodromal symptom of later substance use in the case of stimulant use (specifically amphetamines and cocaine use)(Leventhal et al., 2010). However, there was significantly more evidence supporting the presence of state anhedonia in individuals who were experiencing withdrawal from different substances (Garfield et al., 2014).

Craving, one of the key diagnostic features in substance use, was defined as "an intense desire or urge for the drug that may occur at any time" (American Psychiatric Association, 2013 pp.483). Unlike normal pleasure processing when one experienced anticipatory pleasure when expecting a rewarding experience, in substance use that process of wanting and craving is one marked with high levels of anxiety, distress and stress sensitivity which interfered with the ability to attend to other positively valenced events (Grüsser et al., 2007).

When the substance is consumed, both the peak and the length of intoxication from the "high" and therefore the consummatory pleasure are gradually reduced. This is due to the development of physical tolerance, a process in which the central nervous system adapts to the

substance intake through changes in the dopaminergic and serotonergic systems (Koob & Le Moal, 1997).

Eating Disorders

In the context of eating disorder there has been increased interest in how and whether anhedonia manifested in Anorexia Nervosa (AN) and Bulimia Nervosa (BN) (Holsen et al., 2012). In the case of AN a reduction of anticipatory and consummatory pleasure gained from food has been observed (Wagner et al., 2007). This reduction was observed despite if the food stimulus was presented visually or olfactory and remained extant even when statistically controlled for comorbid depressive symptomatology(Santel et al., 2006). The presence of anhedonia in BN has conflicting evidence, especially relevant to the hallmark symptom of BN, binge eating. When an individual binges it is possible that they experienced increased level of consummatory pleasure. However, when the binge is over they report a significant decrease in consummatory pleasure. (Davis & Woodside, 2002; Ritsner, 2014a)

At the neurological level, physical anhedonia in relation to eating disorders and smell found lower activations in the Ventral Tegmental Area for participants with both Anorexia Nervosa (restrictive type) and Bulimia Nervosa. This activation was lower in Anorexic individuals rather than Bulimic. Bulimia nervosa participants presented a decreased activation of the Caudate Nucleus in relation to controls and both anorexics and bulimics presented with reduced activation in the Anterior Ventral Pallidum and Insula .(Jiang et al., 2019)

Anhedonia in Animal Studies

Until this point, the topic of anhedonia has been discussed in the context of psychiatric diagnoses. The reason for this limitation is due to the literature discussing the topic by examining the populations most likely to exhibit anhedonia. Even in animal studies, a lot of the relevant

data comes from trying to emulate or cause depression-like symptoms in animals. In the following section, the author will focus on animal research on the factors that can affect the development anhedonia.

The first model identified the effect of chronic uncontrollable stress on the development of anhedonia. A number of animal research studies that investigated the response of rats when they were presented with either acute and controllable stressors or uncontrollable and chronic stressors found that the latter group was more likely to develop anhedonia symptoms (Katz, 1982). Anhedonia in rats was operationalized as a decreased preference for drinking water with added sucrose. This reaction was termed Chronic Mild Stress model (CMS). It provided some early insight into how stress affected reward processing, with the animals showing a reduction in their perception of the value of a reward. Later, a number of rodent studies investigated the topic and found that CMS often resulted in the previously mentioned decrease of preference and consumption of appetizing liquids (Willner, 1997). Further, a reduced approach tendency was observed which was associated with an increased threshold for VTA reward stimulation, an area associated with reward, and reduced dopamine release in the NAc in response to rewarding stimuli (Di Chiara et al., 1999; Moreau et al., 1992; Papp et al., 1992). This body of research posited that the experience of uncontrollable and chronic stressors resulted in decreased reward responsiveness and motivation for goal-oriented behavior. This trend has been found in human studies as well, where humans were found to present with decreased hedonic capacity and reward responsiveness when they were exposed to objective stressors that they perceived as out of their control (Pizzagalli, 2014).

Another factor relevant to the development of anhedonia and pertinent to this study is the experience of early life adversity. Whether this is in the form of maltreatment or separation from

a primary caregiver, it has been shown that those individuals tended to develop stress-sensitized systems. This system would make individuals more vulnerable to stressors, causing a reduction in hedonic capacity, motivation to gain rewards and reinforcement learning (McLaughlin et al., 2014; Novick et al., 2018; Pizzagalli, 2014).

Self-compassion

Self-Compassion is a relatively recent construct that has received increasing attention since its operationalization by Kristin Neff in 2003. According to search results when the search engine psychinfo was used, self-compassion has appeared in over three thousand studies since 2003 (American Psychological Association, 2021). It has been associated with a number of benefits in psychological functioning including well-being, motivation, coping and resilience, depression and anxiety and eating disorders (Barnard & Curry, 2011; Braun et al., 2016; Breines & Chen, 2012; Chung, 2016; Da Silva & Simões, 2019; Diedrich et al., 2014; Zhang et al., 2019). Self-compassion has also been presented as a more adaptive alternative to self-esteem (Neff, 2011).

Currently there are two main models of self-compassion (Gilbert, 2010; Neff, 2003b). The first of the two models was developed by Kristin Neff (2003). Furthermore, a psychotherapeutic intervention was created aiming at increasing well-being through mindfulness and self-compassion (Neff & Germer, 2013).

Kristin Neff's Self-Compassion

Self-Compassion was developed on principles derived from Theravada Buddhism. Its author Kristin Neff (2003) proposed that it comprised of three main sub-constructs. Each of the sub-constructs are usually presented in conjunction with an opposing construct, which inhibited self-compassion. The sub-constructs with their foils were Self-Kindness versus Self Judgement, Common Humanity versus Isolation and Mindfulness versus over identification.

Self-Kindness v Self-Judgement

Self-Kindness is one's tendency to treat themselves with forgiveness, sensitivity, warmth, patience, and empathy towards all aspects of one's self. This includes behaviors, cognitions, emotions and even impulses (Barnard & Curry, 2011; Gilbert & Irons, 2005). Even when one experienced failure, a self-compassionate person presented themselves with the affirmation that they were still deserving of love, happiness, and affection. This approach to one's self is very similar to the ideas proposed by the humanistic school of psychology of unconditional positive regard (Rogers, 1957).

On the other hand, self-judgement is being hostile, critical and demeaning to one's self or an aspect of one's self (Neff, 2003b). Self-criticism is a topic that has a long history in psychology with its origins in psychodynamic thought. Freud conceptualized it as a form of moralistic attack by the superego on the ego (Freud, 1922). Furthermore, in object relations self-criticism is often operationalized by internalized parent-child relationships. According to this theory self-judgement is often the internalization of an overtly critical parent (Ainsworth, 1969). It also has a number of detrimental effects and is often associated with a number of clinical disorders ranging from depression, anxiety and eating disorders, as well as being associated with producing and maintaining shame (Gilbert, 2010; Kannan & Levitt, 2013).

Common Humanity v Isolation

This aspect of self-compassion stemmed exclusively from Buddhist teachings. It posited that seeing one as separate from each other was an illusion, as we are all interconnected. Through the idea of common humanity, Neff (2003b) stated that one should attempt to recognize their connection to others, especially when it came to personal deficits such as confusion, sorrow, weaknesses and imperfections as well as forgiving one's self for the foibles that come from being human i.e. being limited and imperfect.

However, as evidenced with individuals suffering from MDD, it is quite common for one to feel that their personal experience and perceived negative attributes make them unacceptable to others. This leads to isolation and the belief that their own failings are unique and make them a damnable individual who cannot belong (Beck, 2011).

Mindfulness V Over identification/ Avoidance

Mindfulness is one of the most researched constructs in the past 20 years (Conversano et al., 2020; Goldberg et al., 2019). It stemmed from the works of Jon Kabat-Zinn (2003) who popularized mindfulness in psychotherapeutic interventions in the western world. The practice of mindfulness become one of the most revolutionary elements in the third wave of psychotherapy. Examples that involve mindfulness include Acceptance and Commitment Therapy, Dialectical Behavioral Therapy and of course Mindfulness Based Cognitive Therapy (Hayes et al., 2009; Kabat-Zinn, 2003; Salsman & Linehan, 2006; Segal et al., 2018). Many have received empirical support through randomized control trial and have been recognized as evidence based practices by Division 12 of the American Psychological Association (APA Presidential Task Force on Evidence-Based Practice, 2006).

In the context of self-compassion, mindfulness is a practice that enabled one to become aware of, pay attention to and accept the present moment(Kabat-Zinn, 2003). Furthermore, it allowed one to attend to their present self in both an affectionate and kind manner (Hofmann et al., 2011; Kabat-Zinn, 2003; Segal et al., 2018). Neff (2003b) also posited that it aids one in experiencing the present without becoming distracted from self-evaluations or worries about the past or the future.

Mindfulness could be inhibited by either over-identification, wherein one begins to ruminate about their limitations, or avoidance, where one attempts to avoid aversive experiences,

cognitions and emotions (Neff, 2003b). Since over-identification involved the rumination of one's limitations as a person, it diverts one's attention from the present. This is due to rumination being a process in which focus is placed repeatedly on past aversive experiences, emotions and cognitions (Donaldson et al., 2007; Watkins & Brown, 2002). Rumination can act as a form of avoidance as it redirects attention from the present and places it on the past. Avoidance in all its forms (cognitive, behavioral and emotional) has been found to have deleterious effects on one's well-being in the long run (Feldner et al., 2003; Germer & Salzberg, 2009; Ottenbreit & Dobson, 2004; Sloan, 2004).

Gilbert's Compassion Focused Therapy

Another model of self-compassion was developed by Paul Gilbert (2010) who built the idea into a psychotherapeutic intervention named Compassion Focused Therapy (CFT)(Gilbert, 2010). It originated from research delving into chronic and complex psychopathology that was linked to shame, self-criticism and abusive / neglectful backgrounds. Similarly to Neff's approach it espouses a number of Buddhist teachings. Nevertheless, its core ideas are derived from evolutionary and social psychology in addition to neuroscientific research focused on receiving and giving care (Gilbert & Procter, 2006). According to a study by Gilbert et al (2008) there are two different types of positive emotions. The first type is related to achievement, excitement, and resource seeking, and the second to peaceful emotions connected to contentment and safety (Gilbert & Irons, 2005). The latter were found to be associated with lower levels of anxiety and depression than the former.

Gilbert's Emotion Regulation System

Perhaps the most significant aspect of Gilbert's work in relation to self-compassion -as it pertained to this study- is his theory of emotional regulation (Gilbert, 2010). In this system, he

proposed three systems that people employed to regulate emotions. The systems were the threat system, the drive system, and the soothing system.

The threat system operated on the principle of survival. It had the capability of being able to detect threats and mobilize a response aimed at increased survival rates (Gilbert, 2010). This system has played a very important role in our survival. It protected us by producing intense emotions of anxiety, disgust, and fear to aversive and harmful stimuli. Behaviorally it produced the fight, flight or freeze response as well as submissive behavior that is connected to feelings of shame, self-attack, or self-criticism. This system was associated with stress hormones like cortisol and adrenaline and the neurotransmitter serotonin.

The drive system is aimed at resource acquisition and achievement, and like the threat systems, its origins are found in evolution. In its most primitive form, the drive system is geared towards finding sustenance, shelter, and territory. In the modern world, however, it is geared towards money, achievement, competitiveness, social rank, and status.

In short, this system enabled goal-oriented behavior, which involved securing resources and aided in the maintenance of our attention on achieving those goals. This system is connected to the nucleus accumbens and the neurotransmitter dopamine.

The soothing system was geared at safety, affiliation, caring and contentment. This system as with other two is also based on elements carried over from evolution, in this case the mammalian care-giving system. This system existed to promote feelings of safety, calmness, and contentment. Unlike the previous two systems, it did not promote action; in fact, it did the opposite. This system is connected to giving or receiving affection, providing or receiving care for others, showing acceptance, kindness, warmth, encouragement, support and affiliation. (Gilbert & Irons, 2005)

System Interactions

The soothing system can act as mediator to the other two system by balancing their effects which if left unchecked can have deleterious effects. Unfortunately, this system is often underutilized or misunderstood. An example of this was boredom, which could be misunderstood as contentment. Boredom understood through this framework is most accurately explained as an imbalance of the drive system and the threat system. No threatening stimulus and no rewarding stimulus are present which results in a feeling of emptiness. Contentment differs to boredom due to one having no active goal to pursue but still feel energized unlike boredom where one does not feel energized (Gilbert, 2010).

Issues with soothing system activation often resulted due to difficult childhood or a history of complex trauma where one experienced bullying instead of affiliation, and parental hostility or neglect instead of warmth (Cohen et al., 2020; Infurna et al., 2016). Personal experience of the above events could have led to an over activation of the threat system which inhibited the activation of the soothing system, and thus prevents one from practicing self-compassion and fostered feelings of shame and/or guilt(Gilbert, 2010).

Research into the fight flight or freeze system has shown that humans are more sensitive to aversive \unpleasant \dangerous stimuli rather than pleasant ones (Thompson et al., 2014). This is evidenced in research surrounding the construct of negativity bias where it was discovered that our attention, cognition and memory are more intensely affected by negative information rather than positive ones (Hitchcock et al., 2017; Karcher et al., 2017; Norris, 2019). This bias could be adaptive to a degree as it allowed humans to be able to protect themselves from the harmful stimuli. This could be done by the development of adaptive coping mechanisms or through other less adaptive methods of coping. Less adaptive methods include safety behaviors or avoidance

where inefficient solutions to coping with a threatening stimulus or avoidance are employed. Sometimes, in the absence of an external threat stimulus when the other systems are not balanced, one can ruminate on past threats which could predispose them to expect more threats in the future (Gilbert, 2010).

Child Maltreatment and its Consequences

Child Maltreatment is an umbrella term that encompasses all the different types of abuse and neglect a child may experience. It includes physical abuse, emotional abuse, sexual abuse and physical and emotional neglect (Ingram, 2009). Child Maltreatment can be defined as any act or omission that aims to endanger the emotional of physical development of a child (Clements et al., 2015). Approximately 40% of children in the United States have been exposed to at least one type of maltreatment during their development (H. Kim et al., 2017).

Child Maltreatment has been found to play a role in several issues that a child may experience during development as well as later in their adult life. It can cause issues in attention, memory, cognitive ability as well as interpersonal skills (Clements et al., 2015; Maguire et al., 2015; van Schie et al., 2017). This can even present in later generations with the maltreatment being transferred from parent to child (Madigan et al., 2019). Child Maltreatment survivors reportedly experienced a number of mental health issues later in life. These issues are commonly categorized into two distinct categories, internalizing and externalizing. There have been conflicting results in previous studies relating to the gender differences in child maltreatment. Nevertheless, in the case of child sexual abuse there is increasing evidence that point to male victims developing externalizing symptoms and female victims presenting with internalizing symptoms (Lewis et al., 2016). Also, children who experienced neglect and emotional abuse tended to present with internalizing issues (anxiety/depression/somatic concerns/ suicidality) rather than externalizing issues (Maguire et al., 2015).

Internalizing Manifestations

The most common internalizing manifestation, especially in the case of abuse (physical/ sexual) is Post Traumatic Stress Disorder (PTSD). This diagnosis is given if an individual has experienced, been witness to or faced events that involved actual or perceived death or injury to themselves or others. Many survivors of child physical abuse or sexual abuse have experienced events that fit these criteria. They can experience recurring distressing dreams or reliving of the traumatic events through dissociative episodes, as well as intense emotional distress when exposed to cues related to the traumatic event and an increased physical reactivity when exposed to cues that resemble or symbolize the event. They also attempt to avoid internal or external events or cues that are associated with the trauma. Survivors may also present with a symptom similar to anhedonia called emotional numbing which presents with a diminished interest in participation in previously enjoyable activities, feeling detached from others, low expectations about the future and a restricted range of emotions (American Psychiatric Association, 2013).

There is evidence that points to PTSD developing more frequently in female populations who have experienced sexual abuse during childhood (Hébert et al., 2014).

Other internalizing manifestations that resulted from emotional abuse and neglect were Social Anxiety Disorder , Major Depressive Disorder and anhedonia (Knappe et al., 2012; Kuo et al., 2011; Pizzagalli, 2014; N. M. Simon et al., 2009).

Child abuse and neglect has been associated to the development of social anxiety disorder, with one study having proposed a mechanism by which Social Anxiety disorder developed. Early experiences of emotional abuse would lead children to develop aversive shame states, which would later become incorporated into a cognitive affective schema. This schema eventually employs self-criticism as protective measure to prevent any personal flaws with the goal of preventing further aversive shame states. This is a maladaptive strategy as self-criticism

maintains a negative self-perception and creates insecurity in social situations. Therefore, it could cause one to experience anxiety in social situations and maintain that anxiety (Shahar et al., 2015).

Emotional abuse or neglect have also been found to develop depressive symptomatology later in life (Goldberg, 2006; Infurna et al., 2016). Furthermore, emotional abuse and neglect has been associated with the development of treatment resistant depression (Cohen et al., 2018; Nanni et al., 2012; White et al., 2012). Neglect has been found to be related to increased depressive symptomatology. However, having a positive or negative relationship with a primary caregiver was found to act as a mediator to the development of those symptom (Maguire et al., 2015).

Externalizing Behaviors

Maltreatment survivors often presented with externalizing problems later in life in addition to internalizing ones. Externalizing problems range from impulse control issues, disruptive behaviors as well as delinquency. Externalizing issues also included increased anger and aggressive behaviors as well as difficulty with self-regulating behavior (Bennett et al., 2005; Erwin et al., 2000; Harper & Arias, 2004; Jaffee et al., 2004). There are number of studies that have investigated the externalizing effects of child maltreatment, with the most commonly identified clinical diagnoses being Attention Deficiency Hyperactivity Disorder (ADHD), Oppositional Defiant Disorder (ODD) (Burnette, 2013; Sanderud et al., 2016; Villodas et al., 2014).

In relation to ADHD, a meta-analytic study which aimed to compile the research data around ADHD and child maltreatment found that individuals with ADHD were 2.39 times more likely to have experienced at least one type of maltreatment during childhood. Further

investigation of the subtypes of maltreatment associated with ADHD prevalence resulted in findings pointing to experiences of emotional abuse having the highest likelihood of developing ADHD. Experiences of neglect and physical abuse resulted in the lowest probability of developing ADHD. Sexual abuse was not associated with ADHD (Clayton et al., 2018). These findings corroborate and expand the results of a literature review by Maguire et al, (2015) which found evidence strongly associating experiences of emotional abuse and neglect to ADHD.

In relation to child maltreatment and ODD, a strong connection has been found in the literature. Specifically physical abuse, sexual abuse as well as emotional abuse have been found to be strongly associated with ODD (Tung & Lee, 2014; Villodas et al., 2014). Even in cases where the child was not the recipient of the abuse but instead a witness to Intimate Partner Violence (IPV), an increase in ODD symptoms was observed. Similarly, when they experienced low parental acceptance the same trend was observed. In both cases, this trend was unaffected by the sex of the child. Both variables of IPV and low parental acceptance have been associated with emotional neglect and abuse (Burnette, 2013).

Most pertinent to this study are the effects of emotional neglect on children and its effect on anhedonia. According to the World Health Organization (1999), parental neglect is defined as the failure of parent or caretaker to fulfill the basic needs of a child in the areas of "health, education, emotional development, nutrition, shelter and safe living conditions" (p.15). These have to happen in a situation where these requirements are reasonably available to the parent or caretaker. Furthermore, these failures have a high chance of causing harm to a child's physical, mental, spiritual, moral and/or social development. It also includes the failure to supervise a child and protect it from harm when it is feasible (World Health Organization, 1999).

Physical neglect refers to the failure of a parent or guardian to provide the basic level of a child's physical needs i.e., nutrition, clothing, supervision, medical attention and personal hygiene (Stoltenborgh et al., 2013).

Emotional neglect is the failure of a parent or guardian to meet a child's emotional needs. It is not limited to giving the child enough nurturing and affection but also protecting the child from witnessing domestic violence or disallowing the child to maintain maladaptive behaviors. It also includes neglecting to seek care for emotional and behavioral problems or failing to provide the child with adequate structure which fosters healthy development (Stoltenborgh et al., 2013).

Finally, educational neglect is the failure of a guardian or parent to foster and support a child's education. This includes the lack of enrolment in mandatory schooling required by the government, permitting prolonged absences from school and in cases of learning disabilities failing to seek and procure the required special education support for the child (Stoltenborgh et al., 2013).

The Current Study

In the following section, the author will present how the variables of anhedonia, emotional neglect, and self-compassion have been associated in past research, as well as propose a model of how these variables could interact.

Anhedonia and Self-compassion

There is limited amount of research between anhedonia and self-compassion. At the time of writing, only one study has investigated these variables together. It did so by comparing how a healthy population and schizophrenic patients present differing levels of anhedonia and associating those to levels of self-compassion. Even when the results were controlled for levels of depression, the schizophrenic population presented with lower levels of self-compassion and

higher levels of both social and physical anhedonia (Gao et al., 2016). These findings showed that there was an inverse correlation between these two variables; this is in line with Compassion Focused Therapy model of affect regulation and the Negative Affect Interference model (Gilbert, 2010; Pizzagalli, 2014).

The model of affect regulation proposed by Gilbert (2010) posited that when someone is suffering from Schizophrenia spectrum disorder, the threat system is over activated due to emotions of anxiety and fear. These emotions contributed to the experience of paranoid delusions and hallucinations. The soothing system on the other hand, which aims to promote affiliation through compassion directed at others and one's self, was inhibited. This was due to the salience of the negative emotions interfering with otherwise positive experiences and the experience and/or expectation of threat stimuli in both interpersonal and intrapersonal contexts (Scheunemann et al., 2019), thus increasing self-judgement and shame, which have been established as inhibitors of self-compassion (Gilbert, 2010). As stated earlier, individuals with high levels of anhedonia experience high negative emotion which minimized positive emotion when presented with a reward (Pizzagalli, 2014; Ritsner, 2014a).

Anhedonia and Emotional Neglect

Child maltreatment has been associated with a number of mental health issues. However, few focus solely on emotional neglect. This is due to the tendency of multiple types of maltreatment to be comorbid (Edwards et al., 2003; Kim et al., 2017). Furthermore, evidence pointing to the more covert effects of child maltreatment like anhedonia are limited (Clements et al., 2015; Cohen et al., 2018; Infurna et al., 2016). The majority of the research either addressed anhedonia as one variable, which is inconsistent with its current models; or their statistical analyses where limited to correlational data, established a connection between emotional neglect

and anhedonia but provided little explanatory power on how they interact (Clements et al., 2015; Cohen et al., 2018; Infurna et al., 2016).

There is limited brain imaging research on how emotional neglect effects brain areas directly related to pleasure. One study found that there was significantly reduced activity in the caudate and the NAc in children who experienced emotional neglect during childhood (Takiguchi et al., 2015). Furthermore, evidence pointing to a reduction in activity of the ventral striatum and blunted development in reward processing have been associated with elevated levels of depressive symptomatology (Hanson et al., 2015). Another study found that FKBP5 polymorphism has been found to interact with emotional neglect to predict increased amygdala reactivity. The amygdala is an area associated with fear processing which supports the stress interference model (Pizzagalli, 2014; White et al., 2012).

At the psychological level, Van Veen et al. (2003) investigated how child maltreatment was related to the tripartite model of depression and anxiety. Their results pointed to a connection of sexual abuse being related with general distress and anxious arousal. Physical abuse was correlated to anxious arousal. However, only emotional neglect was related to all the three symptom dimensions, general distress, anhedonic depression and anxious arousal. Specifically, children who reported experiences of emotional neglect exhibited a significant relation with anhedonic depressive symptoms. Due to methodological concerns, a causal relationship could not be established (Van Veen et al., 2013).

In another study that operationally defined abuse and neglect as the child being aggressively rejected, submissively reject or neglected; findings pointed out that individuals who were in the neglected group experienced higher levels of anhedonia, higher levels of interpersonal problems and increased feelings of ineffectiveness(Hecht et al., 1998).

A meta-analysis investigated the association between different child maltreatment in relation to psychopathology. Their findings supported that out of the different types of maltreatment, experiences of antipathy and neglect were the most significantly related to the increased possibility of developing depression later in life (Infurna et al., 2016).

The findings detailed above pointed to childhood emotional neglect being related to the development of anhedonia in adulthood. However, what remains unclear is which aspect of anhedonia is most affected by emotional neglect.

Emotional Neglect and Self-Compassion

Emotional Neglect as discussed earlier has been found to have deleterious effects on well-being (Tarber et al., 2016). Similar effects have been found for the negative aspect of self-compassion termed self-coldness (Brophy et al., 2020). Research points to an inverse relationship between emotional neglect and self-compassion (Gao et al., 2016). Furthermore, there is evidence that suggests emotional neglect appeared to inhibit the development of self-compassion (Ross et al., 2019).

Self-compassion has been found to act as a partial mediator between distress and childhood maltreatment as well as subjective well-being in male population (Tanaka et al., 2011; Tarber et al., 2016). Furthermore, emotional abuse and emotional neglect especially interfere with the formation of self-compassion, which in turn predicted increased levels of shame and depressive symptoms(Ross et al., 2019). These findings support the inverse relation between shame and self-compassion which is in accordance with the Gilbert's (2010) model of compassion (Ross et al., 2019).

Overall, when the model of emotional regulation from Compassion Focused Therapy is applied to the findings above, it shows that the experience of emotional neglect is likely to have an inhibitory role in the development of the soothing system, inhibiting its ability to function as a mediator between the drive and threat system (Gilbert, 2010; Messman-Moore & Bhuptani, 2020). One of the most salient questions arising from this issue is whether social or physical anhedonia develop due to experiences of emotional neglect in childhood. According to the Gilbert model, it is expected that the soothing component will develop but no research has investigated this topic. Furthermore, considering the evidence delineated above, the author aimed to provide additional evidence for the connection between emotional neglect and the development of anhedonia as well as its subtypes whilst examining the role of self-compassion in this relationship.

Hypotheses

Finally, while there is evidence pointing to a connection between anhedonia and emotional neglect, there is limited evidence on how it affected anticipatory and consummatory anhedonia in the context of interpersonal (social) anhedonia or physical anhedonia.

This study aims to cover that gap in the literature. In this attempt, this study posits two main hypotheses.

The first hypothesis posits that adult individuals who report higher incidence of emotional neglect during childhood will report elevated levels of anhedonia (Physical, Social, Anticipatory and Consummatory) compared to individuals who report lower incidence of emotional neglect in childhood.

The second hypothesis posits that self-compassion will act as a mediator between self-reported parental emotional neglect and anhedonia and its subtypes.

Methodology

Population

The sample was comprised of 320 participants. It was a self-selection sample collected through social media posts. The inclusion criteria for the population of this study were that participants should have been between the ages of 18 and 65 and were able to provide informed consent, as well as read and comprehend the Greek Language. No exclusion criteria were employed in this study.

Power Analysis

Power analysis was conducted using the G*power 3 (Faul et al., 2007).This study expected a high effect size between emotional neglect and anhedonia in particular. This is due to previous findings reporting a large amount of the variance of anhedonic depression being accounted for by emotional neglect (β=.81, p>.001) (Van Veen et al., 2013). According to the literature, there was only one correlational study that found negative relationships between self-compassion and anhedonia -.440 p<001 for physical anhedonia and -.422 p<.001. These finding led to an expected moderate effect size expected from the mediation (Gao et al., 2020). When a power analysis was conducted, a minimum sample of 80 individuals was recommended. To increase the validity of the power analysis, the data from a study that employed all the variables, including the Childhood Trauma Questionnaire and anhedonia as defined by the 4-item subscale of the CES-D, were inputted into the program. This analysis resulted in an effect size of $f^2 = .1$ at .99 power and an α error probability of 0.01 which resulted in the recommendation of a minimum number of 316 participants (Bernstein & Fink, 1997; Cohen et al., 2020). The power analysis was replicated looking at only the anticipatory component of anhedonia employed in the Temporal Experience of Pleasure Scale which resulted in an $f^2 = .247$ at α error probability of

0.01 and at .99 power and α-error probability of 0.01. This analysis resulted in the recommendation of a minimum number of 144 participants.

These variables had not been investigated together in the past. The power analysis of the only study that included most of the variables resulted in a recommended sample of 316. The sample size was set at 320 participants expecting a dropout rate of five to ten participants.

Procedures

After receiving bioethics committee approval (ΕΕΒΚ/ΕΠ/2021/46), the study was advertised through social media posts on social media platforms inviting participants to take part in this survey study. Upon clicking the link, participants were guided to Google Forms. There they were presented with the informed consent form. The consent form described the study's aim, estimated length of survey completion, inclusion\exclusion criteria, the ability to withdraw from the study at any time and confidentiality of the study as well as possible harms\benefits that participants may have experienced from their participation to the study. In addition, the contact information of the principal investigator, the researcher, and an additional impartial party in case of questions about the study or the expression of a grievance or complain, were also included.

After participants provided consent, they were directed to the measures detailed below. If they chose not to continue, they were asked to click a button that would lead them to a web page thanking them for their time. Upon completing the assessment tools, participants were presented with a debriefing form, which provided them with all the information relevant to the study including any possible incomplete disclosures in the consent form.

They were given the option to ask for more information and the right to ask for either a report or summary of the study's findings or the complete dissertation upon its completion. Only 10 participants requested to receive the complete dissertation. Participants were informed that

they would not be able to receive the results for their specific scores, as no identifying data were gathered in the self-report measures. The process by which they could ask for a report was by sending an email to the researcher who would then email them either a draft form of the study's results or the complete paper upon completion. Until the completion of the data collection, the data was stored initially in the google forms account, which was protected with a two-factor authentication. After data collection was completed, the data was stored on the researcher's computer, which was protected with a biometric lock.

Measures:

Self- Compassion

Self-Compassion Scale (SCS).

The SCS is a 26 item self-report measure which measures self-compassion via six proposed subscales (Neff, 2003a). These subscales are divided into two subcategories: the first category is positively directed and is comprised of 3 subscales. Self-kindness "I try to be loving towards myself when I'm feeling emotional pain." common humanity "When things are going badly for me, I see the difficulties as part of life that everyone goes through." and mindfulness "When I fail at something important to me I try to keep things in perspective". The second category is negatively directed and the subscales act as foils of the three positively directed subscales. They are, self-judgement "I'm disapproving and judgmental about my own flaws and inadequacies." isolation "When I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world." and over identification "When I'm feeling down I tend to obsess and fixate on everything that's wrong.". The scale's items are scored on 5-point

Likert scale ranging from one (very rarely) to five (very often). Higher results indicated higher levels of the construct assessed in each subscale. This scale has been found to either provide a total score representing ones overall level of self-compassion or two scores, one for self-warmth and self-coldness (Neff et al., 2017, 2018). This study employed the Greek validated version of the SCS (Mantzios et al., 2015). The reliability levels found in this study was within acceptable levels (α=.71) for the overall reliability score of the tool. Whereas the reliability of subscale scores in this study were the following: self-kindness (α=.84), self-judgement (α= 0.79), common humanity (α=0.74), isolation (α=0.76), mindfulness (α=0.78) and over identification (α=0.78).

Emotional Neglect

Maltreatment and Abuse Exposure Scale (MAES)

The Maltreatment and Abuse Exposure Scale is a variation of the Maltreatment and Abuse Chronology of Exposure scale(Teicher & Parigger, 2015). Both versions of the tool assess the presence and severity of emotional/ physical neglect; parental non-verbal/ verbal abuse; sexual abuse; peer emotional abuse and physical bullying, as well as witnessing of intraparental violence and witnessing violence towards siblings during childhood. Sample items for each subscale include, emotional neglect "A parent or other important parental figure was very difficult to please." physical neglect "You had to wear dirty clothes". Parental non-verbal abuse "Intentionally pushed, grabbed, shoved, slapped, pinched, punched or kicked you.", verbal abuse "Swore at you, called you names, said insulting things like your "fat", "ugly", "stupid", etc. more than a few times a year.", sexual abuse "Had you touch their body in a sexual way.". Peer emotional abuse "Said things behind your back, posted derogatory messages about you, or

spread rumors about you.", peer physical bullying "Intentionally pushed, grabbed, shoved, slapped, pinched, punched, or kicked you.", intraparental violence "Saw adults living in the household push, grab, slap or throw something at your mother (stepmother, grandmother)." Witnessing sibling abuse "Hit your sibling (stepsibling) so hard that it left marks for more than a few minutes."

What differentiates the two is that the MACE requires participants to state at which ages they experienced or witnessed the maltreatment or bullying whereas the MAES does not. The MAES is a 52-item scale which asks participants to provide "Yes" or "No" responses as to whether they experienced the adverse childhood events asked by the items. In this study, certain subscales were omitted. Those were witnessing Intraparental violence, witnessing violence to siblings, peer emotional abuse and peer physical bullying as well as sexual abuse. These items were omitted due to them having no connection in literature to the development in anhedonia as well as to reduce the number of items participants were asked to respond to(Cohen et al., 2018; Van Veen et al., 2013). Therefore, the author omitted 25 items from the scale, which resulted in 27 items in total. Omitting these items did not affect the current investigation as the scale was not treated as providing a total score for maltreatment but rather only, the specific subscales that were relevant to the study were considered. The subscales were translated using the forwards-backwards translation.

The Maltreatment and Abuse Exposure Scale proposes different cut off scores for reaching above threshold of exposure of different types of maltreatment and abuse measured. These cut off points were derived by comparing similar scale cut off scores like the Child Trauma Questionnaire and The Adverse Childhood experiences scale (Bernstein & Fink, 1997; Felitti et al., 1998; Teicher & Parigger, 2015). The cut off points for verbal abuse was a scaled score of

three, for Non-verbal abuse and physical abuse was four; emotional and physical neglect had a cut-off score of two.

The internal consistency for each subscale used in this study were Emotional Neglect (α=.67.), Parental Nonverbal Emotional Abuse (α =.68), Parental Physical Abuse (α=.72), Parental Verbal Abuse (α =.71), Physical Neglect (α =.63).

Anhedonia

The tools below all measure one's capacity to feel pleasure through social/physical means. The scores were interpreted inversely with higher scores on the scales showing lower levels of anhedonia and vice versa.

Temporal Experience of Pleasure Scale (TEPS)

This scale was developed by Gard et al. (2006); it was designed to measure both anticipatory and consummatory physical anhedonia. It is comprised of 18 items and is scored on a Likert scale of one (very false for me) to six (very true for me). It is comprised of two subscales, one for anticipatory pleasure (10 items) "When something exciting is coming up in my life, I really look forward to it" and consummatory pleasure (8 items) "I love the sound of rain on the windows when I'm lying in my warm bed". It was standardized on a student population, as well as psychiatric populations that suffered from schizophrenia, bipolar disorder and opioid abuse (Gard et al., 2006; Garfield et al., 2016). The tool was translated into Greek using the forward backwards procedure. Regarding the internal consistency levels found in this study: the anticipatory scale had acceptable levels of internal consistency (α= .74), whereas the consummatory subscale (α=.67) showed marginally acceptable levels of internal consistency. The total scale had a Cronbach's alpha of .75, which is within acceptable limits.

Anticipatory and Consummatory Interpersonal Pleasure Scale (ACIPS)

This measure assessed anticipatory and consummatory social anhedonia and was designed and validated by the Gooding and Pflum (2013). The ACIPS is a 17-item scale and is scored on a Likert scale of one (very false for me) to six (very true for me). It had very good internal consistency of alpha .82. The scale was translated into Greek using the forwards backwards procedure. This study employed a non-validated scoring of the items. This was because during its development the tool, rather than being validated with a two-factor structure measuring anticipatory and consummatory constructs, was instead found to load better on a three-factor structure. These were: Intimate social interactions, Group Social Interactions, and Social bonding and making Connections (Gooding & Pflum, 2014). There were seven items that were calculated together in this study providing a score for anticipatory interpersonal social anhedonia "I look forward to seeing people when I'm on my way to a party or get-together." with acceptable internal consistency α=.72. For consummatory interpersonal anhedonia, 10 items were used. "I enjoy joking and talking with a friend or coworker." also presented with acceptable internal consistency α=.76.

Motivation and Pleasure Scale-Self Report (MAP-SR)

This scale was developed by Llerena et al, (2013) and was designed to measure effort and pleasure across different domains. It was translated to Greek using the forwards backwards procedure. It contains 15 items which were scored on a 4-point Likert scale. Six items loaded into consummatory "In the past week, what is the most pleasure you experienced from being with other people?" and anticipatory pleasure "Looking ahead to being with other people in the next few weeks, how much pleasure do you expect you will experience from being with others?" related to social, recreational, or work domains. The following three items loaded into feelings

and motivations centered on family, romantic partners, and friends "When it comes to close relationships with your family members, how important have these relationships been to you over the past week?" Finally, the remaining six items loaded into motivation "In the past week how motivated have you been to be around other people and do things with them?" and effort to engage in activities "In the past week how motivated have you been to do hobbies or other recreational activities?" For the purposes of this dissertation, only 6 items were used for analysis, that is the first 4 items of the scale which measured consummatory interpersonal pleasure and the 2 items which measured interpersonal anticipatory pleasure (Llerena et al., 2013; Rizvi et al., 2016). The items which assessed motivation and importance of relationships were omitted due to falling out of the scope of this study. According to the data of this study, the internal consistency (α=.77) of this short version of the questionnaire was within acceptable levels.

Demographics

This questionnaire gathered general demographic information pertinent to the participants' sex, age, and ethnicity, education level and relationship status.

Statistical Analysis

The data in this study was analyzed using SPSS v.26 after conducting a descriptive statistics analysis and tests of normalcy of data (IBM Corporation, 2019). A Pearson correlation test was completed to investigate that the independent variables and dependent variables were associated. Following the correlation analysis, the author satisfied the statistical criteria to conduct a regression analysis. For emotional neglect, a linear regression was run. As a second step, a hierarchical, multiple regression was conducted. During the first step, only the variable of emotional neglect was placed as the dependent variable to establish how it predicted change in

the different subtypes of anhedonia. During the second step, all the available maltreatment variables (non-verbal and verbal abuse, physical neglect and abuse) were statistically controlled for which allowed to get a better understanding as to the change emotional neglect would cause when the other variables were controlled for on the four subtypes of anhedonia. This statistical control was used to control for the tendency of different types of abuse and neglect to co-occur. Finally, the PROCESS macro was employed to investigate whether self-compassion acts as a mediator between childhood emotional neglect and the different types of anhedonia (Hayes, 2022)..The PROCESS v4.1 tool, which is a bootstrapping macro for SPSS, was used to conduct the mediation analyses to establish whether self-compassion acted as mediator between emotional neglect and interpersonal anticipatory anhedonia as measured by the ACIPS and MAP-SR anticipatory subscale scores. The second mediation analysis that used the PROCESS v4.1 tool was conducted to identify whether self-compassion had a similar mediator role for emotional neglect and physical anticipatory anhedonia as measured by the TEPS anticipatory scale and MAP-SR consummatory anhedonia subscale

Results

Participant Characteristics

Out of the 320 participants, 135 were men (42.18%) and 182 (56.88%) were women, with three (0.94%) participants who reported they did not wish to answer the question.

The majority of the participants had at least a Bachelor's degree (N=127, 40.06%) or a Masters (N=118, 40.06%). 57 participants reported having received up to a high school education, 10 had a PhD, 3 a middle school education, 1 person received only an elementary school education and 1 reported never receiving any kind of formal education.

The sample was predominantly made up of participants who reported that their ethnicity was Cypriot (N=215, 67.19%), 94 participants stated that they were Greek (29.47%), 4 were English, 2 were Australian, out of the remaining 4 there were American, Bulgarian, French and German respectively. One individual did not state their nationality. As it relates to relationship status, 79 (24.7%) individuals reported being married, 47 (14.7%) were cohabitating and 74 (23.1%) were in a relationship. Ten were divorced, 3 were separated, 9 were unmarried, 96 (30%) were single, and 2 did not respond.

Descriptive Statistics

The mean scaled scores for the Verbal Abuse subscale (M=2.574, SD=3.211), pointed that most participants did not exceed the threshold for verbal abuse, 29.3% of the sample scored above the cutoff point. Non-verbal abuse had a mean scaled score of M=2.510, (SD=2.431) with 16.2% of participants scoring above the cut-off point. The mean scaled score for Physical Abuse was M=1.75 (SD=2.252) with 15.9% having scored above the cut-off point. The average scaled score for emotional neglect was M=1.74 (SD=2.463), with 25.3% having met the threshold for

emotional neglect. Finally, the mean scaled score for physical neglect was M=.65 (SD=1.552) with only 8.6% of participates having scored above the cut off.

The scores separated by gender are detailed in table 1. By gender there were significant differences observed between female and male participants, with female participants scoring significantly higher on both anticipatory and consummatory pleasure as scored by the relevant TEPS and ACIPS subscales. This trend was not present with male participants who scored significantly higher on Self-Compassion than their female counterparts. Furthermore, there was no significant difference based on sex as it related to childhood maltreatment. These findings are presented in table 2.

Mean scores for the TEPS subscales were M=41.320(SD=7.046) for the anticipatory pleasure subscale of the TEPS and M= 35.566 (SD=6.117) for the consummatory pleasure subscale. The mean scores for the ACIPS subscales were M=30.897(SD=4.947) for the anticipatory subscale and M=46.865(SD=6.495) for the consummatory subscale. The total scale average for the ACIPS was M=77.762(SD=10.827). The scores for the secondary measure (MAP-SR) that assessed interpersonal consummatory pleasure provided with a mean score of M=5.234(SD=1.664), anticipatory interpersonal pleasure had a mean score of 2.36(SD=.913). Self-compassion scores overall mean score of the total scale was 3.056(SD=.653).

Correlational Analyses

To test whether the primary research hypothesis of this study is valid, whether the presence of childhood maltreatment will result in an increase in interpersonal consummatory/anticipatory or physical consummatory/physical anhedonia through a regression analysis, depended on several factors. First, the author had to satisfy statistical assumptions required to conduct this type of analysis. A Pearson Correlation analysis was conducted to establish how the independent

variable of emotional neglect was correlated with the four-anhedonia variables. As expected from the research hypothesis, emotional neglect was inversely correlated with the TEPS anticipatory scores as well as scores of the ACIPS anticipatory and both the MAP-SR anticipatory and consummatory interpersonal scales. These findings showed that when one experienced emotional neglect in childhood they were more likely to experience less pleasure in adulthood, which can be interpreted as an increase in anhedonia. The findings for correlations between pleasure scores, the remaining maltreatment scores and self-compassion mean scores are presented in table 3 in appendix 3.

Regressions

As expected, based on the primary hypothesis, it was found that the effect of emotional neglect was only significant for two types of anhedonia. The first emotional neglect would account for 2% in interpersonal anticipatory anhedonia when measured by the ACIP scale R^2=.020, F (1,309) =6.375, p=.012. After controlling for the other variables of maltreatment, the effect of emotional neglect on interpersonal anticipatory anhedonia remained statistically significant albeit producing a very small change R^2 change=.003, R^2=.34, F (5,298) =3.144, p=.009.

Similar results were observed for the effect of emotional neglect on anticipatory physical anhedonia as measured by the TEPS- Anticipatory subscale. When the effect of other maltreatment variables was not controlled for, it was found that emotional neglect explained only 2% of the variance in anticipatory physical anhedonia R^2=.020, F(1,309)=6.438, p=.012. When the other maltreatment variable were controlled for, emotional neglect accounted for a statistically significant albeit small 0.04% change in variance explained R^2=.042, F(5-298)=2.620,p=.024.

Adding further support to the findings, anticipatory interpersonal pleasure was affected by experiences of emotional neglect in childhood the relevant subscale of MAP-SR showed. As such, emotional neglect significantly accounted for 2.8% accounted for MAP-SR interpersonal anticipatory pleasure R^2=.028, F (1,310) =8.794, p=.003. This trend remained the same after the other maltreatment variables were controlled with a statistically significant yet small change in variance being observed, .08%, R^2=.036, F(5,299)=3.273,p=.007.

The previous findings pointed to only anticipatory pleasure being affected by emotional neglect; however, the findings for the MAP-SR consummatory subscale show a significant yet small effect of emotional neglect on interpersonal consummatory pleasure. The uncontrolled linear regression shows that consummatory pleasure is affected by 1.1% from experiences of emotional neglect R^2=.011, F (1,310) =4.584, p=.033. This trend remained present after statistical control of the other variables R^2 change= .005, F (5,299) =2.898, p=.014.

Mediation

The second hypothesis posited that relationship of anhedonia and its subtypes, and emotional neglect were mediated by self-compassion. The findings from the previous section pointed to emotional neglect significantly accounting for levels of anticipatory interpersonal anhedonia and anticipatory physical anhedonia.

Overall, the findings for anticipatory physical anhedonia showed that self-compassion did not act as a mediator between emotional neglect and physical anticipatory anhedonia. This is due to the finding pointing that path a, and path c of the mediation analysis being significant which show a direct effect that is not significantly affected by the presence of the mediator. These findings are presented in diagram 1 and table three in appendices 5 and 6. Similar findings were

found for the ACIPS interpersonal pleasure scale as well summarized in diagram 2 and table 4 in appendices 7 and 8.

The findings around the interpersonal anticipatory and consummatory scales as measured by the MAP-SR showed a different picture. Beginning with MAP-SR anticipatory scale, the effect of emotional neglect on self-compassion (path a) was found to be significant (b=-.064, SE=.015, p<.001). Next, (path b) self-compassion was found to significantly affect anticipatory interpersonal pleasure t (b=2.179, SE=.332, p<.001). When the author controlled for the effect of the mediator, i.e. self-compassion, path c' (the direct effect of emotional neglect on anticipatory interpersonal anhedonia) was found to be insignificant (b=-.136. SE=.089, p>.05). Path c which shows the direct effect of emotional neglect on MAP-SR anticipatory results was significant (b=-.273, SE=.092,p<.05) These findings in addition to the indirect effect scores being significant point to self-compassion as having acted as a mediator between emotional neglect and anticipatory interpersonal anhedonia (a*b=.137,Bootstrap CI_{95}=-.219 and -.070).

Similarly, the MAP-SR consummatory subscale was found to be mediated by self-compassion. Path a, was found to be significant (b=-.064, SE=.015, p<.001). Path b was also found to be significant (b=1.039, SE=.187, p<001). Path c was found to be insignificant which points to self-compassion acting as a full mediator (b=-.043, SE=.050, p>.05). With Path c', also being significant (b=-.109, SE=.051, p<.05). Finally, the indirect effect of emotional neglect on consummatory interpersonal pleasure as measured by the MAP-SR consummatory subscale was found to be significant, supporting the hypothesis that self-compassion functions as a full mediator between the other two variables (a*b=-.065,Bootstrap CI_{95}=-.106 and -.032).

Discussion

Summary of Findings

The findings point to a limited yet statistically significant effect of experiences of emotional neglect on levels of physical and interpersonal anticipatory anhedonia. The preponderance of the evidence showed that experiences of emotional neglect in childhood could affect the amount of anticipatory pleasure one experienced as an adult. However, they do not appear to be the only factor responsible for this effect, with the effect ranging between 2-2.8%. Consummatory interpersonal anhedonia was affected by experiences of emotional neglect, but this was only the case in one of the two scales used to assess interpersonal anhedonia. The effect was even smaller (1.1%) than the one observed for anticipatory anhedonia. In all the cases described above, the effect remained present and significant when other abuse variables were statistically controlled.

The mediation analyses showed that self-compassion did not act as a mediator for physical anticipatory nor physical consummatory pleasure. For interpersonal pleasure, the results are conflicting with the results of one measure (MAP-SR) showing that both anticipatory and consummatory pleasure have a self-compassion as a mediator whereas the analysis for the other measure (ACIPS) show that self-compassion does not act as a mediator between the other two variables.

This research adds support to some of the findings of Infurna et al. (2016) and Van Veen et al. (2013); both these studies proposed that experiences of emotional neglect were related with development in anhedonia later in life. However, neither were able to establish a causal relationship between the two nor address how that relationship affects the four subtypes of anhedonia.

This dissertation sought to answer several questions relevant to the topic of anhedonia. Most of the literature on the topic has employed limited operational definitions for the construct. Often having to employ one or two item subscales from tools that assess depression symptomatology, or one of the anhedonia scales that separate anhedonia to either physical or social or by looking into only anticipatory or consummatory anhedonia (Ameil et al., 2014; Cohen et al., 2018; Horan et al., 2006). Alternatively, they would often employ tools that assess either physical or social anhedonia without accounting for anticipatory or consummatory anhedonia. This project took a more holistic view of anhedonia and attempted to fill a hole in the literature by looking at all the relevant sub-constructs.

The findings of this dissertation have shown that out of the four types of anhedonia, only 3 appear to be affected by experiences of emotional neglect: physical anticipatory anhedonia, interpersonal anticipatory anhedonia and interpersonal consummatory anhedonia. The results of this project are in line with Pizzagalli's (2014) position that early life adverse experiences cause one to develop issues with reward processing later in life. Furthermore, emotional neglect carried a limited effect on physical consummatory anhedonia, this points out that experiences of neglect do not affect one's innate physical hedonic capacity. If interpreted through the lens of associative learning, the effect of emotional neglect on physical consummatory anhedonia can be clarified. When a child experienced emotional neglect, there was no association between rewarding stimuli and punishing stimuli, as would be the case with emotional or physical abuse as this association was not evident in this investigation (Kumar et al., 2018).

Another possible explanation to physical consummatory anhedonia could be that it is often associated with trait anhedonia, which according to the literature is most likely to be present in Schizophrenia spectrum disorders(Kring & Barch, 2014).

The effect on anticipatory anhedonia both physical and social was expected. This is due to anticipatory anhedonia involving elements of learning and value computation. As such, early life experiences of emotional neglect became instrumental in how one evaluates rewarding stimuli after they have been experienced due to a lack of validation by a parent or guardian. In accordance with social cognition theory, a child will often emulate the behavior of an adult when they perceive them receiving a reward. During emotional neglect, the parent would not model these kinds of responses to rewarding stimuli due to being emotionally unavailable or not present physically.

Furthermore, according to the literature persons who were diagnosed with MDD tended to present with decreases in anticipatory pleasure. However, no project has determined whether that deficit was ubiquitous across interpersonal and physical anhedonia.

Another gap in the literature that this project set out to answer was whether experiences of emotional neglect would affect the development of anhedonia in a non-clinical sample. This is because to the author's knowledge, virtually all the literature on anhedonia has used clinical populations. Most of them have been conducted on populations diagnosed with MDD or Schizophrenia spectrum disorders. This project identified the hedonic deficits that an otherwise healthy population experienced. It did so by showing that even in a healthy population sample, the effect of emotional neglect can still cause elevations in levels of anticipatory and consummatory social anhedonia and anticipatory physical anhedonia, even when other types of abuse/neglect are statistically controlled. The effect observed was limited but it did point to the possibility that social hedonic capacity and reward anticipation mechanisms could be affected by emotional neglect experiences, even when psychiatric diagnoses are not present.

Another possible explanation for our findings is somewhat reflected in a similar study that investigated how physical and social consummatory anhedonia development was affected by, emotional neglect and dysfunctional attitudes. This study found similar results to this dissertation wherein out of the different types of possible maltreatment, only emotional neglect was found to have the most significant role in the development of anhedonia later in life(Wang et al., 2022). The population used in this study were individuals diagnosed with MDD, and as such reported higher levels of anhedonia, which resulted in similar results but with a higher level of effect of emotional neglect on anhedonia being observed(Wang et al., 2022).

Self-compassion, acted as a mediator for only interpersonal anhedonia and in only one of the measures employed in this study. This meant that it does not act as mediator for physical anhedonia, which considering the Gilbert model of emotional regulation, is understandable. This could be due to the development of self-compassion or the soothing system working through affiliation which is geared towards the interpersonal domain (Gilbert, 2010).

Clinical Implications

The finding of this dissertation proposed that pleasure processing can be affected by experiences of childhood emotional neglect. According to a literature review by Hanson et al, (2021); there are evidence that experiences of early life stress, which include emotional neglect, child maltreatment, loss of a parent are connected with lower approach motivation and lower reward learning over time in humans (Hanson et al., 2021). These studies provide additional support to damaging effect of childhood maltreatment on reward processing. This dissertation is in line with the trend reported in the review mentioned above, as it contributes to the understanding on the development of anhedonia, as the result of childhood maltreatment but has presented that the construct most affected by childhood maltreatment appears to be anticipatory

anhedonia. This is likely due to this construct, which required learning over time being interfered with by negative affect.

Since 2019, there has been a trend in research directed at the increased understanding around the development and treatment of anhedonia. This was likely to due to increasing evidence on the transdiagnostic nature of anhedonia (Cohen et al., 2020; McMakin et al., 2012; Pizzagalli, 2022; Spano et al., 2019; Ward et al., 2019). In fact evidence pointed to anhedonia being the most common construct present in Disorders in the use of substances, eating disorders, and in cases of Post-Traumatic Stress Disorder with the prevalence observed ranges from 24% to 75% (Carmassi et al., 2014; Carragher et al., 2016; Destoop et al., 2019; Dolan et al., 2022; Hoge et al., 2014; Stull et al., 2022; Zelazny & Simms, 2015). This dissertation is in line with the transdiagnostic nature of anhedonia, because this study posited that deficits in pleasure processing would be observed in a general population regardless of an extant clinical diagnosis. This was found to be supported by the data uncovered in this research,and as such it added further support to the transdiagnostic nature of anhedonia.

Furthermore due to the transdiagnostic nature of anhedonia as well as its deleterious effects in treatment, there have been a number of treatment methodologies that were evaluated for the treatment of anhedonia. These treatments include pharmacological and psychological interventions.

Beginning with pharmacological treatments some promising results have been observed in studies that investigated the effect of Kappa-opioid receptors antagonists. These types of treatment have been found to affect the functioning of the ventral striatum, and restore normal functioning in the dopaminergic mesolimbic reward circuitry, specifically this is done through a

change in the balance of neurotransmitter in the VS and VTA neurons (Brooks & O'Donnell, 2017).

Ketamine was another type of pharmacological treatment evaluated for its anti-anhedonic properties and has been found to have both acute and chronic effects on the function of the cortical regions and midbrain regions relevant with pleasure processing(Mathew & Zarate, 2016; Nogo et al., 2022).

Selective Serotonin Reuptake Inhibitors have been found to be largely ineffective in the treatment of anhedonia, this appears to be due to effect on mostly serotonergic activities without affecting adrenergic activity. There are, however increasing evidence for the efficacy of melatonin analog agomelatine (AGO) which has been found to perform both melatonergic and serotonergic activities, which resulted in decreased anhedonia. However the mechanism by which this change takes place were still unclear, with two possible hypotheses, the first being that it acted by altering circadian rhythms or by increasing the availability of dopamine and norepinephrine(Stahl, 2014).

Research on pharmacological interventions has proposed a number of ways in which possible anti-anhedonic treatments could restore reward functioning. This is done through directly altering the function of relevant cortical and subcortical structures. However these interventions did not employ, the most up to date definition of anhedonia, only addressing hedonic tone or physical anhedonia and excluding the other types of anhedonia, thus creating a gap in the literature. Thus, it is unclear how to treat interpersonal anhedonia, from a pharmacological aspect, ergo by employing the definition used in this dissertation in future pharmacological interventions research would allow for clinicians to assess the alleviation of interpersonal anhedonia rather than only physical anhedonia.

A number of psychological treatments for anhedonia have been evaluated for their efficacy. This was due to an observation that traditional psychotherapeutic interventions, aimed to reduce negative affect, was found to be ineffective in reducing anhedonic symptomatology. Instead what has been found to be more effective in treating anhedonic symptomatology was to increase positive affect. This could be done through targeting the positive valence systems of reward anticipation, reward responsiveness and reward learning. Some of these interventions such Positive Affect Treatment (PAT), Virtual Reality Reward Training (VR-RT) and Amplification of Positivity (AMP) all employed treatment methodologies that trained the clients to direct their attention towards positively valenced affective events, by learning how to evaluate those events as positive, and to recall those events(Sandman & Craske, 2022). These interventions have been found to not only increase positive affect but also reduce negative affect(Chen et al., 2021; Craske et al., 2016). Thus reducing negative affective interference in pleasure processing. Furthermore, some of these interventions, appear to employ methodologies that increase self-compassion, as was the case with PAT where as part of the third module of this intervention clients' engaged in Loving-kindness meditation which is associated with increasing self-compassion (Gallacher, 2014). This practice is in line with the present findings, as it supports the inverse relationship between anhedonia and self-compassion observed in this study and the role of self-compassion as a mediator for levels of interpersonal anhedonia.

The proposed treatments of anhedonia detailed above, that aim to increase positive affect, point to the possibility that they could function as preventive mechanisms for anhedonic symptomatology. This dissertation posited that preventative interventions could take place early in life for individuals who have experienced maltreatment in childhood, in order to increase positive affectivity thus protecting against anhedonic symptoms or dysfunctions of the reward

processing system. This is expected to result in a reduced prevalence of anhedonia. In turn, this reduction could result in better recovery rates, and lower rates of treatment resistant Major Depressive disorder or even reduced negative symptoms in Schizophrenia Spectrum Disorders.

Furthermore, these types of preventative interventions are transdiagnostic, so are not attached to clinical diagnose. Therefore they could be applied to a general population to enhance their reward processing and reducing the severity of possible future clinical diagnosis as well increase overall well-being due to an increase in the ability to gain pleasure from interpersonal stimuli.

Due to the findings identifying the role of emotional neglect in the development of anhedonia there could be educational interventions that aim to teach parents with a history of depressive symptomatology, to engage in practices that provide them with increased pleasure. Thus reducing the risk of parent being emotionally neglectful towards the child due to their own depressive symptoms, specifically anhedonia (Rodrigo et al., 2011). Alternatively these preventative interventions could educate parents on the types of maltreatment and inform them on what emotional neglect is and how to not engage in it by teaching appropriate parental practices. Both of these could act as protective factors for children who are exposed to early life stress due to parental psychopathology.

It's also possible to employ techniques that increase self-compassion, in children and adolescent population where emotional neglect is reported. As has been observed from the psychological interventions described above, increasing self-compassion could increase the functioning of the reward system. Thus allowing for the decreased prevalence of anhedonia in adults.

Based on our findings it could be beneficial for psychological interventions that increase pleasure to take place as early as possible, preferably during childhood and adolescence, in order to prevent anhedonic symptoms from developing. Therefore, it would be beneficial,if some of these treatments methodologies where adapted for use in children and adolescent populations. Furthermore, if they were applied in a school setting it's possible that there could be an observable reduction in the prevalence of treatment resistant MDD as well as increased recovery rates in diagnoses such as Schizophrenia Spectrum Disorders, Eating disorders, PTSD and substance abuse disorders.

Research Implications

This research was hampered due to a lack of validated tools that assess interpersonal anhedonia. The majority of the tools that assessed interpersonal anhedonia did so by requiring the presence of a relational context between the participant and their levels of pleasure. Due to this issue this dissertation employed two tools assessing interpersonal anhedonia. Therefore it would be of great importance for future research to create tools that assess interpersonal anhedonia outside the interpersonal context in which it happens resulting in an objective, valid and reliable way to assess interpersonal anhedonia both consummatory and anticipatory.

The topic of anhedonia has only recently gained support in its function as a transdiagnostic symptom, as such it would be beneficial for future research to engage in its assesment outside the context of the diagnoses that it has been traditionally associated with such MDD and Schizophrenia Spectrum Disorders. This is supported by the findings of this dissertation as levels of anhedonia have been observed even in a general population with no extant psychiatric diagnosis.

Furthermore this project identified the need for further research on the topic of childhood emotional neglect and its possible consequences on one's ability to gain pleasure. Due to the population used in this study it was hypothesized that this was the reason for the low effect of emotional neglect on anhedonia. It is expected that this effect would be greater if it was investigated in the context of relevant clinical diagnoses, which would increase research on the topic of emotional neglect in general as well as in the context of anhedonia.

Limitations

This study faced a number of limitations that affected the findings; first and foremost, Covid-19 affected the manner that the questionnaires were administered as well as causing significant delays in the process.

This study employed a general population sample which was expected to have lower levels of anhedonia and lower levels of maltreatment. This choice limited the expectation on the levels of the dependent variables being assessed. Nevertheless, the effect of emotional neglect on anhedonia was still observed.

At the time, no assessment tools measuring anticipatory and consummatory interpersonal anhedonia as two distinct constructs existed. Rather, the extant tools only assessed interpersonal pleasure either in various social contexts such as work, family, friends, and romantic partners. As such, the author employed both tools in order increase the reliability levels for interpersonal anhedonia. Because of the limitation mentioned above, both the ACIPS and MAP-SR were scored and interpreted in a non-validated manner. This change could be one of the reasons for the reduction of internal validity, as measured by Cronbach's alpha, observed in the scales as they were not designed to be scored in the manner used in this study. Furthermore, it changed how the data was interpreted as the social context in which interpersonal pleasure took place was

not included in this analysis. Nevertheless these changes related to context did not affect the amount of pleasure reported by participants, as such it reflected their actual experience of pleasure in interpersonal context in all social contexts.

The author of the study opted to exclude the scale of witnessing intraparental violence, bullying and witnessing sibling violence from the MAES. This was due to those factors not being connected with anhedonia in the literature (Herrenkohl & Herrenkohl, 2009; Kim et al., 2017; Shakoor et al., 2015). The modifications of the scales above could have a number of effects on the interpretation of the results of this dissertation. The excluded subscales of the MAES, could have provided additional factors that affected levels of anhedonia later in life.

In the case of excluding the bullying subscales there have been limited evidence proposing a correlation to anhedonic symptoms, with the caveat that elevations of anhedonia levels were found in the context of depressive symptomatology due to bullying victimization (Kumpulainen et al., 1998). Similarly there were no evidence supporting the inclusion of the MAES witnessing subscales be it intraparental or sibling violence in an investigation relevant to anhedonia.

Studies as recent as 2021 have proposed an association between experiences of sexual abuse in childhood and anhedonia later in life. These findings conflict with previous research on the topic as at the time of writing this dissertation proposal there were no evidence supporting the connection between these two variables. Preliminary support for this association was found in 2021, as such the author elected to omit the sexual abuse subscale in order to alleviate the possibility of causing any undue distress to the participants of the study(Harkness et al., 2023; Long et al., 2022; Sonmez et al., 2021). Future investigations into the association between childhood maltreatment and anhedonia, should take into account the role of sexual abuse in the development of anhedonia.

This dissertation did not account for the presence of clinical diagnoses specifically Major Depressive Disorder and its potential effects on levels of anhedonia and self-compassion. The justification for this omission was mostly due to the goal of this project identifying how anhedonia is affected by experiences of childhood emotional neglect, in a general population. However, it is possible that the levels of anhedonia found in this project could be the result of depressive symptomatology because in Cyprus the prevalence for MDD ranges from 11.5%-27.9% (S. Sokratous et al., 2014; Sokratis Sokratous et al., 2013).

Furthermore, due to not assessing the presence of extant psychopathology this could account for the different levels across the different types of anhedonia explored in this study. This could be due to the different types of anhedonia present in different diagnoses, the presence of trait physical consummatory anhedonia in schizophrenia spectrum disorders and the presence of state interpersonal and physical anhedonia being observed in MDD are two examples of how anhedonia can present itself differently depending on the diagnosis. The low effect of childhood emotional neglect and anhedonia observed in this study could also be the result of a clinical diagnosis being a better or equal predictor for the development of anhedonia rather than emotional neglect.

The majority of the sample (80.5%) presented in this study stated that they had achieved at least a bachelors or higher. These findings negatively affected the generalizability of this study.

Another limitation of the study was its cross-sectional design; in the future, this study could be replicated in a longitudinal design, which would allow a better understanding of how emotional neglect affects the mechanisms of reward acquisition in otherwise healthy populations.

Future Research

This dissertation has found limited support for the role of emotional neglect in the development of anhedonia. Some of the findings point to different types of maltreatment such as experiences of physical abuse being inversely correlated with anticipatory interpersonal pleasure, and physical neglect being related consummatory interpersonal anhedonia and anticipatory physical anhedonia.

The fact that this dissertation used a general population could explain why the effect of emotional neglect indicated was so low, whereas other studies have focused on either a population with a diagnosis of MDD or schizophrenia spectrum disorders. Future studies could investigate the effect of emotional neglect on how anhedonia develops in individuals with Major Depressive Disorder as well as in substance abuse. As it would allow a more nuanced understanding of the association of childhood maltreatment and anhedonia. Ideally this research would be longitudinal in nature in order to observe how anhedonia develops and manifests throughout childhood and later into adulthood, this type of research would provide support to the existence of endogenomorphic depression.

Furthermore, future research could employ a similar design to this project while accounting for clinical diagnoses. Thus, allowing for the identification of possible predictors of anhedonia other than emotional neglect.

The findings discussing the possible pharmacological treatments of anhedonia are significant, however, these studies have all been focused in the treatment of physical anhedonia, as the tools used to assess anhedonia tended to either assess anhedonia as a singular construct or as a single item in a depression scale. As such they did not account for the treatment of interpersonal anhedonia, nor did they account whether they affected anticipatory or consummatory anhedonia. Therefore, future studies should investigate how interpersonal,

anticipatory and consummatory anhedonia would be affected by these pharmacological interventions, in order to cover a similar gap in the literature as the one covered in this dissertation.

In future research, it would be recommended that the study be conducted on the different populations to examine the effect of emotional neglect on populations that exhibit higher levels of anhedonia.

Conclusion

Overall, the findings of the research suggested that emotional neglect plays a small yet significant role in causing a deficit in anticipatory reward functioning and interpersonal consummatory reward functioning. Based on these findings, the author can conclude that while this deficit is more pronounced in individuals with MDD or Schizophrenia spectrum disorders, experiences of emotional neglect can cause these deficits even in a non-clinical population. This allowed the author to surmise that emotional neglect in childhood affects reward processing in general.

Furthermore, self-compassion was found to act as a mediator for certain aspects of anhedonia, thus allowing for the conclusion that while emotional neglect affects reward processing, self-compassion can act as protective factor by mediating the effect of emotional neglect on the aforementioned process.

Both conclusions carry value, firstly in a scientific concept as they covered a hole in the literature on the topic of anhedonia, as well as for their clinical implications due to proposing self-compassion as a possible protective factor that if fostered can reduce the effects of emotional neglect on interpersonal anhedonia.

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Appendices

Appendix 1

Table 1

Descriptive Statistics of Key Variables by Gender

Subscale	Mean		SD		Range	
	Male	Female	Male	Female	Male	Female
TEPS Anticipatory	39.24	42.94	7.08	3.59	18-52	24-57
TEPS Consummatory	34.55	36.41	6.19	5.88	16-48	15-47
ACIPS Anticipatory	30.13	31.56	5.55	4.22	11-41	17-41
ACIPS Consummatory	44.96	48.32	7.18	5.53	10-59	32-60
MAPS Anticipatory	15.56	15.13	3.62	4.28	7-24	2-24
MAPS Consummatory	7.49	7.36	2.09	2.32	2-12	2-12
Verbal Abuse	2.44	2.66	3.14	3.23	0-10	0-10
Non-Verbal Abuse	2.28	2.66	2.36	2.45	0-10	0-10
Physical Abuse	1.91	1.62	2.41	2.11	0-8	0-8
Emotional Neglect	1.72	1.75	2.45	2.49	0-10	0-10
Physical Neglect	.85	.49	1.8	1.31	0-8	0-6
Self-Compassion	3.21	2.94	0.61	0.66	1.39-4.92	1.44-4.76

Note: N=317, 3 participants did not identify gender.

Appendix 2

Table 2

Comparison of Key Variables by Gender

Subscale	Mean		SD		
	Male	Female	Male	Female	t
TEPS Anticipatory	39.24	42.94	7.08	3.59	-4.79*
TEPS Consummatory	34.55	36.41	6.19	5.88	-2.72*
ACIPS Anticipatory	30.13	31.56	5.55	4.22	-2.60*
ACIPS Consummatory	44.96	48.32	7.18	5.53	-4.70*
MAPS Anticipatory	15.56	15.13	3.62	4.28	.96
MAPS Consummatory	7.49	7.36	2.09	2.32	.50
Verbal Abuse	2.44	2.66	3.14	3.23	-.62
Non-Verbal Abuse	2.28	2.66	2.36	2.45	-1.38
Physical Abuse	1.91	1.62	2.41	2.11	1.13[a]
Emotional Neglect	1.72	1.75	2.45	2.49	-.09
Physical Neglect	.85	.49	1.8	1.31	1.96[a]
Self-Compassion	3.21	2.94	0.61	0.66	3.72*

*Note: ***p<.001, a=Equal Variance not assumed.*

Appendix 3

Table 3

Correlations between Maltreatment Variables, Pleasure Variables and Self-Compassion

	TEPS-Anticipatory	TEPS-Consummatory	ACIPS-Anticipatory	ACIPS-Consummatory	MAPS-Consummatory	MAPS-Anticipatory	Self Compas Scal
Emotional Neglect	-.133*	.026	-.142*	-.091	-.121**	-0.166**	-.235
Physical Neglect	-.131*	-.044	-.124*	-.134*	.000	-.045	-.08
Non-Verbal Abuse	-.013	.061	-.098	-.029	-.186**	-.193**	-.245*
Verbal Abuse	.061	.060	-.024	.005	-.064	-.083	-.281
Physical Abuse	-.013	.080	-.128*	-.071	-.040	-.023	-0.09

*=p<.05

**=p<.01

Appendix 4

Table 4

Mediation Analyses for TEPS Anticipatory Scale, Self-Compassion and Emotional Neglect

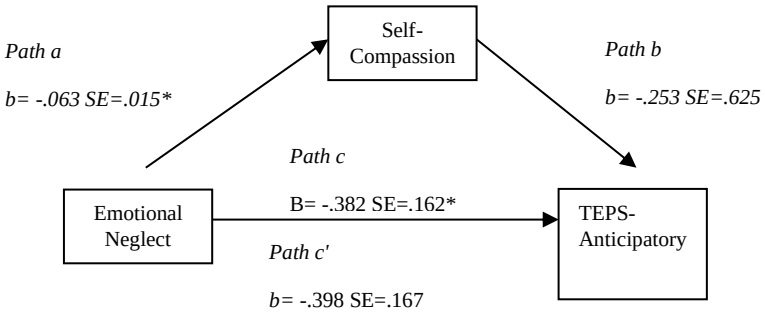
Variable/Effect	*b*	*SE*	*t*	*p*	*95% Confidence Interval*	
Emotional Neglect predicting Self-Compassion	-0.063	0.015	-4.263	<.001	-0.092	-.034
Self-Compassion predicting Physical Anticipatory Pleasure	-0.253	.625	-.405	>.05	-1.482	.976
Emotional Neglect predicting Self-Compassion predicting Interpersonal Anticipatory Pleasure	-.398	.625	-.405	>.05	-1.482	.976
Effects						
Direct	-.398	1.167	-2.384	<.05	-.726	-.138
Indirect	-.016	.014			-.064	.103
Total	-.382	.162	-2.358	<.05	-.700	-.063

Based on 5000 Bootstrap samples

Appendix 5

Figure 1

Mediation Figure TEPS- Anticipatory



*=p>.05

Appendix 6

Table 5

Mediation Analyses for ACIPS Anticipatory Scale, Self-Compassion and Emotional Neglect

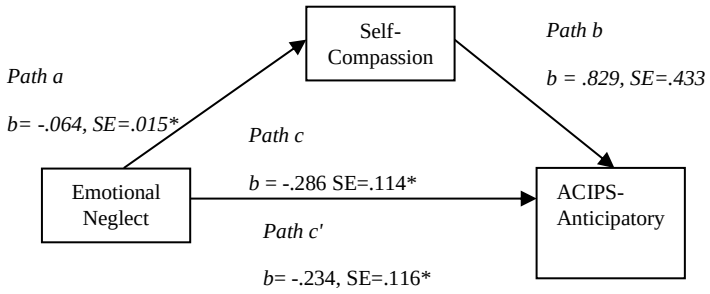
Variable/Effect	*b*	*SE*	*t*	*p*	*95% Confidence Interval*	
Emotional Neglect predicting Self-Compassion	-.064	0.015	-4.281	<.001	-0.093	-.034
Self-Compassion predicting Physical Anticipatory Pleasure	-.829	.433	1.914	>.05	-.023	1.682
Emotional Neglect predicting Self-Compassion predicting Interpersonal Anticipatory Pleasure	-.233	.116	-2.010	<.05	-.462	-.005
Effects						
Direct	-.233	.116	-2.010	<.05	-.005	-.116
Indirect	-.053	.030			-.114	.005
Total	-.286	.113	-2.525	<.05	-.063	-.142

Based on 5000 Bootstrap samples

Appendix 7

Figure 2

Mediation Diagram ACIPS- Anticipatory



*=p>.05