

**An investigation of Emotional Expressiveness as one of the
Proposed Mechanisms of Change of Radically-open
Dialectical Behaviour Therapy (RO-DBT).**

By

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**This thesis is submitted to University of Southampton in fulfilment of the
requirements for the degree of a Doctorate in Clinical Psychology**

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Declaration of Authorship

I, Helena Maher, declare that this thesis and the work presented in it are my own words and have been generated by me as re result of my own original research.

Title: An investigation of Emotional Expressiveness as one of the Proposed Mechanisms of Change of Radically-open Dialectical Behaviour Therapy (RO-DBT).

I confirm that:

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2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly attributed;
3. Where I have consulted the published work of others, this is always clearly attributed;
4. Where I have quoted from the work of others, the source is always given.
With the exception of these quotations, this thesis is entirely my own work;
5. I have acknowledged all main sources of help;
6. Where this thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
7. None of this work has been published before submission

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ABSTRACT

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Thesis for the Degree of Doctorate in Clinical Psychology

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A systematic review of the literature was conducted to explore Emotional Expressiveness in Depression, 11 eligible papers were identified. Papers were critically evaluated with the research question in mind: ‘What empirical evidence is there that patients with depression are less emotionally expressive than non-depressed individuals?’ All 11 papers supported the research question that individuals with depression are less emotionally expressive, in comparison to non-depressed individuals. To the best of the author’s knowledge, no previous review has been conducted on emotional expressiveness and depression. The research available to date is in its infancy and several limitations of the studies have been delineated in this review. Thus, conclusions are tentative at best.

The empirical study in this thesis investigated Emotional Expressiveness as one of the Proposed Mechanisms of Change of Radically open-Dialectical Behaviour Therapy (RO-DBT). Depression is considered to be one of the leading causes of disability today, with more than 300 million suffers world-wide (WHO, 2017, 2012). Treatment options for mild to moderate depression have proved to be efficient. However, individuals with more complex trajectories appear to be resistant to both pharmacological and psychological interventions currently available. Thus, many patients present to us clinically with chronic treatment resistant depression. RO-DBT is a transdiagnostic treatment approach that specifically set out to treat patients with complex presentations. It posits that one of the main impairments in these populations is their deficits in emotional expressiveness, which leads to exacerbation of symptoms of depression and functions as a maintenance factor of the disorder.

The main objective of the current study was to explore one of the likely mechanisms of change in RO-DBT, namely, a change in emotional expressiveness as a possible result of the therapy. It was hypothesised that individuals’ observed and self-reported emotional expressiveness would become less maladaptive after receiving RO-DBT.

Mental well-being would increase and ambivalence over expressing emotion and observed maladaptive social signalling would decrease, as measured by the PhQ-9, ‘Maladaptive Social Signalling scale’, and the AEQ. 30 participants’ that took part in the original RCT REFRAMED study (14 Male; 16 female, n=30) were eligible according to the inclusion/exclusion criteria for the study. Video-recordings from the

RO-DBT session (Pre, Mid, Post) were viewed and rated for emotional expressiveness and scores for the three different time points on the PHQ-9 and AEQ were analysed. A cross-sectional design was utilised and a repeated measures MANOVA yielded a statistically significant result across different time points of therapy (Pre, Mid, Post). Our results provide some support for the efficacy of RO-DBT therapy, to reduce maladaptive social signalling behaviours, increase mental well-being and ambivalence over expressing emotions. However, there are several limitations of the study and results should therefore be interpreted with caution.

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CHAPTER 1

Literature Review

Title: Exploring Emotional Expressiveness in Depression

Topic: Emotion Expressivity in Depression

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1.0 Statement by researcher

For the purpose of the current thesis the researcher has adopted the language that the original research team employed in the randomised controlled trial called REFRAMED (REFRActory depression - Mechanisms and Efficacy of Radically Open Dialectical Behaviour Therapy; Lynch, et al., 2015a). Firstly, Professor Thomas Lynch and colleagues have a background in Psychiatry and as such utilises language that are more commonly used in medical research, rather than psychological and social research. An example of this is the reference to diagnosis throughout this thesis and to medical jargon such as patient and patient groups. Secondly, when conducting large scale research it is important to utilise the same 'language' to refer to conditions, in an effort to make comparisons between patient groups, to enhance matching between groups (e.g., by using DSM criteria for diagnosis) and to make comparisons between different studies more accessible. It also supports the standardisation of various instruments used for research studies. Thirdly, during the process of assessing patients eligibility for the REFRAMED trial semi-structured clinical interviews (SCID-I and SCID-II) were employed which were based on the criteria outlined for different diagnosis in DSM-IV and DSM-V. Thus, talking about different diagnosis in the current thesis went in line with this. The author of this research takes the standpoint that for the purpose of this thesis it was in the best interest to utilise the language that had been used in the REFRAMED trial. However, it is important to acknowledge that when working with individuals in a clinical setting, language such as; diagnosis and patient should not be employed. Taking a more humanistic and holistic standpoint is essential, where the individuals strengths and weaknesses are assessed and evaluated and treatment is targeted to each individual's needs.

1.1 Introduction

Emotional expression is a difficult concept to formally define, due to its multifaceted nature. According to Collier (2014) it deals with both verbal and non-verbal behaviour, as a means of communication and it involves a messenger, a message and a receiver. Emotional expression specifically focuses on the messenger and the message, which can be communicated through numerous modalities (Collier, 2014). For instance, an underlying emotion or affective state can be relayed by words, tone of voice, touch, body language, posture and facial expressions amongst other modes. Collier (2014) further discusses the inherent difficulty with defining ‘emotional expressions’, in particular in reference to the complexity with non-verbal and verbal behaviours and how these rarely communicate one specific feeling, rather they have many meanings where the emotional component is only one aspect. Collier (2014) uses eye contact as one example to portray the many meanings of ‘emotional expressions’ and explains how eye contact is used to regulate speech between individuals, as well as how it communicates the internal feelings of the individual. The complexity of emotional expression is further complicated by the question of intentionality, with two competing schools of thought, namely seeing emotional expression as either a deliberate and controllable mode of communication (e.g., Birdwhistell, 1970) or without self-awareness and control (e.g., Darwin, 1965, 1862; Ekman, 1973). Thus, for the purpose of this thesis ‘emotional expression’ will be used to represent the way that we communicate non-verbal and verbal behaviour with varying degrees on intentionality.

In this paper some of the studies reviewed looked at cultural differences in emotional expression. It needs to be highlighted that the generalisability for the concept of ‘emotional expression’ across cultures is limited by its very nature.

Charles Darwin's (1872, 1965) work on emotions and his book 'Emotions in Man and Animals' has had a significant influence on our understanding of emotions and the way that we view emotions to date. One of its premises purported that the way we express our emotion are consistent with the theories of evolution, which denoted that emotions are universally expressed across cultures. However, the notion of universally expressed emotions was contested by many researchers that followed Darwin (e.g., Ekman, 1999). Thus, despite the fact that human beings across the world have next to identical genetic makeup and their facial muscles and the neurons that fire in their brains are nearly identical across cultures, the way that we express our emotions is heavily dependent on where we were brought up and the cultural influences that we have had. Furthermore, how the expression of emotion is viewed by that society and its meaning for those individuals will impact on how it is expressed, interpreted and perceived.

Western and Eastern cultures place value on very different aspects of the individual, where Eastern cultures promotes a collectivist society with the family at the very centre, Western cultures strive towards autonomy, individualism and self-growth (e.g., Loui, 2014; Tsai, Miao, Seppala, Fung, Yeung, 2007). According to Louie (2014) there is an underlying sense of shame in Asian cultures that stem from a fear of being ostracised from both your family, the community and your culture, with the ultimate shame being 'bringing dishonour to your family'. Thus, if it's not "culturally acceptable" to express emotions or even to "feel" them, this intrinsically will have a significant impact on how emotions are expressed, interpreted and perceived. Tsai and colleagues (2007) explored the cross-cultural expression further by looking at 'high arousal' emotions (e.g., being afraid, angry, annoyed, aroused, happy, distressed etc.) and low arousal emotions' (e.g., feeling at ease, bored, calm,

pleased, relaxed, sad etc.). They found that in Western cultures high arousal emotions are preferred, as these are highly effective when trying to influence others. Eastern cultures on the other hand strive towards being a part of a group and conforming, hence low arousal emotions are preferred.

Much research on expression of emotions cross-culturally looks at the difference between Western-Eastern cultures, however, it is essential to acknowledge the vast cultural differences we see all over the world. For instance, in a large study conducted by Kim-prieto and Eid (2004) how emotions are experienced in a culture due to specific norms, was studied in over a thousand participants from five different African nations (Ghana, Nigeria, South Africa, Tanzania, and Zimbabwe). Different cultures places values on different norms, that is, certain emotions may be considered desirable, whereas others are not. Thus, people would be more inclined to “search out” an emotion that is more culturally valued. Results from this study revealed both within-nation and between-nation differences in these norms. In the more collectivist societies they found that for instance, ‘guilt’ was a more desirable emotion, compared to ‘pride’, which was less desirable. This study also provided evidence for some ‘norms’ of emotional experience being in line with other nations, thus these could be classified as more universal norms. A surprising finding from the study was that in spite of the collectivist nature of many African nations, a large class of people in the nations investigated found all negative emotions undesirable. Yet, they also found subgroups (e.g., a Tanzanian group), that approved of anger.

Levenson, Ekman, Heider and Friesen (1992) highlighted differences in how two different cultures interpreted and perceived emotion. They demonstrated that individuals from two vastly different cultures (Sumatrans and Americans), both experienced an emotion in the same way physiologically. However, only the

Americans described this subjective feeling as an emotion. For the Sumatrans this subjective physiological experience on its own was not “enough” to be labelled an emotion, rather, for it to be considered an emotion in their culture, it had to be shared with others and experienced in a group. This and other cross-cultural work exemplifies the differences in how emotions can be perceived and experienced vastly differently in different cultures. It also demonstrates how this, in turn, will have an impact on how these individuals will express emotions, interpret and perceive them. Throughout this thesis we urge the reader to keep the limitation of the generalisability of emotional expressiveness in mind and to look at this work as a mere pilot. It is suggested that future work will include the study of emotional expressiveness cross-culturally.

Research to date on individuals with Major Depressive Disorder (MDD) has looked at many different aspects of how emotional functioning may affect mood for the individual. However, very little research has investigated how this may have significant negative impact on interpersonal relationships and what the long-term consequences of this impact may be. In this literature review we set out to investigate what empirical evidence there currently is to suggest that individuals with depression are less emotionally expressive. The review starts by summarising mental health difficulties and their societal impact, in particular MDD. It will then outline some of the research in the area that has looked at depression and emotional functioning, leading up to the main body of this paper which reports the results of the literature review in detail.

1.1.1 Prevalence and Costs of Mental Health Problems

Mental health problems are a major public health concern and one of the main contributing factors for global disease burden (Trautmann, Rehm, & Wittchen, 2016; Vos, Barber, Bell, Bertozzi-Villa, Biryukov, et al. 2015; Whiteford, Degenhardt, Rehm, Baxter, Ferrari et al., 2013). According to Trautmann and colleagues (2016) approximately 165 million people in the EU are affected each year with a mental health disorder. Mental health problems do not distinguish between race, gender, ethnicity or socioeconomic classes and may affect any individual. Thus, mental health problems have substantial societal and economic implications for countries, with both short and long-term consequences (e.g., Trautmann et al., 2016; Patel, Chisholm, Parikh, Charlson, Degenhardt et al. 2016; Layard, Clark, Knapp & Mayraz, 2007). This is particularly due to indirect costs, such as: long-term treatment costs and lost productivity. For instance, many individuals with mental health disorders are absent from work for longer periods of time, they may retire early, seek disability and care benefits and are at higher risk of mortality (Trautmann et al., 2016). Gustavsson and colleagues (Gustavsson, Svensson, Jacobi, Allgulander, Alonso et al., 2011) reported the estimated direct and indirect costs for mental health conditions in Europe in 2010 to be €798 billion and these costs are expected to go up substantially. It is to be noted that many of these cost-related studies struggle to find relevant and accurate measures of costs and as a consequence studies show huge variation (e.g., Trautmann et al., 2016). Mental health conditions have high societal costs, though perhaps the most significant cost is the impact it has on the individual and their family, the burden of disease and the effect this has on the individuals' quality of life and mental wellbeing (e.g., Trautmann et al., 2016; Schofield, Shrestha, Percival, Passey, Callander et al., 2011).

1.1.2 Major Depressive Disorder; Prevalence & Symptoms

Major Depressive Disorder (MDD) is a common mood disorder that is highly prevalent, it affects over 300 million people across the world and is one of the leading causes of disability and the global burden of disease (e.g., The World Health Organisation, 2017, 2012; Kessler, Berglund, Demler, Jin, Koretz, et al., 2003).

Many individuals that suffer from MDD have chronic depression, recurrent depression and/or treatment resistant depression (TRD). Recurrent depression is characterised by; periods of depression, recovery and symptom freedom, with subsequent relapse, whereas chronic depression is diagnosed if an episode of depression lasts for over two years (e.g., World Health Organisation (WHO) 2017; Boland & Keller, 2009). According to Boland and Keller (2009) over 75% of individuals that have experienced depression, will have more than one episode in their lifetime. According to Gotlib and Joormann (2010), the high rates of recurrence and relapse are an indication that there are specific factors that increase the risk for an individual to develop depression. TRD signifies depression that does not respond well to prophylactic or currently available therapeutic treatments and depression persists despite numerous trials of different types of interventions (e.g., Lynch, Whalley, Hempel, Byford, Clarke, et al., 2015a; Fournier, DeRubeis, Shelton et al., 2009; Berlim & Turecki, 2007). For the purpose of this doctorate thesis we will refer to chronic depression and TRD as refractory depression (RD) from here on out (e.g., Lynch et al., 2015a). Research in the field also emphasizes the complex clinical picture of MDD, as many suffer from comorbid Personality disorders (PD's) and anxiety disorders (Lynch, Whalley, Hempel, Byford, Clarke, et al., 2015a).

According to the Diagnostic and statistical Manual (DSM-V) and International Statistical Classification of Diseases and Related Health Problems (ICD-10) MDD is characterised by a collection of behavioural, emotional, and cognitive symptoms, such as: depressed/low mood, anhedonia, significant change in weight or loss of appetite, sleep disturbance, low energy and fatigue, suicidal ideation and suicidality, feelings of worthlessness, guilt and hopelessness, cognitive difficulties (e.g., slowed thinking, concentration, decision making and memory) and psychomotor agitation or retardation (American Psychiatric Association, 2013; World Health Organization, 1992). For MDD to be diagnosed, symptoms need to have been present for more than two weeks, not be attributable to any other cause and produce significant distress for the individual (American Psychiatric Association, 2013; World Health Organization, 1992).

1.1.3 Emotional Functioning in Depression

There appears to be a general consensus between current researchers that maladaptive emotional functioning exacerbates both the severity and the persistence of symptoms in depression (e.g., Thompson, Mata, Jaeggi, Buschkuhl, Jonides, et al., 2012). Research to date in the area of MDD and emotional functioning has been diverse and extensive. Most research focuses on emotion recognition, emotion reactivity (e.g., positive and negative affect), cognition and emotion (e.g., Working Memory) and emotion regulation strategies, such as: cognitive reappraisal and suppression in different modalities of emotional expressivity. The majority of these research studies have looked at impairments in the depressed individual, however very little research has investigated how these impairments actually impact on their

relationships with others and how this in turn can exacerbate symptoms of depression and function as a maintenance factor. An example of this is research on emotional reactivity, emotional reactivity is defined as “emotional reactions that are elicited in response to a circumscribed external “event”, such as a valence stimulus or a specific daily event” (Thompson et al., 2012, p.3). One inherent difficulty with the work on emotional reactivity is that it does not give a wider understanding of an individual’s emotional experiences. Rather it looks at specific response to an experience that has been manipulated by the researcher, thus the “experience” is further reduced to a negative or positive event (Thompson et al., 2012). However, research on emotional reactivity is still valuable and has given us important insights into these experiences. Rottenberg (2005) demonstrated that individuals with MDD are less reactive to stimuli, regardless of content in comparison to non-depressed people. These findings are interesting and evoke questions such as; if depressed people are flat in their affect, how does this affect their interactions with other people? Nonetheless, some research has looked at the impact that the expressive suppression has on other people.

Gross and John (2003) conducted five studies of emotion regulation, specifically investigating cognitive reappraisal and expressive suppression in an effort to see if individuals differ in their approaches of using these strategies and if their given choice of strategy has an impact on their experience and expression of emotion and subsequent wellbeing. Gross and John (2003) evaluated these studies with the emotion theory by Gross (2001) in mind. That is, emotions can be seen as being on a time-line, beginning with an evaluation of emotion cues, when these emotions have been attended to, this in turn triggers a set of responses that are

experiential, behavioural and physiological in nature, subsequently as these response tendencies have ascended they can be manipulated in different ways.

For the purpose of investigating emotion regulation strategies, Gross and John (2003) chose to look specifically at ‘cognitive reappraisal’ which is an antecedent-focused strategy and ‘expressive suppression’ (emotional suppression) which is response-focused strategy. Cognitive reappraisal is something we choose to do before the emotion response tendencies are fully activated, for instance, we can interpret a difficult situation as something that we can learn from or we can see it as very stressful and negative event, thus eliciting very different emotional responses from the same situation. Emotional suppression or expressive suppression on the other hand comes at a later stage of the emotion process and has to do with inhibiting your experiential, physiological and behavioural response tendencies (response modulation), for example, ‘putting on a poker face’ when playing cards (Gross and John, 2003).

The authors found that participants in the five studies that used ‘cognitive reappraisal’ approached stressful and difficult situations with a more active and positive attitude, thus, intervening early on in the emotion generation process and changing the behavioural outcome and the subsequent inner feeling that the emotion then created. The reappraisers were generally more positive, reported less negative feelings and had both more positive and closer relationships than the suppressors, as they openly shared their emotions, in turn leading to greater overall wellbeing. On the contrary, Gross and John (2003) found the participants that utilised ‘expressive suppression’ as an emotion regulation strategy, which is a strategy later on in the emotion process, to experience themselves as being dishonest to self and others by not showing their true emotions. The suppressors often put on a mask to hide how

they feel and dampen both inward and outward displays of emotion. They are less successful than reappraisers at repairing their mood, they often get stuck on negative events and ruminate more, and they feel less PA and more NA. Suppressors have more distant than close relationships, perhaps both due to their own choosing and due to being viewed as inauthentic by others. Thus, as a coping strategy to deal with unwanted emotions, ‘expressive suppression’ does work, that is, these individuals do express less negative emotions, however at dire costs to their own wellbeing (Gross and John, 2003).

Butler, Egloff, Wilhelm, Smith, Erickson and Gross (2003) investigated emotion regulation strategies by conducting experiments that explored ‘expressive suppression’ and its consequences during social interaction. In their experiment they had two unacquainted pairs of women, that were told to discuss an upsetting topic, in the first study one member of each pair was randomly assigned to and instructed to; either suppress emotion, respond naturally or to use cognitive reappraisal in such a way that emotional responses would decrease. In the second study, one member was either assigned to emotional suppression or ‘no instruction’. Results from the first study revealed that the person that was assigned to the suppressing condition became distracted from the conversation and it reduced their responsiveness and disrupted communication. In turn, the suppressors’ partners’ blood pressure rose, thus emotional suppression had an impact not only on the person suppressing, but also on the other person in the dyad. In the second study emotional suppression led to an increase in blood pressure in both the suppressor and the suppressors’ partner, it further reduced the flow of conversation and the ability to build rapport and build on the relationship.

These results indicate that the way in which individuals regulate emotions have important implications for their health and wellbeing. Butler et al. (2003) highlighted that by using emotional suppression to avoid showing negative emotions to others, the individuals own negative emotions appear to increase, thus this may be a maintaining factor in both depression and anxiety. Furthermore, emotional suppression not only impacts the individual engaging in it, but also impacts the person that they interact with. This can subsequently lead to social isolation and mental health difficulties for the individual.

Another area of emotion research that this literature review will look at more closely is ‘ambivalence of emotional expression’. This particularly refers to the person’s inner feelings and the discrepancy they feel. Thus, they may want to express an emotion, yet they feel reluctant to do so, either due to a fear of how their emotion will be perceived by others (i.e., they will be rejected, ridiculed, criticised and humiliated) or a fear that by expressing the emotion outwardly they may feel the associated feeling more strongly (King and Emmons, 1991).

1.2 Purpose of this Review

An abundance of literature has explored the relationship between depression and emotional functioning. However, research to date has predominantly focused on how cognitive impairments associated with depression impact on emotional functioning. This research has given us considerable insight into how depressed individuals view their world and how they process information. Some researchers have gone further to look at how specific impairments seen in depression may either be precursors of the condition (i.e., risk factors) or potential maintaining factors of

depression. Whether these impairments are risk factors for depression or causing the symptoms of depression to remain, it is important to investigate further how they may impact on our relationships with others. For the purpose of this review we set out to explore this further by investigating what empirical evidence there currently is that depressed individuals are less emotionally expressive than other people. Less expressive individuals are often seen as disingenuous by others, people feel uncomfortable in their presence and distance themselves from these individuals. For the individual this may subsequently lead to interpersonal difficulties (e.g., distant and aloof relationships) social isolation and loneliness, which in turn may exacerbate symptoms of depression and anxiety and may function as a maintaining factor of mental health difficulties (e.g., Lynch et al., 2015). This review is a starting point for future research within depression and may give important insights for how we approach future treatments of this condition.

This literature review can add to the current stance of the area, as from what the authors can tell, there are no other reviews that explore depression and emotional functioning.

1.2.1 Review Question

- What empirical evidence is there that patients with depression are less emotionally expressive than non-depressed individuals?

1.3 Method

1.3.1 Inclusion and Exclusion Criteria

A study was selected for inclusion if it adhered to the following inclusion and exclusion criteria. Please see Table 1 below.

Table 1: *Inclusion and Exclusion Criteria*

Inclusion Criteria: a study was included if the following criteria were met.	Exclusion Criteria: a study was excluded if any of the following criteria were met.
The study was looking at individuals with Depression and ‘social signalling’ and/or emotional expressiveness	The study was looking at ‘social signalling’ and/or emotional expressiveness in any other clinical population than depression
The study was looking at ‘social signalling’ and/or emotional expressiveness in non-clinical populations	If the study sample was under the age of 18
The study population was an adult sample	Book chapter or dissertation
The study had been published in a journal	The study was disseminated in any other language than English
The study was disseminated in English	The study published before 1996
The study was conducted between 1996 and 2017	Non empirical study (i.e., theoretical paper)
	Single case study

1.3.2 Search Strategy and Selection of papers

With the purpose of carrying out a systematic search of the literature the following data bases were searched via EBSCO: PsychInfo, Medline, PsychARTICLES, PubMed, Web of Science and Cinahl. The search was conducted in October 2017, search terms and databases were checked by a librarian with specialist knowledge of systematic reviews. The following search terms were employed; “Depression and "emotion* express* and adults”, “Depression and

“social signal*”. Total search for the first search term “Depression and "emotion* express* and adults” yielded 472 results in total. The second search term “Depression and “social signal*” yielded 52 results. Please see the flow chart in Figure 1 for details of search results.

Following the two searches all publications prior to 1996 were excluded as per a discussion with a librarian that has expert knowledge of systematic reviews, any publication disseminated in a language other than English were also excluded, as well as book chapters and dissertations. Titles and abstracts were then scanned to ensure that the papers were relevant to the research question and that they adhered to the inclusion and exclusion criteria.

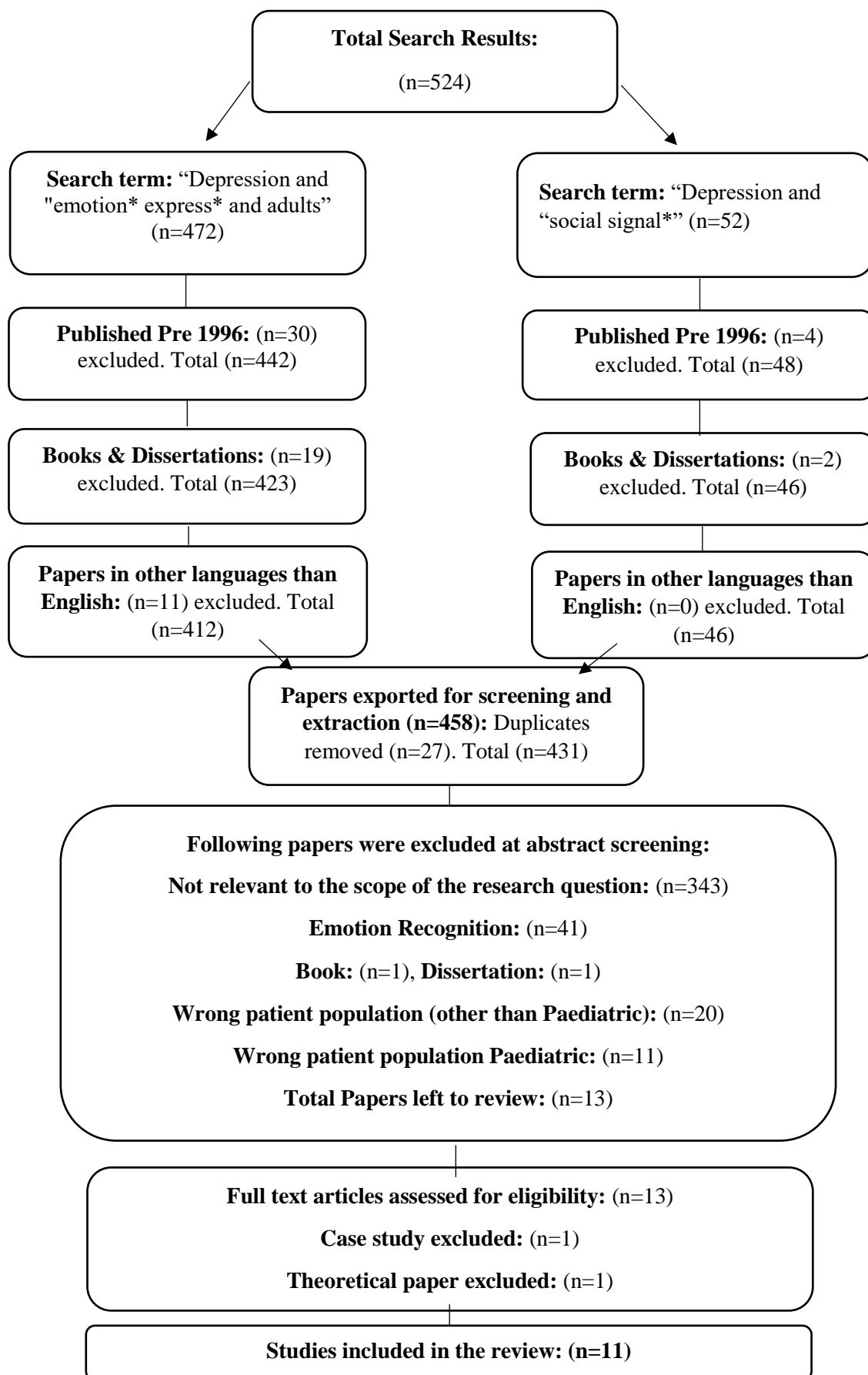


Figure 1: Flow Chart of Study Selection Process

Table 2:*Studies selected for review*

Author & Year	Design	Sample	Measures	Main findings	Critique	QATQS¹ rating
Brockmeyer, Grosse Holtforth, Krieger, Altenstein, Doerig, Friederich and Bents (2013).	Cross-sectional Design	MDD (n=76) (MDD; 30 male; 46 female) Non-Depressed Controls (NC) (n=77) (NC; 42 male; 35 female).	The ambivalence over the expression of emotion scale (AVEX-SF) ($\alpha = .87$)	In comparison to non-depressed controls, patients with MDD reported greater Ambivalence over Expressing Emotion (AEE). Furthermore, results showed AEE and depression to be positively correlated for this group.	Limitations 1: utilising a cross-sectional design meant that authors could not tell if AEE preceded MDD (as a risk factor for depression) or if it maintained the symptoms of the disorder. Limitation 2: A new measure of AEE was used. Limitation 3: self-report measures can be influenced by memory bias. Limitation 4: did not include comorbid diagnosis. Strength: excluded anxiety to get a homogenous sample of depression only. Limitation 5: No information was given regarding medication.	Moderate
Brockmeyer, Kulesa, Hautzinger, Bents and Backenstrass (2015).	Cross-sectional Design	Early onset chronic depression (n=30), 60% women & 40% male;	1. Beck Depression Inventory-II (BDI-II). Cronbach's $\alpha = .96$. 2. Cognitive-Behavioral Avoidance Scale (CBAS).	In comparison to non-depressed controls Chronically depressed patients showed greater avoidance on all measures. Compared to patients with	Limitation 1: Self-report data may be affected by memory bias. Limitation 2: A cross-sectional design means that	Moderate

		<p>Episodic depression (n=30), 67% women, 33% male; NC (n=30), 60% women, 40% male.</p>	<p>The four subscales yielded the following Cronbach's alphas: $\alpha=.78$ (cognitive-social), $.91$ (cognitive-non-social), $.90$ (behavioral-social), and $.82$ (behavioral-non-social). 3. Emotion avoidance subscale of the Need for Affect Scale (NAS-A). Cronbach's $\alpha=.90$ in total sample. 4. Ambivalence over Emotional Expression Questionnaire (AEQ). Cronbach's alphas for the two structures: competence ambivalence $\alpha=.91$ and the effect ambivalence $\alpha=.86$.</p>	<p>episodic depression results indicated greater cognitive-non-social and behavioral-non-social as well as behavioral-social and emotional avoidance (in the form of restricted emotional expression to others) in the chronically depressed patients. In Chronically depressed patients a positive correlation was found for general emotion avoidance and behavioral-social avoidance with levels of depression.</p>	<p>no causal conclusions can be made. Limitation 3: Depressed patients were mostly inpatients which may have an impact on the generalisability of the study Limitation 4: No information was given regarding medication Strength of study: All participants were assessed with SCID-I and II. No further mentioning in the study that patients were excluded due to comorbid diagnoses, apart from a diagnosis of substance abuse/dependence, bipolar disorder, or psychosis. This is a strength, as many studies exclude patients with comorbidities, which limits research and implications for generalisation.</p>	
Author & Year	Design	Sample	Measures	Main findings	Critique	QATQS rating
Chentsova-Dutton, Chu, Tsai, Rottenberg,	Cross-sectional Design	EAs (n=30) (15 depressed and 15 non-depressed)	Participants' were recorded viewing the film clips. Facial behaviours were subsequently coded using the Emotional Expressive	Depressed European Americans (EAs) demonstrated less reactivity when viewing a sad film (e.g., less crying) in	<p>Limitation 1: This was a cross-sectional study.</p> <p>Limitation 2: Small sample size will have an impact on</p>	Moderate

Gross and Gotlib (2007)	AAs (n=26) (12 depressed and 14 non- depressed)	<p>Behavior Coding System (EEB). Coders had been trained in the EEB and were blinded to the participants' condition and group. Interrater reliability: for amusement (intraclass $r = .82-.89$ across films=acceptable); sadness (intraclass $r = .51-.71$ [for the neutral film and the sad and amusing films, respectively]). The interrater agreement was moderate for crying ($\kappa = .67$) during the sad film.</p> <p>Emotion inventory: Cronbach's $\alpha = .68-.92$ across film clips.</p> <p>Participants' physiological response was continuously measured throughout viewing of the film clips. Indices selected were specifically related to emotion reactivity: cardiac (heart rate), vascular (finger temperature), electrodermal (skin conductance response), and respiratory (respiratory rate).</p>	<p>comparison to non-depressed participants. In contrast, depressed Asian Americans (AAs) on the other hand showed greater emotional reactivity (e.g., more crying) when compared with non-depressed individuals. No difference was found between culture and depressed/non-depressed groups when viewing a funny film (e.g., reported amusement or facial behaviour). No difference was found in Physiological reactivity to the film clips between the groups. Depression appears to affect emotional reactivity across cultures (e.g., crying). However, the way that the emotion is expressed may differ culturally (e.g., more or less crying) due to established cultural norms.</p>	<p>power and generalisability of the study.</p> <p>Limitation 3: Study utilised a non-social and normative task to elicit emotion. Future research should aim to use tasks that are interpersonal in nature, to elicit emotion.</p> <p>Limitation 4: as a cross cultural study other cultural groups should have been employed as reference groups.</p> <p>Strengths: Employs several measure of emotion reactivity; reports of emotional experience, facial behaviour, and physiological reactivity.</p> <p>Study reports the mean percentage of the EA and AA depressed participants' treatment status (57, 50), psychotropic medication usage (53, 33) and number of medications (0.76, 0.42).</p>
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English and John (2013)	Cross-sectional design. A comparative correlational mediator design	<p>Study 1: Non-clinical sample: 157 students (70% female; mean age 20 years).</p> <p>Study 2: 114 students at a university in mainland China (75% male; Mean age 19 years).</p> <p>Study 3: 106 women, age 60. Follow-up data at age 70, 93 of the women (88%) responded to follow-up questionnaires.</p>	<p>Reappraisal and Suppression was measured using: The Emotion Regulation Questionnaire (ERQ). Coefficient alpha reliability .81 for suppression and .80 for reappraisal.</p> <p>An adapted Relationship satisfaction Index: Alpha .66.</p> <p>The Berkeley Expressivity Questionnaire (BEQ) measured habitual expression of emotion. Expression of positive emotion: alphas .73 and for negative .74.</p> <p>Subjective Authenticity was measure using an adapted form of the scale: alpha was .78</p> <p>Satisfaction With Life Scale (SWLS) was used to indicate adjustment, alpha .87.</p>	<p>All three studies found across cultures that inauthenticity was the only factor that mediated the link between habitual use of suppression and poor social functioning, which refers to; less satisfaction in relationships and less social support. Results generalised across cultural contexts and for different age groups. In study 3, results revealed that the use of suppression at age 60 was linked to and predicted poorer social support at age 70. All results were stable even after controlling for broader adjustments.</p> <p>Authors concluded that the negative costs of suppression does not appear to be caused by individuals expressing less positive emotions. Alternatively, they posit that it is the incongruence between the inner-self and outer-behaviour that leads to the negative social consequences of suppression.</p>	<p>Limitation 1: study used a correlational mediation design. Findings from the study are consistent with the hypothesis, but cannot directly provide evidence for causal effects.</p> <p>Limitation 2: This study utilised self-report measures, which is limiting. However, measures used were well validated.</p> <p>Limitation 3: Study 1 and Study 2 use student samples. Study 3 uses an all-female sample.</p> <p>Limitation 4: All studies use non-clinical samples</p> <p>Limitation 5: No information regarding medication.</p>	Moderate
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Lewis (2012)	Cross-sectional Design	Experiment 1: Non clinical sample: 54 students. 48 female and 6 male, age range 19-25 years.	Experiment 1: The Irritability-Depression-Anxiety Scale (IDA)	Experiment 1: Participants were randomly assigned to different conditions e.g., lower eyebrows). Results yielded that lowering your eyebrows and creating a frown, was enough to make the individual's mood more negative and increased depression scores. This experiment highlights the significant impact that facial expressions have on our mood, thus the implications for individuals with depression are highly relevant, in particular for treatments of depression.	Limitation 1. Student population, this meant that all participants were young adults and means it does not generalise to the rest of the population.	Weak-Moderate
	Between subject design	Experiment 2: 24 students, age range 19-25 years.	Experiment 2: 30 surprising facts were presented e.g., "There is a rare medical condition called Exploding Head Syndrome"	Experiment 2: Participants were asked to manipulate their face into 3 different conditions (up, down or avoiding up and down). Results showed, that raising your eyebrows up, which was the congruent facial expression to the surprising facts, led to feelings of being more surprised.	Limitation 2: All participants are University students which also limits the generalisability for the rest of the population as this group may come from specific social classes and ethnic groups.	
		Experiment 3: 32 female students and 1 male, age range 19-25.	Experiment 3: 12 different Odors were presented in 12 sealed containers (e.g., 'farm-yard,' 'urine,' and 'vomit'). Participants rated 4 boxes in each of the facial muscular conditions and they rated the intensity of all of the odors.	Experiment 3: Participants were told to manipulate face (facial muscular conditions) into either nose-up, nose-	Limitation 3: Non clinical sample. It would have been beneficial to have one or two comparison groups, e.g., depressed individuals' and patients with OCD.	
			In all experiments the participants rated their ability to create the facial expression and ability to hold it.		Limitation 4. This study was cross-sectional and	
					Limitation 5: No clinical sample, thus no information was given regarding medication. It would be interesting to see how the facial	

				down or nose-normal relaxed. Results showed that wrinkling your nose impacts on the way that a specific odor is interpreted. Making a disgusted face makes the odor more unpleasant.	expressions affect another individual.	
Lu, Uysal, and Teo (2011)	Cross-sectional study Design. Mediation analysis	255 students took part in the study (4 extreme outliers were excluded), thus data presented is for 251 participants. Mean age; 21.85 (SD = 5.30), 78% females. Sample was ethnically diverse.	Ambivalence over emotional expression (AEE). Internal reliability was high ($\alpha = .89$). The Brief Symptoms Inventory (BSI) was employed to look at depressive symptoms. Internal reliability was .85. A revised version of McGill Pain Questionnaire (SF MPQ) looked at general pain and measured intensity of different types of pain. Internal reliability was .92. 21-item General Need Satisfaction Scale was employed to look at general need satisfaction. Internal reliability .88 and for the different subscales autonomy, competence, and relatedness internal	This study found high levels of AEE to be associated with more depressive symptoms and greater reports of pain. Catastrophizing fully mediated the association between AEE and pain. In addition, catastrophizing and need satisfaction were found to mediate between AEE and symptoms of depression. Results also showed that the two dimensions of catastrophizing; helplessness and magnification mediated the association of AEE. Authors posit that individuals that have high levels of AEE and feel hopeless about their distress may use magnification as a way of seeking support. That is, if they magnify their physical symptoms (somatise emotional distress) this may be a more acceptable way of receiving help. This then results in exacerbating pain	Limitation 1: Self-report measures Limitation 2: cross-sectional study. Causal relationships are only hypothesised. Limitation 3: Non-clinical sample. Generalisability of study is limited as it uses a student population. Limitation: No medication information included.	Moderate

			<p>reliability .71, .75, and .79 respectively.</p> <p>Pain Catastrophizing Scale was utilised to assess pain catastrophizing. Internal reliability .96. Reliability for the three subscales rumination .93, helplessness .92 and magnification .83.</p>	<p>and self- reported pain levels. The authors also suggests that the negative relationship between AEE and symptoms of depression are partly due to psychological needs not being met. The competence and relatedness factors of 'need satisfaction' were also shown to mediate between AEE and symptoms of depression. Authors suggest that difficulty expressing ones feelings may lead individuals to feel less competent and less in control over their environment, which in turn effects their interpersonal relationships.</p>		
Paul, Rauch, Kugel, Horst, Bauer et al. (2012)	Cross-sectional Design	40 right-handed female students were chosen for the study sample (n=150) based on their scores on the MCI. Repressors: (n=20) Sensitizers: (n=20)	Mainz Coping Inventory (MCI) assess for two coping strategies; vigilance and cognitive avoidance. Repressors: (n=20) high cognitive avoidance scores and low scores on the vigilance scale. Sensitizers: (n=20) High scores on vigilance and low scores on cognitive avoidance Cronbach was 0.84 for the MCI avoidance and 0.89 for MCI vigilance.	The results of this fMRI study revealed a significant difference in Repressors and Sensitizers brain response to facial emotions (masked threatening and masked happy faces). Repressors appeared to have a stronger response in several brain regions (frontal, parietal and temporal cortex) to facial expressions, in comparison to Sensitizers. Thus, the orbito-frontal brain regions may be important in processing	<p>Limitation 1: Sample; only females, student sample, hence not generalizable to the population.</p> <p>Limitation 2: Study did not utilise any psycho-physiological measures for e.g. heart rate, electro-dermal activity etc.</p> <p>Limitation 3: cross-sectional design.</p>	Moderate

<p>Repressors and Sensitizers did not differ on age or IQ as measured by neuropsychological tests.</p> <p>State-Trait-Anxiety Inventory (STAI). Employed post fMRI to assess state-trait anxiety. Cronbach alpha for the STAI state 0.86. The trait version had Cronbach alpha for STAI trait 0.92. Sensitizers had both higher State and Trait anxiety compared to repressors.</p> <p>The Beck Depression Inventory (BDI) was employed to assess depressive symptoms. Cronbach alpha 0.83. No difference were found between Sensitizers and repressors on the BDI.</p> <p>T2* functional data were acquired at a 3 Tesla scanner: fMRI stimulus: Emotional and neutral faces were used as briefly presented targets.</p>	<p>facial expressions when using repression as a cognitive strategy. Study also found the cingulate gyrus, basal ganglia and insula to be more reactive to emotional expression in repressors, especially for threatening images (fearful, angry). According to the authors the results confirm their hypothesis that repressors are more hypersensitive to threatening stimuli and to a lesser extent happy stimuli, when compared to Sensitizers.</p>	<p>Limitation 4: non-clinical sample Strength: study gives information that the non-clinical sample had to be free of any medication.</p>
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Peters, Overall and Jamieson (2014)	Cross-sectional study design	182 participants (91 opposite-sex dyads). One dyad was excluded as regulator was revealed as suppressor. Sample came from community and students in the University. (99 White, 49 Asian, 12 Hispanic, 10 Black, 12 mixed/other) Mean age=19.88	<p>The Positive and Negative Affect Schedule (PANAS) was employed to assess affective state before and after viewing the emotion eliciting video. Positive before video: Cronbach's $\alpha = .895$, after: $\alpha = .873$. Negative before: $\alpha = .845$, after: $\alpha = .850$).</p> <p>After watching the emotion eliciting video participants were told to discuss video and emotions with a partner. In each pair one partner were instructed to either suppress emotions or express them visibly. After conversation they rated their partners attribution e.g., eye contact, posture, if they were good communicators etc. Interaction attributions: participants rated Participants rated how well they were able to hold back emotions and if interaction was intense, uncomfortable, and difficult.</p> <p>Physiological signals:</p>	<p>Findings revealed that partners who interacted with suppressive regulators (without knowing they were suppressing emotions) reported them to show less emotion, facial expressions and gestures. They also reported that they were worse overall communicators in comparison to partners of expressive regulators. In addition, regulators of both conditions, reported the experience as more negative and intense than the partners that had been given no instructions. All participants showed SNS arousal when they were waiting to have a conversation with a stranger about the emotion eliciting film. However, only suppressors had greater vasoconstriction. The authors highlight that this is a typical threat response. Interestingly, during the conversation both parties in the dyad with the suppressor showed SNS arousal and vasoconstriction arousal. By suppressing emotions the regulator had a negative effect on their</p>	<p>Limitation 1: Cross-sectional design</p> <p>Limitation 2: Sample was predominantly white. Cross-cultural differences in emotion regulation and emotional expression needs to be taken into account.</p> <p>Limitation 3: having opposite sex dyads, may in itself cause physiological threat responses in participants'</p> <p>Limitation 4: Regulators were given instructions to either inhibit emotional expressions or maximising signalling, this may in itself have affected physiological responses, as they had to exert effort to do so. This may have had an effect on the comparisons made between the different regulator conditions.</p> <p>Limitation 5: non-clinical sample.</p>	Moderate-Strong
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			electrocardiography (ECG), impedance cardiography (ICG), and blood pressure.	partners and impacted on their physiological response.	Limitation 6: No medication information included.	
Seidel, Habel, Finkelmeyer, Schneider, Gur et al. (2010)	Cross-sectional design	24 depressed inpatients (12 females) 24 healthy controls matched for gender, age and education.	Stimuli were presented on a laptop: 16 photographs of different emotional expressions (happiness, sadness, anger, and fear) and sixteen photographs of neutral faces were presented to the participants. All emotional expressions were standardised from previous research. Joystick task: The joystick was in front of participant on desk. Reaction time was then measured. Participants were given instructions to push the joystick lever as fast as possible when they saw a yellow frame and pull when they saw a blue frame. All emotional faces appeared on both the yellow and blue frame. Reliability of the reaction time measures for the different emotional faces: values ranging between	Findings from this study indicate that individuals with MDD understand the emotion. However, they react differently to the social cues, in comparison to healthy controls. Females were found to display more avoidance in the explicit condition. Social withdrawal was not as marked in the joystick task.	Limitation 1: All participants were Caucasian. Limitation 2: Depressed patients were all inpatients and may not as such be representative of all depressed patients. Inpatients commonly have more severe and complex presentations. Limitations 3: Study only looked at depression and excluded all comorbidities, such as anxiety and PDs. Strength: study gives information about medication in the clinical sample. All but one patient was on antidepressant medication. 13 patients took only antidepressants (AD, 6 SSRIs, 4SNRIs, 1TCA and 2 SSRI and SNRI). Ten of the depressed patients were on a combination of	Moderate

			<p>alpha= 0.790 and alpha= 0.939 for the HC sample and alpha= 0.771 and alpha= 0.914 for the DP sample.</p> <p>Explicit rating task: participants were asked to rate 80 pictures from joystick task on how likely you would feel to approach them or walk away from them. Cronbach's alpha (ranging from 0.685 for neutral to 0.826 for sad expressions).</p> <p>The emotion recognition task ("Vienna Emotion Recognition Tasks") was employed to assess how accurately and quickly an emotion could be recognised.</p>		<p>medication (5 AD + neuroleptic, 3 AD + tranquilisers, and 2 all three types of medication).</p>	
Soto, Perez, Kim, Lee and Minnick (2011)	<p>A moderator analysis was employed for this study. Authors theorised that the relationship between suppression and</p>	<p>71 European American (EA) students, Mean age: 20.04 years, 59% women. 100 Hong Kong Chinese, Mean age:</p>	<p>Emotion Regulation Questionnaire (ERQ) assessed suppression and cognitive reappraisal. Coefficient alpha for suppression scale for all participants .80 (EA .84, HKC .69) and for cognitive reappraisal .84 overall (EA .87, HKC .82).</p>	<p>Results of the study supported the authors' hypothesis that in cultures where suppression is normative (preferred according to cultural norms), suppressing emotions is not associated with a negative or adverse psychological functioning. HKC participants reported higher</p>	<p>Limitations 1: self-report measures.</p> <p>Limitation 2: The use of a moderator analysis, which is a correlational method brings limitations to the study. Study can't rule out that in EA participants the increased low mood and decreased life satisfaction</p>	Moderate

	psychological well-being be moderated by culture.	20.61, 52% women.	<p>To assess psychological well-being the Satisfaction With Life Scale (SWLS) was utilised. Alpha was .86 for full sample (EA .87, HKC .82).</p> <p>To look at psychological distress the Epidemiologic Studies Depression Scale (CES-D) was employed. Alpha .91 for full sample (EA .94, HKC .96).</p>	<p>levels of suppression, yet less impaired psychological functioning. Nevertheless, the results showed that suppression in the HKC participants was not associated with positive psychological functioning either.</p>	<p>may lead to greater suppression.</p> <p>Limitation 3: In the study the mediating mechanisms are the “normative values of expressing emotions in different cultures”, however, these normative values were never explicitly measured or analysed.</p> <p>Limitation 4: Non-clinical sample and no information about medication in participants.</p>	
Trémeau, Malaspina, Duval, Corrêa, Hager-Budny et al. (2005)	Cross-sectional Design	<p>Participants were inpatients from a psychiatric institute in New York and in France. 58 patients with schizophrenia (non-depressed), 25 with unipolar depression (non-psychotic)</p>	<p>Three tasks were utilised in the study.</p> <p>1. Visually cued task; posed facial expressions, visual modality. Participants had to imitate 6 pictures of facial expressions (anger, disgust, fear, joy, sadness, and surprise), taken from ‘Pictures of Facial affect’ test.</p> <p>2. Verbally cued task; posed facial expressions, verbal modality. Participants were asked to</p>	<p>In comparison to healthy controls, both patient groups were found to be impaired on all expressive variables. Very few differences were found between the two clinical samples. However, overall the patients with Schizophrenia were found to be less expressive. Depressed patients showed less spontaneous expressions of all emotions but happiness.</p> <p>Authors of the study concluded that patients with Schizophrenia and Depression present with</p>	<p>Strength: comparing two clinical populations</p> <p>Limitation 1: the ratings for the Facial Action Coding System may not have been as discriminatory as they could have been. Did not rate intensity of emotion expressed.</p> <p>Limitation 2: the study did not discriminate between different kinds of smiles, which other studies have done. For instance, other authors have differentiated</p>	Moderate

and 25 healthy controls (HC).	<p>‘express’ or show the 6 emotions.</p> <p>3. Narrative task: an emotion was named and the participant then had to think about and describe an event that significantly related to that emotion for two minutes.</p> <p>All 3 tasks were video-taped. A blinded judge rated the expressions of facial emotions according to the criteria of the Facial Action Coding System. Another blinded judge counted the number of facial coverbal gestures.</p> <p>The SANS affective flattening subscale was utilised to look at degree of blunted affect. Brief Psychiatric Rating Scale total</p>	<p>similar impairments in emotional expressiveness. This appears to be the case for all modalities of emotional expression: posed and spontaneous emotional expression, smiling, coverbal gestures, and verbal output.</p>	<p>between social smiles and smiles arising from feelings of happiness.</p> <p>Limitation 3: Participants came from different cultures and from two different countries.</p> <p>Limitation 4: This study concentrated on facial expressions and other elements of emotional expression, such as vocal pitch and gestures, were not assessed.</p> <p>Strength: Information regarding medication. Depressed patients did not take any antipsychotics. In the Schizophrenia group patients could not have changed their antipsychotic medication in the past two weeks and they had to take anticholinergic therapy if they were on antipsychotics. 15 subjects were assessed both on antipsychotics and off.</p>
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1.4 Papers for review

The search result of “Depression and Emotion* Express*” and “Depression and Social Sign*” revealed a wide range of papers, many which were beyond the scope of this review and unrelated to the research question. Namely, depression and emotional reactivity across cultures, the ambivalence over emotional expression and avoidance of emotional expression, emotion regulation strategies such as, cognitive reappraisal and suppression and the effect of suppression on a partner in a dyadic interaction, the link between repression and negative states in brain studies, facial expressions and the direct link to mood differences across cultures of the impact of suppression and facial emotional expressiveness in depression and schizophrenia. The research design of the selected papers will be outlined, followed by a critical review of the different themes of research that emerged from the selected papers, with the research question in mind. The quality of all papers was assessed using the Quality Assessment Tool for Quantitative Studies¹ (QATQS) (National Collaborating Centre for Methods and Tools, 2008), ratings for each paper ranged from weak-strong, for further inspection of these ratings, please see Appendix A. 9 out of the 11 studies received a QATQS rating of moderate, one study received a rating of weak-moderate (Lewis, 2012) and one study, moderate-strong (Peters, Overall and Jamieson, 2014).

1.4.1 Demographics and Designs of studies

1.4.1.1 Study Demographics

In an effort to evaluate the studies selected for this review, demographic characteristics for each paper will be outlined and critiqued here. For further inspection of demographic characteristics, please see Table 3 below.

The 11 studies in this review were predominantly conducted in Western cultures, with the following location distribution; four studies in Germany, six in the USA and one in the UK. One study utilised a subsample of participants from Hong Kong. Authors of these publications and affiliates of the studies were also from Universities and Hospitals in Austria, Switzerland and New Zealand. Thus, ten out of the 11 studies were largely conducted in western cultures which have implications for the findings of these studies and the conclusions that can be drawn from them. As per example, in the study that included a subsample of participants from Hong Kong, cultural differences in suppression were found. HKC participants were found to suppress more, yet they reported less negative impact of suppression in comparison to European American counterparts (Soto et al., 2011). Generalisability of these studies, for the population as a whole are therefore compromised. In terms of demographics and western cultures, this review includes papers from different ‘typically’ western cultures. However, it is possible that the variability seen in location distribution of this literature search was limited, due to the exclusion criteria of only including papers that were disseminated in the English language. As a result, studies disseminated in the following languages; Italian, Spanish, French and Chinese were excluded early on in process of this literature review. We also refer the reader back to the introduction where some of the difficulties with the concept of emotional expression cross culturally are highlighted.

Sample sizes in the 11 studies reviewed ranged from a sample of 24 participants’ up to 255 participants’. Nonetheless, it is important to note that the studies where we see larger sample sizes tend to be studies that have employed student populations as their participants’. Studies utilising clinical populations are in general far more valuable than studies employing student populations. Both in terms

of illuminating important aspects of depression, which in turn can result in better patient care and improvements in treatment options, subsequently enhancing these individuals well-being. But also for drawing conclusions about particular aspects of depression. Nevertheless, employing larger sample sizes means increased power and better generalisability overall and therefore renders these studies imperative for progression of knowledge in the area. Six out of the 11 papers selected for this review did not utilise a clinical population, rather they recruited students and/or a community sample. In the five studies that included clinical populations to investigate different aspects of emotional expressiveness in depression, the patient groups were compared to non-depressed controls in all five studies. One study discriminated between different types of depression (chronic and episodic) (Brockmeyer et al., 2015), one looked at depressed and non-depressed individuals of different cultures (Chentsova-Dutton et al., 2007) and one compared Unipolar depression (non-psychotic) to patients with schizophrenia (non-depressed) and a healthy control sample. Studies were also reported to be well matched on age, gender and education between groups. Thus, for the purpose of this literature review the selected papers represent a good mix of sample types, sample sizes and includes both clinical samples of patients with depression, healthy controls and one other patient cohort. Hence, valuable conclusions can be drawn from these papers.

In regards to using student samples for research, this further limits the conclusions that can be drawn from the studies, as students may not represent the larger population. Firstly, because they are mainly young adults, secondly, because they may not represent the ethnic diversity seen in the general population and finally because University students may come from more privileged backgrounds and socioeconomic classes, which enables them to pursue further education.

Brockmeyer et al. (2013), Brockmeyer et al., (2015), Seidel et al. (2010) and Trémeau et al. (2005) all recruited their patients with depression from inpatient units in hospitals. Inpatients with depression are generally seen to have a much more severe trajectory of the condition, in comparison to patients with depression that are seen in outpatient settings. Thus, this is significant limitation of these studies and reduces the generalisability for depression as a whole. Although, the results of this research is still valuable, it is particularly significant for patients with chronic and treatment resistant depression, as these are the patients we often see ending up in inpatient units in psychiatric hospitals. In terms of the current literature review it is possible that it is in fact these patients that have the more severe trajectory, which may be seen to have more blunted emotional expressiveness, which in turn has exacerbated their symptoms of depression and their emotional loneliness and isolation, leading to admittance to hospital.

One study Brockmeyer et al. (2013), recruited their non-depressed controls via advertisements in media and counselling centres. The recruitment of non-depressed individuals from counselling centres, may have a major impact on the generalisability of these controls to the rest of the population. It may be hypothesised that individuals' that visit counselling centres are more likely to have issues with their psychological well-being and may as such not be representative of a non-clinical healthy control group.

Six out of the 11 studies included in the current literature review employed a non-clinical sample, 5 out of these studies did not include any information about the participants' medication use. Paul and colleagues (2012) utilised a non-clinical sample, yet still reported that the participants in the study had to be free of any medication to participate, this is a definite strength of this paper. Out of the five

papers that utilised a clinical sample two papers (Brockmeyer et al., 2013; 2015) did not report any information regarding medication usage in their clinical population, this is a limitation of the studies. Three of the papers with clinical samples reported information regarding medication usage which is a relative strength. Chentsova-Dutton et al. (2007) reported the mean percentage for the EA and AA depressed participants' treatment status (57, 50), psychotropic medication usage (53, 33) and number of medications (0.76, 0.42). Seidel et al. (2010) reported detailed information regarding the medication in their clinical sample. Namely, all but one patient was on antidepressant medication. 13 patients received only antidepressants (AD, 6 SSRIs, 4SNRIs, 1TCA and 2 SSRI and SNRI) and ten of the depressed patients were on a combination of medication (5 AD + neuroleptic, 3 AD + tranquilisers, and 2 all three types of medication). A major limitation of psychological research is the difficulty with controlling for medication usage. It is often unethical or at least impractical to change patients' medication intake during a research study. Thus, by at least reporting the medication usage, the reader is aware of the potential limitations this has for any conclusions that can be drawn from the study.

1.4.1.2 Study Designs

All of the 11 papers reviewed here employed a cross-sectional research design. Two out of the 11 studies utilised a mediation analysis design, albeit still cross-sectional in nature (Lu, Uysal, and Teo, 2011; English and John, 2013) and one study employed a moderator analysis (Soto et al., 2011). Although cross-sectional designs are commonly used in medical and Social Science research, it is not without its limitations. Cross-sectional designs look at a population or a subgroup of a population at a particular point of time, thus we cannot infer a temporal or causal

relationship between the variable being measured and the outcome (e.g., Solem, 2015). Ideally research should be employing prospective or longitudinal designs as this would mean that a temporal relationship could be established (e.g., Solem, 2015). In terms of the studies in this review, the main limitation of utilising the cross-sectional design, is that the studies cannot establish if for example, the blunted emotional expressiveness seen in depressed people are an antecedent of depression or caused by the condition. Irrespectively, all studies indicate that emotional expressiveness is maladaptive, and that it has a negative impact on the individual with depression and others interacting with this individual and that it may function as a maintenance factor for depression.

All 11 studies reported high reliability and validity for the measures used in the studies. Statistical analysis for the 11 studies were rated with the QATQS and were deemed as appropriate type of statistical analyses for each research question.

Table 3

Demographic characteristics of the papers

Author & Year	Location	Sample: size & type	Recruitment	Design
Brockmeyer, Grosse Holtforth, Krieger, Altenstein, Doerig, Friederich and Bents (2013).	Germany & Switzerland	76 MDD patients 77 Non-depressed controls (NC) Well matched on age and gender	MDD patients: two University based outpatient units NC: advertisements in media & counselling centres.	Cross-sectional Design Univariate ANOVA Pearson r correlation
Brockmeyer, Kulesa, Hautzinger, Bents and Backenstrass (2015).	Germany	30 Chronic depression 30 Episodic depression 30 Non-depressed controls (NC)	Depressed patients: community hospital and outpatient psychotherapy centre. Most	Cross-sectional Design MANOVA Planned contrasts

		Well matched on age and gender. NC higher educational level.	patients were inpatients. NC: advertisements in media and from university.	
Chentsova-Dutton, Chu, Tsai, Rottenberg, Gross and Gotlib (2007)	USA	European American (EAs): (n=30) Depressed (n=15) non-depressed (n=15) Asian American (AA's): (n=30) Depressed (n=15) non-depressed (n=15)	Advertisements and flyers and referrals, two outpatient psychiatry clinics.	A two-way ANOVA (Diagnostic Group \times Cultural Group) conducted on change scores in sadness and amusement behaviours
English and John (2013)	USA	Study 1: 157 American students Study 2: 114 undergraduates in mainland China	Undergraduate Psychology students from public university.	Mediation Analyses: Expression of Emotion and Authenticity as Potential Mediators
Lewis (2012)	UK	54 undergraduates	Undergraduates at a University-received credits for participating	Cross-sectional design IV: instructions given. DV=score on the IDS questionnaire. Between subject design ANOVA and pairwise comparison
Lu, Uysal, and Teo (2011)	USA	255 Undergraduate students	Undergraduate students at a large state University	Mediation analysis Initially bivariate correlations were conducted to test mediation Path analysis model
Paul, Rauch, Kugel, Horst,	Germany	40 healthy right-handed women - Students	Selected from a sample of 150 students	A 2×4 ANOVA

Bauer et al. (2012)				
Peters, Overall and Jamieson (2014)	USA & New Zealand	182 community members and undergraduate students 91 opposite-sex dyads (99 White, 49 Asian, 12 Hispanic, 10 Black, 12 mixed/other)	Online study pool (SONA) and flyers. Participants were compensated \$10 or course credits	Mixed ANOVA's
Seidel, Habel, Finkelmeyer, Schneider, Gur et al. (2010)	Germany, Austria & USA	24 MDD inpatients (12 females) 24 non-depressed controls (NC) matched on gender, age and education	MDD: inpatient units at hospital NC: advertisements posted at the University Hospital Compensated for participation	Repeated measures ANOVA
Soto, Perez, Kim, Lee and Minnick (2011)	USA Hong Kong	71 European American (EA) college students 100 Hong Kong Chinese (HKC) college students Participants in the U.S. completed the study for course credit and those in Hong Kong	EA: from one University HKC: from two universities in	Moderation Analyses A hierarchical regression to test hypothesis that culture would moderate the relationship between suppression and depressed mood suppression interaction
Trémeau, Malaspina, Duval, Corrêa, Hager-Budny et al. (2005)	USA	58 patients with schizophrenia, 25 inpatients with unipolar depression, and 25 non-depressed controls (NC)	Patients: Psychiatric inpatient hospital NC: hospital employees or medical students	Regression analyses and Pairwise comparison with Bonferroni adjustments.

1.4.2 Synthesis and further critique of Papers

A number of means of investigating emotional expressiveness were explored across the different papers, namely emotional reactivity, facial emotional

expressivity ambivalence and avoidance of emotional expression and emotional regulation. The evidence presented across these different papers will now be synthesised and critiqued.

1.4.2.1 Depression and Emotional Reactivity

Chentsova-Dutton et al. (2007) investigated emotional reactivity in a sample of depressed and non-depressed European Americans (EAs) and Asian Americans (AAs). In line with previous research the depressed EAs cried less (lesser emotional reactivity) when viewing a sad film, when compared to non-depressed participants. Interestingly, the depressed AAs cried more than their non-depressed counterparts, that is, they showed greater emotional reactivity. When viewing a funny film no differences were found between any of the groups, regardless of culture. Furthermore, no difference was found in physiological reactivity to the film clips between the groups. The authors concluded that depression has an impact on emotional reactivity across cultures (e.g., crying). However, the way that the emotion is expressed may differ culturally (e.g., more or less crying) due to established cultural norms. It is evident from the results above that at least in Western cultures emotional reactivity is dampened in individuals with depression and thus, it supports our hypothesis that depressed individuals are less emotionally expressive. However, this does not appear to generalise across cultures, as AAs exhibited greater emotional reactivity in this study.

1.4.2.2 Depression and Facial Emotional Expressivity

Lewis (2012) reviews some of the very compelling evidence of ‘the facial feedback effect’. He states that by embodying an emotion, such as smiling, by raising your eyebrows and “putting on a smile” people evaluate information more

positively, they express more positive feelings and report feeling happier. On the other hand, if they lower their eyebrows the effect appears to be a subsequent negative mood (Lewis, 2012). Lewis also presents some research that has shown that individuals with facial paralysis feel more depressed and the greater their impairment of smiling is, the higher levels of depression is reported. Other researchers have utilised the effect of botulinum toxin A (BTA), better known as Botox, to look at the effects of emotion and the facial feedback effect of induced facial paralysis (Lewis, 2012). Lewis delineates some of the current research in this area, highlighting both the positive effects and negative effects Botox may have on personal affect and social communication. That is, depending on what muscles Botox are injected in, its subsequent muscle paralysis can inhibit the experience of both positive and negative feelings (e.g., muscles used for frowning or for smiling). In the current research study Lewis (2012) employed a non-clinical sample to investigate the effects of different facial expressions of common emotions. In line with current research in the area, he found that by for instance, creating a frown (by lowering your eyebrows), this was enough to have an impact on the participants' mood, which became more negative and it also increased depression scores. This was also true for other emotions, such as surprise and disgust. Results showed that raising your eyebrows up, which is the congruent facial expression to the tasks that presented surprising facts, led to feelings of being more surprised. In turn, manipulating your face into a disgusted face made odours more unpleasant and wrinkling your nose made them more pleasant.

Emotional expressiveness has been shown to be impaired not only in depression, but also in patients with a diagnosis of schizophrenia (Trémeau et al., 2005). In the paper by Trémeau et al. (2005) they set out to study facial expressive

behaviours in patients with schizophrenia, depression and in a control group. Not unexpectedly, the study revealed that both patient groups were less emotionally expressive and were found to be impaired on all of the expressive variables, when compared to controls. Overall the patients with schizophrenia were less expressive, however, very few differences were found between the two clinical samples. Results revealed that individuals with depression showed less spontaneous expression in all emotions apart from happiness. This may be due to the dampened emotional reactivity that depressed individuals display (e.g., Rottenberg, 2005; Chentsova-Dutton et al., 2007). Authors concluded that patients with schizophrenia and depression present with similar impairments in emotional expressiveness in all modalities (examined in this study) of emotional expression, posed and spontaneous, respectively. The authors highlight several limitations in the study in regards to ratings of faces and discriminating between different types of smiles and they illuminate the importance of looking at cultural variations in future studies. In addition, this study only focused on facial expressions of emotion, thus future research should investigate other modalities of emotional expression such as, vocal pitch and gestures. In terms of the research question for the current literature review, this is a significant piece of research that further supports the hypothesis that individuals with depression are less emotionally expressive.

Seidel et al. (2010) compared individuals with MDD and healthy controls on their ability to distinguish between different emotional expressions and their subsequent reactions to the different expressions (happiness, sadness, anger, and fear). The study involved looking at pictures of emotions, a reaction task (using a joystick), and a task where the participant had to rate how likely or unlikely they were to approach an individual (displaying different emotional expressions; the

explicit condition). The findings indicate that individuals with MDD are able to distinguish between different emotional expressions and understand what the underlying emotion is. However, they react differently to the social cues, in comparison to healthy controls. Females were found to display more avoidance in the explicit condition. Social withdrawal was not as marked in the joystick task.

1.4.2.3 Ambivalence and Avoidance of Emotional Expression in Depression

Emotional ambivalence occurs when an individual has a desire to express an emotion, but inhibits this desire in fear of expressing emotions publically or in fear of being unable to express the emotion so that others will understand what they are feeling (e.g., King and Emmons, 1990). This in turn creates an inner conflict or ambivalence for the individual, which subsequently leads to feelings of stress and unwanted long-term consequences (King & Emmons, 1990).

Brockmeyer et al. (2013) set out to investigate if individuals with MDD had higher ambivalence over expressing emotion in comparison to a non-depressed sample of healthy controls. In comparison to non-depressed controls, patients with MDD reported greater Ambivalence over Expressing Emotion (AEE). Furthermore, levels of AEE and levels of depression were positively correlated in this group. That is, higher ambivalence over expressing emotion was associated with higher depression scores. Firstly, this study provides evidence that patients with depression are more ambivalent over expressing emotions than individuals without depression. Secondly, it further offers support for the notion that not expressing an emotion when one wants to (AEE) is related to an individual's well-being and mood. However, this study may not be representative of the typical population that we see

in clinics, as the sample excluded participants with comorbid PD's. Research to date confirms that a large percentage of patients diagnosed with MDD also present with PD's and anxiety disorders (e.g., Lynch et al., 2015a; Fava, Farabaugh, Sickinger, Wright, Alpert et al., 2002; Riso, du Toit, Blandino, Penna, Dacey et al., 2003).

Brockmeyer and colleagues (2015) further investigated AEE and cognitive-behavioural avoidance in depression. One of the strengths of this study was its use of two different cohorts of depressed individuals, namely, individuals with chronic and episodic depression, where chronic depression is characterised by poorer treatment response and more severely impaired functioning in comparison to episodic depression. As expected, results revealed that chronically depressed patients exhibited more avoidance on all measures when compared to healthy controls. Nonetheless, chronically depressed patients also showed more avoidance than patients with episodic depression in the following areas; cognitive-non-social (e.g., trying to not think about things like the future), behavioural-non-social (e.g., quitting things that are too challenging), as well as, behavioural-social (e.g., making excuses to get out of doing things) and emotional avoidance (e.g., restricting or avoiding emotions and or overt expressions of emotions). Furthermore, this study found a positive correlation for emotional avoidance and behavioural-social avoidance with levels of depression in chronically depressed patients. That is to say, the more depressed a chronically depressed individual is, the more they avoid expressing emotions (to self and others) and the more they avoid partaking in social situations. This paper lends further support to the hypothesis that individuals with depression are less emotionally expressive in comparison to other people and that this has an impact on their social life. The authors of the paper go on to discuss the findings of 'emotional avoidance' in the context of alexithymia, which refers to a lack of

confidence in ability to express emotion, differentiate between them and an inferior ability to describe one's own emotions to others. Current research has linked alexithymia to deficits in the ability to form and maintain interpersonal relationships (e.g., Hesse and Floyd, 2011). Thus, not only does this research show that depressed individuals are less expressive, it further shows that chronically depressed patients present with more emotional avoidance than patients with episodic depression and that this avoidance has a direct relationship with their day-to-day level of functioning and level of depression. Avoidance of emotional expression may potentially be one of the contributors to the treatment resistant facet of chronic depression. A strength of study was that there is no mention in the study that patients with dual or comorbid diagnosis such as PD's were excluded.

Lu, Uysal, and Teo (2011) explored the relationship of depressive symptoms, pain and AEE in a student sample. They found that higher levels of AEE were associated with greater reports of pain and depressive symptoms, respectively. Employing a mediation analysis, catastrophizing was found to mediate the association between AEE and pain. In addition, catastrophizing and need satisfaction were found to mediate between AEE, pain and symptoms of depression. Similarly, the two dimensions on the catastrophizing scale helplessness and magnification also found to be mediators for AEE and pain. Lu and colleagues (2011) theorised that when an individual has higher levels of AEE this may increase their feelings of distress and hopelessness as they struggle to express emotions and to seek support. Hence, by magnifying their physical symptoms (i.e., somatising emotional distress), they successfully find a more acceptable way of seeking and receiving help. This then results in exacerbated pain and self-reported pain levels. The authors also suggest that the negative relationship between AEE and symptoms of depression are

partly due to psychological needs not being met. The competence and relatedness factors of 'need satisfaction' were also shown to mediate between AEE and symptoms of depression. Authors suggest that difficulty expressing one's feelings may lead individuals to feel less competent and less in control over their environment, which in turn affects their interpersonal relationships. This is in line with previous research reported above (e.g. Hesse and Floyd, 2011; Brockmeyer et al., 2015). This study further supports the hypothesis that individuals with symptoms of depression demonstrate more restricted emotional expressiveness, which in turn may have severe consequences for the individuals' health, well-being and interpersonal functioning.

Paul et al. (2012) conducted a research study using fMRI scans to investigate the effects of repression in different brain areas. Repression is a coping strategy that involves; avoidance, denial or dissociation in an effort to protect the self from distress and threats, this is done by ignoring the stress inducing stimuli. A student population was utilised in the current study. Repressors showed scores that were high in cognitive avoidance and low on the vigilance scale. Whereas, Sensitizers had high scores on vigilance and low scores on cognitive avoidance. Masked threatening and masked happy faces were shown to all participants. The Repressors and the Sensitizers differed significantly in brain responses to the facial stimuli, as measured by fMRI. Repressors appeared to have a stronger response in several brain regions (frontal, parietal and temporal cortex) to facial expressions, in comparison to Sensitizers. Thus, the orbito-frontal brain regions may be important in processing facial expressions when habitual repression is employed as a cognitive coping strategy. The study also found the cingulate gyrus, basal ganglia and insula to be more reactive to emotional expression in repressors, especially for threatening

images (fearful, angry). Results confirmed the authors' hypothesis that repressors are more hypersensitive to threatening stimuli and to a lesser extent happy stimuli, when compared to Sensitizers. As in other emotional regulation strategies and coping strategies, research suggests that repression is associated with impairments in psychological well-being (Paul et al., 2012).

1.4.2.4 Emotion Regulation Strategies: Cognitive Reappraisal, Emotional Suppression and Repression

English and John (2013) further investigated emotion regulation strategies in an effort to understand both the short and long-term social effects of suppression in particular. They hypothesised that the use of suppression would inevitably lead the individual to feel inauthentic and this would in turn impact on their ability to relate to others and to interpersonal functioning. Results were in line with their hypothesis and in three different experiments across cultures, inauthenticity was found to mediate between the use of suppression and impaired social functioning, which led to unsatisfactory relationships and less social support. These results were also found in an older adult population and the use of suppression was linked to and also able to predict levels of social support ten years on. English and John (2013) postulated that the negative effect of suppression is not necessarily a result of expressing less positive emotions, rather, it is the incongruence between the inner-self and outer-behaviour that leads to the negative social consequences of suppression. Indeed, several studies have shown a link between the use of suppression as an emotion regulation strategy and an increase in negative emotions and a physiological response, in both the suppressor and the individual they are interacting with (e.g., Butler et al., 2003).

Peters, Overall and Jamieson (2014) wanted to further explore what the impact of suppression was for both the individual suppressing emotion and their dyadic partner. They set up an experiment where participants viewed videos that elicited emotions, they were then paired up with an unacquainted opposite sex-partner participants and were told to discuss the video and the emotions it elicited with the partner. In each pair one partner was instructed to either suppress emotions or express them visibly (without the other person being aware of this). The findings from the study indicate that the partners that conversed with suppressive regulators (without knowing they were suppressing emotions), felt that they displayed less emotions, facial expressions and gestures. They also reported that they were worse overall communicators in comparison to partners of expressive regulators. In addition, regulators of both conditions, reported the experience as more negative and intense than the partners that had been given no instructions. SNS arousal was seen in all participants when they were waiting to have the conversation with their unacquainted partner. However, only suppressors had greater vasoconstriction. The authors highlight that this is a typical threat response. Interestingly, during the conversation both parties in the dyad with the suppressor showed SNS arousal and vasoconstriction arousal. By suppressing emotions the regulator had a negative effect on their partners and impacted on their physiological response. A few limitations with the current study was; that 'opposite sex dyads', may in itself have caused the physiological threat responses seen in participants'. Furthermore, the mere task of suppressing emotions or indeed exaggerating the expression of them, may have in itself have affected physiological responses. This may have had an effect on the comparisons made between the different regulator conditions. Additionally, it would be beneficial to look at suppression in different cultures.

These two studies on suppression of emotional expressiveness provide further evidence that individuals with depression are impaired in the way that they social signal to others and the significant impact that may have on other individuals, as well as the person with depression.

Yet, another study in this literature review sought to find out what impact expressive suppression has on psychological functioning. Soto and colleagues (2011) conducted a cross-cultural study (European Americans ‘EAs’ and Hong Kong Chinese ‘HKC’). Interestingly they found that in cultures where suppression is normative, that is, the preferred way of displaying emotions according to cultural norms, suppressing emotions were not associated with a negative or adverse psychological functioning. HKC participants reported higher levels of suppression, yet less impaired psychological functioning. Nevertheless, the results showed that suppression in the HKC participants was not associated with positive psychological functioning either. Thus, in line with research on emotional reactivity (e.g., Chentsova-Dutton et al., 2007) we see that cultural differences emerge in research on emotional expressiveness, that is to say that the way that emotions are “expressed” (e.g., crying more) and “felt”(feeling less negative impact) differs between Western and Asian cultures. These differences are most likely due to the cultural norms that are ingrained in the individual from one generation to the next. Thus, in terms of the research question for the present literature review, emotional suppression does not appear to be experienced the same way cross-culturally and in some Eastern cultures it does not appear to have the same negative impact on psychological well-being as it does in Western cultures. However, more evidence need to be provided to make this generalisation across Eastern cultures.

1.4.3 Further Limitations of the Literature Review

Limitations for each of the research papers reviewed can be found in Table 2 and throughout the text in this chapter. The most significant overall limitation of this literature review was that the searches did not yield any papers on emotional expressiveness in any other modality than facial expressions. For instance, no papers looked at vocal pitch, gestures, head movements, body language and posture in depressed individuals.

1.4.4 Future directions

Future reviews should try to include different modalities of emotional expressiveness. For instance, post literature search we did a specific search that revealed some research in this area. For example, Alghowinem, Goecke, Cohn, Wagner, Parker et al. (2015) investigated if they could detect depression severity across cultures from video recordings of depressed individuals, looking specifically at eye gaze and head pose. The research team found ‘eye gaze’ to be the strongest at detecting depression across cultures, results for ‘head pose’ were not as strong, however they suggest that both modalities are combined and utilised together for most reliable detection. Yang, Fairbairn and Cohn (2013) found that naïve listeners were able to detect depression severity in patients with MDD by vocal prosody. Results also yielded that changes in vocal prosody over time showed changes in symptom severity of depression. Interestingly they also found that ‘interviewers’ vocal prosody changed in line with the depressed individual at different time points of depression severity. That is, when depression severity decreased, both the individual with MDD and the interviewer used shorter and less variable ‘switching pauses’. This may indicate that human beings consciously or subconsciously can tell

by looking at or listening to an individual, if they are depressed or not. Hence, this may change the way that these individuals interact with the depressed person.

Future research studies on emotional expressiveness and social signalling in individuals with depression should look at, for example, the intra and interpersonal impact that blunted emotional expressiveness have for individuals with depression and ‘what the short and long-term consequences of decreased emotional expressiveness have’ and ‘what the impact of lowered emotional expressiveness is on other individuals’. Future research should also investigate emotional expressiveness and depression across more cultures to explore differences among different ethnic groups.

1.5 Implications of the Literature & Conclusions

The current literature review makes an attempt to review the stance of research to date, which has investigated emotional expressiveness in individuals with depression. All eleven studies reviewed here supported the hypothesis that individuals with depression are less emotionally expressive than non-depressed individuals. However, one of our studies (Soto et al., 2011) found HKC participants to report high levels of suppression, though, this was not associated with a negative or adverse psychological impact on the individual. Results of the study supported the authors’ hypothesis that in cultures where suppression is normative (preferred according to cultural norms), suppressing emotions is not associated with a negative or adverse psychological functioning.

The current literature review adds to the knowledge in the area of emotional expressiveness and depression, by drawing together the available research in a synthesised manner and by critically evaluating the research studies that emerged

from our specific search terms. Although the studies reviewed here have many limitations that need to be addressed for future research, these studies suggest that emotional expressiveness is impaired in individuals with depression and that the maladaptive emotional expression may have a significant impact on the individual's trajectory of the disorder, leading way for more chronic and complex presentations. In addition, maladaptive emotional expressiveness and social signalling appears to impact the individual that interacts with the depressed person negatively. That is, research in this review revealed physiological and self-reported negative impact on the individual that interacted with the person that suppressed their emotions and expressions of these. This is likely to have a significant impact on the depressed individuals' social relationships and may lead to social isolation and loneliness. Hence, this has significant implications on how we treat depression in the future and indicates the importance of addressing issues with maladaptive emotional expression and social signalling in therapy.

CHAPTER 2

Empirical Paper

Title: An investigation of Emotional Expressiveness as one of the Proposed Mechanisms of Change of Radically-open Dialectical Behaviour Therapy (RO-DBT).

Word count: 8570

Topic: Emotion Expressivity in Depression

2.0 Introduction

2.1 Study Background:

According to The World Health Organisation (WHO 2017, 2012) approximately 320-350 million people in the world suffer from depression. These estimates include individuals with substance abuse and depression. In Europe, figures presented by the WHO (2013) show that one in 15 people suffer from Major Depressive Disorder (MDD) each year and if anxiety and all types of depression are included, this figure rises to four in 15 individuals. Marcus and colleagues argue in their publication on Depression for WHO (Marcus, Yasami, Van Ommeren, Chisholm, & Saxena, 2012) that depression is a leading cause of disability, measured in years lost due to disability. The main reasons for this are; the early onset of the disorder, the marked reduction in functioning for the individual and the recurring nature of Depressive disorders (Whiteford, Degenhardt, Rehm, Baxter, Ferrari et al., 2013; Marcus et al., 2012, WHO; Murray & Lopez, 1997). However, there are several other reasons why MDD is one of the largest contributors to the worldwide mental health burden. To this day, patients are still concerned about the stigma attached to mental health disorders and as a result many patients leave their conditions untreated for a long time (Clement, Schauman, Graham, Maggioni, Evans-Lacko et al., 2014; Barney, Griffiths, Jorm, & Christensen, 2006; Byrne, 2000; Lai, Hong, & Chee, 2000). Many patients that seek help for depression are only offered pharmacological treatment, often due to the absence of available psychological treatment (Layard, Clark, Knapp & Mayraz, 2007). Research has shown that patients prefer psychological treatment as opposed to pharmacological treatment for depression and when only given the option of pharmacological treatment many choose to not be treated at all (Layard et al., 2007). In a very recent

study conducted in both high and low- income countries (Thornicroft, Chatterji, Evans-Lacko, Gruber & Sampson, 2017) results revealed that only a minority of patients with MDD actually receive the minimally accepted treatment for the condition, highlighting the urgency of transforming services worldwide.

Research to date indicates that talking therapy, in particular CBT, can be an effective treatment for depression and can help prevent relapse (Layard et al., 2007; DeRubeis, Hollon, Amsterdam, Shelton, Young et al., 2005). However, most treatment studies exclude patients with comorbid personality disorders (PD) or patients with complex presentations and high suicidal ideation, thus these studies are not a true reflection of patients that we see clinically and cannot as such be generalised to all patients with depression (Lynch, Whalley, Hempel, Byford, Clarke, et al., 2015a). Cuijpers and colleagues (Cuijpers, Berking, Andersson, Quigley, Kleiboer, et al., 2013) conducted a meta-analysis to examine the effects of CBT for adult depression. They found that CBT was indeed an effective treatment, but not superior to other therapies or to pharmacological treatment. They also emphasised that CBT is the most researched psychotherapy for depression and as such has the greatest weight, yet this does not mean that it is the most effective. Furthermore, similar to many other papers, Cuijpers et al. (2013) found talking therapy combined with pharmacological treatment to be the most effective.

A large number of individuals that suffer from MDD have Chronic depression (depression lasting for more than two years) or Treatment resistant depression (TRD; referring to depression that doesn't respond to treatment), the two showing great overlap with low rates of successful prophylactic outcomes (e.g., Lynch et al., 2015a; Fournier, DeRubeis, Shelton et al., 2009; Berlim & Turecki, 2007). The term refractory depression (RD) covers both terms and will be used from

here on (Lynch et al., 2015a). Research also reveals that many of these individuals have comorbid personality disorders (PDs) and anxiety disorders (e.g., Fava, Farabaugh, Sickinger, Wright, Alpert et al., 2002; Riso, du Toit, Blandino, Penna, Dacey et al., 2003), which most likely further contribute to the chronic and treatment-resistant course. Research has predominantly focused on PD's such as Borderline and Anti-social PD (Cluster B) (see Clark, 2005), which can be viewed as under-controlled (UC) type disorders. Cluster A PD's (Paranoid, Schizoid, Schizotypal) and Cluster C PD's (Avoidant, Dependent, Obsessive-compulsive) appear to be less researched, yet tend to be very common among individuals with MDD (e.g., Vilaplanaa, McKenney, Riescoc, Autonella, Cervillab et al., 2010). In fact, Vilaplanaa and colleagues (2010) found Cluster C PD's to be the most prevalent in patients with MDD. According to Lynch et al. (2015a) approximately 40-60% of individuals with unipolar depression have a comorbid PD and this is likely to be higher for individuals with RD. These high comorbidity rates likely render the treatments that are currently available insufficient or inappropriate. Therefore, the need for new treatment options for patients with RD is crucial. One such new treatment is Radically Open Dialectical Behaviour Therapy (RO-DBT).

RO-DBT is an evidence-based transdiagnostic psychotherapeutic approach that is specifically aimed at patients that present with over-controlled (OC) type disorders and RD (Lynch et al., 2015a; Lynch, Hempel & Dunkley, 2015b). The research literature to date supports the efficacy of RO-DBT for patients with anorexia nervosa, chronic depression and overcontrolled personality disorder (e.g., Chen, Segal, Weissman, Zeffiro, Gallop et al., 2015; Keogh, Booth, Baird & Davenport 2016; Lynch, Cheavens, Cukrowicz, Thorp, Bronner et al., 2007; Lynch, Gray, Hempel, Titley, Chen et al., 2013; & Lynch, Morse, Mendelson & Robins,

2003). RO-DBT's efficacy and mechanisms for treatment of RD are currently being investigated in a large multi-site randomised controlled trial called REFRAMED (REFRActory depression - Mechanisms and Efficacy of Radically Open Dialectical Behaviour Therapy; Lynch, et al., 2015a).

The therapy itself finds its theoretical roots in neuro-biosocial theory and proposes that through bio-temperament/genetics, environment and coping style, individuals may over time develop an over-controlled style, that is, they have too much self-control (Lynch et al., 2015; Lynch, Seretis & Hempel, 2016). According to Lynch et al. (2015a, 2015b, 2016), these individuals have a genetic predisposition that makes them hyper-sensitive to threat, less sensitive to reward and highly risk-averse; they are often preoccupied with details in their environment, they may display constrained and fixated behaviours, such as having excessive moral standards or being extremely rule-governed, and they may display low empathy, high social comparison, bitterness, envy and resentment towards others (Lynch et al., 2015b, 2016). They also tend to inhibit emotional expressions and struggle to read others' emotional expressions. These traits may also be exacerbated by a threat-sensitive environment, where risk-taking is discouraged, which may lead to masking of emotions and social withdrawal (Lynch et al., 2015b, 2016). Consequently, individuals with OC type personality characteristics tend to have distant and aloof relationships, lacking in social connectedness (Lynch et al., 2015b, 2016).

On a neurobiological level the heightened threat sensitivity activates the sympathetic nervous system (SNS) ('fight or flight response', a defensive response), which in turn deactivates the parasympathetic nervous system mediated through the ventral vagal complex (PNS-VVC) and leads to impairments in the ability to read others' facial expressions, impairments in emotional expressiveness (e.g., flat facial

expressions and monotonous voice) and social connectedness (Lynch et al., 2015b, 2016). Current literature proposes that when individuals suppress their emotions, others are less likely to want to socialise and interact with them (e.g., Butler, Egloff, Wilhelm, Smith, Erickson et al., 2003; Dan Glauser & Gross, 2011; Gross & John, 2003). Thus, this “excessive bio-temperamental inhibitory control influences psychological well-being via the negative impact it has on social-signalling and social connectedness” (Lynch et al., 2016, p. 1003) According to Lynch et al. (2016) the very essence of what OC individuals try to achieve (being ‘likeable’ and good citizens) is lost due to the combination of the activated threat system (SNS activation and deactivation of the PNS-VVC) and the learnt response of hiding inner feelings: as a result they come across as inauthentic and untrustworthy. Consequently, social signalling difficulties and low emotional openness lead to emotional loneliness in many individuals with maladaptive OC characteristics (e.g., Lynch et al., 2015b, 2016).

Whilst RO-DBT has strong roots in standard DBT it differs noticeably in both its theory and treatment. Standard DBT sees ‘emotion dysregulation’ as the core difficulty for UC type disorders (Linehan, 1993). RO-DBT conversely posits that for OC disorders, low openness/flexibility, social signalling deficits and inability to connect with others lead to emotional loneliness (Lynch et al., 2015b, 2016). Lynch and colleagues (2015b) explicate the relationship between these difficulties, suggesting that ‘emotional loneliness’ is the end product: as all outward expression of inner emotions has ceased and all corrective feedback is being blocked automatically, individuals with OC type disorders struggle to build and maintain relationships. “RO-DBT links the communicative functions of emotion to the formation of close social bonds” (Lynch et al., 2015b, p.5). Hence, “radical

openness” in RO-DBT aims to address over-controlled behaviours and aloof and distant relationships in an effort to decrease emotional loneliness (Lynch et al., 2015b, 2016).

The hierarchy of treatment goals in RO-DBT is different from standard DBT. Life threatening behaviours are still prioritised, followed by therapeutic alliance ruptures. Contrary to standard DBT, therapeutic alliance ruptures are not seen as ‘problems’, rather these are seen as opportunities to learn that conflict and expression of one’s inner feelings can lead to enhanced intimacy and are an essential part of all normal relationships (Lynch et al., 2015b). Finally, ‘social-signalling’ deficits are targeted, which are divided into five themes; inhibited emotional expression, overly-cautious and hyper-vigilant behaviour, rigid and rule governed behaviour, aloof and distant relationships and envy and bitterness (Lynch et al., 2015b). Social-signalling skills taught in RO-DBT focus mainly on ways to activate the PNS-VVC, that is, to increase social safety in the individual and as such enable a friendlier, more inviting and relaxed non-verbal signalling style, which subsequently encourages closer bonds and positive feedback from others (Lynch et al., 2015b). RO-DBT skills also draw on neurobiological research of mirror neurons (e.g., Montgomery & Haxby, 2008; Van der Gaag, Minderaa & Keyzers, 2007). That is, we are ‘hardwired’ to subconsciously mirror another human being’s facial expressions, which helps us tap into their physiological and/or emotional state, thus bringing us closer to the individual (e.g., Lynch et al., 2015b). Along with techniques that encourage PNS-VVC activation and facilitate empathy through mirror neurons and non-verbal signalling (e.g., eye brow wags and half-smiles), RO-DBT also teaches the OC individuals to be more open and flexible, for instance, by “being silly” or “participating in unplanned tasks”. According to Lynch et al (2015b, p.6)

the key mechanism of change in RO-DBT is open expression which leads to increased trust, which in turn leads to social connectedness.

Prior to RO-DBT treatment the individual is assessed for over-controlled behaviours. Over-control is seen on a spectrum, where individuals' behaviours or traits can be seen to be either towards being more "overly agreeable" or more "overly disagreeable", assessing what type of OC traits the individual predominantly has, treatment can then be tailored towards their specific and individual needs. Therapy begins with psychoeducation about OC and about the bio-social theory of OC. Here, the individuals' are encouraged and facilitated to discover their own OC traits and through stories and metaphors they gain an understanding of why and how these traits have developed (e.g., through genetic vulnerabilities and environment). Social signalling is further explained and the evolutionary factors that contributes to its importance for social belongingness and how social signalling fosters relationships. Throughout the therapy, the therapist models healthy relationships, social signalling and radical openness and it promotes self-inquiry and "outing" one-self. Together with the therapist the individual sets goals for therapy, addressing their maladaptive OC behaviours. Mindfulness practice is also incorporated into the treatment, for instance, focussing on 'Loving and Kindness' meditation and 'participating without planning'. Similarly to DBT, both individual therapy and skills groups of RO-DBT follow a manual for treatment in a sequential manner. Nonetheless, the areas targeted are selected based on the specific types of maladaptive behaviours and the goals for treatment.

2.2 Aims of Study:

The main objective of the current study is to explore one of the possible mechanisms of change in RO-DBT, namely, a change in emotional expressiveness as a possible result of the therapy. That is, will individuals' observed and self-reported emotional expressiveness become less maladaptive after receiving RO-DBT? In addition, this study will investigate whether less maladaptive social signalling behaviour (i.e., emotional expressiveness) is correlated with an increase in perceived mental wellbeing. To answer these research questions, the current research study analysed both observed and self-reported data from the REFRAMED study at three separate time-points, namely, pre, mid and post treatment. As the patient group in the current study is hypothesized as having 'over-controlled' traits, we set out to adapt the Non-Verbal Social Signalling Scale (Greville-Harris, Hempel, Karl, Dieppe & Lynch, 2016) to include traits of emotional expressiveness that are typical for over-controlled individuals. The newly adapted scale was employed to assess observed emotional expressiveness. Self-reported emotional expressiveness was measured with the 'Ambivalence over Emotional Expressiveness' (AEQ) scale (King & Emmons, 1990) and self-reported well-being was assessed with the 'Patient Health Questionnaire-9' (PHQ-9) (Kroenke, Spitzer & Williams, 2001). While the REFRAMED study was a randomised controlled trial (RCT) with two treatment arms, namely, Treatment as Usual (TAU) versus RO-DBT, only data from individuals who were randomly assigned to the treatment condition of RO-DBT and who attended both individual sessions and skills classes were included in the present study. The rationale for this was that the original study's control group was the TAU condition. Hence, no data was available for this group, as no intervention had been administered, there were no video-recordings to rate for this group. Ideally a control

group should have been employed for the current study, this will be discussed further, as a limitation of the study, in the discussion of this paper.

2.2.1 Hypotheses:

Hypothesis 1a: There will be a statistically significant change over time (Pre, Mid, Post) in observed Emotional Expressiveness, as measured by the Maladaptive Social Signalling Scale. Indicating less maladaptive social signalling behaviour, from pre-RO-DBT treatment to post-RO-DBT treatment.

Hypothesis 1b: There will be a statistically significant change over time (Pre, Mid, Post) in self-reported depression scores, as measured by the PHQ-9. Indicating a decrease in depression scores from Pre-RO-DBT treatment to post-RO-DBT treatment.

Hypothesis 1c: There will be a statistically significant change over time (Pre, Post) in self-reported scores of Ambivalence over Emotional Expression as measured by the AEQ. Indicating a decrease in ambivalence over emotional expressiveness scores from Pre-RO-DBT treatment to post-RO-DBT treatment.

Hypothesis 2: Maladaptive social signalling behaviour will be positively correlated with depression scores on the PHQ-9 and the AEQ.

2.3 Method:

Ethics approval for the current study was sought from the University of Southampton Ethics Committee for secondary data analyses. This was subsequently approved by the Ethics Research Committee and the Research Governance office (ERGO), University of Southampton (See Appendix B). Data utilised for the present

study was collected over a five-year period, as part of a multicentre randomised controlled clinical trial, REFRAMED (See Appendix C for REFRAMED ethics).

2.3.1 Design:

The current study employed a cross-sectional design, employing observational ratings of maladaptive social signalling behaviour and self-report questionnaires on levels of depression and ambivalence of emotional expression, to investigate the impact of RO-DBT treatment in patients with RD over time. The independent variable (IV) being RO-DBT over time (Pre, Mid, Post). Dependent variables (DV) being the Maladaptive Social Signalling (MSS) scale, PHQ-9 and AEQ.

2.3.2 Methodology for the REFRAMED trial:

The REFRAMED trial was conducted at three National Health Service (NHS) sites in the UK. Participants were recruited to the REFRAMED trial from both primary and secondary care. Mental health professionals such as psychologists, psychiatrists, mental health nurses and general practitioners (GPs) referred participants to the trial. Potentially eligible participants were also identified through database searches, through advertisements in secondary and primary care clinics (e.g. waiting rooms, GP surgeries) and in the community (e.g. libraries). GPs and secondary care clinicians could refer patients directly to the study and patients could self-refer after seeing posters, leaflets or a website about the study. Participants, who had been identified as potentially eligible for the trial, were scheduled in for a comprehensive interview to assess whether they met the inclusion and exclusion criteria for the trial. All individuals that were referred to the REFRAMED clinical

trial were interviewed using the Structured Clinical Interview for diagnostic disorders Axis I and Axis II (SCID-I & SCID-II) to ensure eligibility to the study. A range of other assessment tools were also employed, including for instance the Hamilton Rating Scale for Depression (HAM-D) and a cognitive assessment.

2.3.3 Participants on the REFRAMED trial:

A total of 250 participants were found eligible to take part in the REFRAMED trial and these participants were randomly assigned to either Treatment as Usual (TAU) (n=88) or RO-DBT (n=162).

2.3.3a Inclusion Criteria for the REFRAMED trial:

- 18 years and above
- Current diagnosis of Major Depressive Disorder (MDD) (SCID-I diagnosis, section 7)
- HAM-D score of 15 and above
- TRD/RD defined as follows; chronic depression lasting two or more years, and/or 2 or more episodes of depression; in the current episode they must have been taking anti-depressant medication (ADM) for at least 6 weeks without any symptom relief.
- Participants may also meet criteria for ‘Cluster A’ (Paranoid, Schizoid, Schizotypal) or ‘Cluster C’ (Avoidant, Dependent, Obsessive-compulsive) Personality Disorders (SCID-I & SCID-II), however, this was not necessary for inclusion.

2.3.3b Exclusion Criteria for the REFRAMED trial:

- IQ less than 70
- Insufficient English proficiency to complete therapy
- Patients that meet criteria for ‘Cluster B’ (Antisocial, Borderline, Histrionic and Narcissistic) personality disorder.
- Primary diagnosis of Bipolar disorder or Psychosis
- Primary diagnosis of Substance dependence or substance abuse disorder

2.3.4 Methodology for the current study:

Participants for the current study were randomly selected from the 162 patients in the REFRAMED trial that had been allocated to RO-DBT and who met the criteria for the current study. Self-reported and observational data were collected for three time-points for this study: pre-treatment, mid-treatment (approximately four months after start treatment), and post-treatment (approximately seven months after start treatment).

2.3.4a Inclusion Criteria for the current study:

Participants were eligible for this study if;

- they had attended at least 25 sessions of individual RO-DBT therapy,
- their sessions were video-recorded,
- they had given consent for their video-recordings to be used for teaching and research purposes.

2.3.4b Exclusion Criteria for the current study:

Participants were excluded from the study if their video-recorded therapy sessions were not of sufficient enough quality to employ the coding scheme.

2.3.4.1 Participant & Tape selection

Participants in the RO-DBT arm of the study were offered approximately 28-30 sessions of individual therapy (seven months) and skills classes. As part of standard procedures for the REFRAMED trial, all treatment sessions were either video- or audio-recorded for the purpose of adherence checks. However, not all sessions were video-taped; on some occasions the therapist had forgotten to record

the session or the equipment failed to work. Therefore, the first step of this study consisted of assessing the availability of good quality video-recordings that corresponded to the three time points (Pre, Mid, Post therapy) needed for coding the behaviour. Out of the 162 participants that received the RO-DBT intervention, 74 participants were eligible according to the current study's inclusion/exclusion criteria. Upon closer inspection of the video-recordings a further six participants were excluded due to insufficient video-quality, leaving 68 eligible participants for the study. Preferably, the full sample of eligible participants should have been included in the current study. However, as this research study formed part of a thesis for a qualification of a Doctorate in Clinical Psychology, there was limited time to analyse the data. The task of rating observed maladaptive social signalling behaviours is very time consuming. Thus, for the purpose of this study 30 participants were randomly selected from the list of 68 eligible participants utilising the random function in SPSS.

2.3.4.2 Participants characteristics:

Table 3 below provides details of the participants in the current study. All participants in the study were aged 18 and above and had a diagnosis of MDD (SCID-I diagnosis, section 7). Participants also had a HAM-D score of 15 or above and met criteria for RD. Note that all comorbidities in the table below are presented as presently active and participants may present with several comorbidities concurrently.

2.3.4.3 Coding of Video Tapes

Three tapes for each participant were rated: session three (or as close to as possible) represents the pre-therapy time-point (selected to allow for the patient and

therapist to get acquainted during the first two sessions), session twelve (or as close to, if not available) represents the mid-therapy time point and session twenty-eight (or as close to, if not available) represents the end of therapy. If the researcher was unable to reliably score a session due to the video recordings not showing the participant clearly, the following session was scored. Scoring for each video-recording started 15 minutes into each session at pre, mid and post therapy time-points. Each therapy tape was viewed for 20 minutes (from minute 15 to minute 35) to allow for the scoring of the coding scheme.

2.3.5 Ethical considerations

To protect the participants' anonymity all data was stored with the participants' unique identifier code only and any identifying information was kept separately at the University of Southampton. As video-recorded therapy sessions could potentially be identifiable, each participant had to give specific consent for the recordings to be utilised for research purposes. Please see the attached consent form (Appendix D).

Table 4: *Demographic profile of participants*

	Participants Frequency:		Percent (%)
Gender	Female: 16		53
	Male: 14		47
Age Category:			
17-35	6		20
36-55	8		26
56-66	16		54
Income:			
0-20000	21		70
20001-50000	5		16
50001+	2		7
N/A	2		7
Education:			
Left before 16:	5		16
Finished before or by 18:	11		37
Attended/completed University:	12		40
N/A:	2		7
Ethnicity			
White British:	27		90
White Other:	2		7
Mixed White/Asian:	1		3
Age at onset of Depression:	Mean:	25.67	
	SD:	12.96	
	Range (in years):	7-48	
Chronic	25		83
Recurrent	5		17
Previous therapy:			
Yes	23		
No	6		
Missing data	1		
Comorbidities: PD's	12		39
Avoidant PD	15		49
Obsessive Compulsive PD	9		29
Paranoid PD	2		7
Schizoid PD	2		7
Dependent PD			
Comorbidities:			
General Anxiety:	11		37
Social Phobia:	8		27
Panic Disorder	5		17
Spec. Phobia	8		27
Agora Phobia	4		13
OCD	2		7
PTSD	3		10
Anorexia	0		0
Bulimia	0		0
Binge Eating	2		0
Body Dysmorphic disorder	1		3
Somatoform disorder	1		3

PD = personality disorder; OCD= Obsessive Compulsive Disorder, PTSD= Post Traumatic Stress Disorder

2.3.6 Measurements:

As part of the clinical trial a number of measures, questionnaires and self-reported data were utilised to assess the efficacy of RO-DBT exposure in this patient cohort. However, for the purpose of this research study we have selected three measures that will specifically tap into emotional expressiveness, body language and well-being, namely, the ‘Ambivalence over Emotional Expressiveness Questionnaire’ (AEQ), the ‘Patient Health Questionnaire-9’ (PHQ-9) and the adapted Social Signalling scale.

1. *Patient Health Questionnaire-9 (PHQ-9; originally based on the mood*

measure from; Kroenke, Spitzer & Williams, 2001): The PHQ-9 is a 9-item inventory that assesses individuals’ wellbeing. Patients score each criterion from “0” (not at all) to “3” (nearly every day). Total scores range from 0-27. It is a tool developed for depression and the 9 items correspond with the criteria in DSM-IV on mood. According to Kroenke et al. (2001) the PHQ-9 is a reliable measure with excellent internal reliability (Cronbach’s alpha of .089) and test-retest reliability. Kroenke and colleagues (2001) found the PHQ-9 to be 88% sensitive to identifying MDD. Please see Appendix E for the full PHQ-9 Questionnaire and clinical interpretation of scoring.

2. *Ambivalence over Emotional Expressiveness Questionnaire (AEQ; King &*

Emmons, 1990): King and Emmons (1990) hypothesized that emotional ambivalence develops in an individual as a result of the conflict between a need to express emotion and a wish to not show emotions publically. The individual then experiences an inner ambivalence, which becomes stressful

and may manifest as an automatic maladaptive cognitive process that can lead to difficulties with relationships and social loneliness in the long-term (King & Emmons, 1990). The AEQ is a 28-item scale looking at different aspects of cognitive ambivalence and conflicts related to emotional expression. Each item on the scale expresses two thoughts e.g. “I want to express my emotions honestly but I am afraid that it may cause me embarrassment or hurt”; the individual can then score the item from “1” (Never) to “5” (Very often). The instructions for the scale specifically point out that ‘higher scores’ should only be chosen if the individual feels that both “thoughts” in the question are true for them. Total scores range from 28-140. The AEQ has high internal consistency both for the original German version and the English version (Cronbach’s $\alpha=0.89$), as well as test-retest reliability (King & Emmons, 1990; Katz & Campbell 1994). Please see Appendix F for a copy of the AEQ.

3. ***Non-Verbal Social Signalling Scale; adapted from Greville-Harris, Hempel, Karl, Dieppe and Lynch, 2016***: The non-verbal social signalling scale looked at the following non-verbal behaviours; eye gaze, smiling, frowning, laughing, head towards experimenter, head away, head straight ahead, head up towards the ceiling and head down towards floor, all scored from “1” (not at all) to “5” (frequently). For the Greville-Harris et al. (2016) version of the scale, please see Appendix G.

‘Maladaptive Social Signalling Scale’: The Non-Verbal Social Signalling Scale was further adapted for the purpose of this study, by including elements that specifically explore over-controlled (OC) social signalling behaviours. The principal social signalling deficit in individuals’ with OC is the habitual

masking of emotions. What an OC person expresses to others is rarely how they feel on the inside. This pervasive masking of inner emotions transpires into maladaptive emotional expressiveness such as: serious, blunted, and concerned or flat facial expressions (e.g., frowning), unusual eye contact (e.g., intense, uncomfortable eye gaze or avoidance of eye contact).

Alternatively, they may come across as overly polite and pro-social displays of emotion which may feel exaggerated or out of place. For instance, excessively agreeing (nodding head excessively or vocally agreeing excessively), exaggerated politeness and empathy (e.g., to someone they have just met), smiling or laughing when they are clearly in distress. These maladaptive emotional expressions are not only seen in the form of facial expressions, but also for body postures (e.g., sitting unnaturally stiff and upright), body language (e.g., leaning in too close/no personal space) and voice (e.g., exaggerated/unnatural pitch/tone/intonation) and are often incongruent to the individual's actual feelings.

Modifications were also made to the original part of the scale (Greville-Harris et al., 2016), particularly in relation to the scoring of the scale. The behaviours within each item are organised in such a way that the extreme ends of the item represent maladaptive behaviours and get higher scores, whereas the middle option of the item represents 'appropriate' or typical behaviours and receives a score of '0'. For instance, Question 1; Smiling inappropriately (position 1), smiling appropriately (position 3) and not smiling at all or flat face (position 5), can be marked on a scale from 1-5, with differing degrees of these behaviours. If this is marked as 'smiling appropriately' (3), a score of "0" will be given. Total scores range from 0-30.

The total sum of the scores gives an indication of the extent of the maladaptive social signalling behaviours. That is, higher scores will indicate increased maladaptive social signalling behaviours. The newly adapted scale will here on be referred to as the ‘Maladaptive Social Signalling Scale’, please see Appendix H for the full scale and the scoring instructions.

2.4 Statistical Analysis:

Data for the present study was analysed utilising SPSS (v.23). All data was checked for errors to ensure that the data set was entered correctly. Inspection of the trimmed means for the different measures and time points showed very little difference from the original means, which indicated that none of the variables of interest had any extreme outliers. Normality tests were run to ensure that all data was normally distributed; the Kolmogorov-Smirnov statistics were not significant ($p > .05$) indicating all variables could be analysed using parametric tests.

2.4.1 Cronbach’s alpha:

To check the reliability of the newly adapted behavioural coding scheme, Cronbach’s alpha was calculated using SPSS.

2.4.2 Inter-rater reliability:

To assess inter-rater reliability for the ‘Maladaptive Social Signalling Scale’ two independent coders rated the same 13% of the 90 therapy sessions, across pre, mid and post therapy. This was to ensure that the ratings of the researcher were reliable. The two external independent coders were blinded as to which time point they were rating to prevent any potential bias, that is, they did not know if they were scoring a Pre, Mid or Post therapy session.

Intraclass Correlation Coefficients (ICC's) were used to assess the inter-rater reliability between the three coders for the 'Maladaptive Social Signalling Scale' to measure consistency across the three raters. Prior to conducting the ICC's the data was checked to ensure that the assumptions for the statistical analyses were met; the data was continuous and measured on a nominal or ordinal scale, all three raters assessed the same observations, the response variables had the same number of categories and the raters were all independent and selected for the current research study (see Landers, 2015).

2.4.3 Main analyses:

Aim 1: The first aim was to determine whether appropriate emotional expressiveness is a possible mechanism of change in RO-DBT, by investigating observed and self-reported emotional expressiveness and well-being before, during and after receiving RO-DBT.

To help protect from making Type 1 errors by conducting several ANOVA's on the dependent variables, we chose to be conservative by first conducting a one-way Multivariate Analysis of Variance (MANOVA). The MANOVA was utilised to discern the nature of the differences between the different time points with respect to the dependent variables and to examine if emotional expressiveness is associated with a change in RO-DBT.

Following the results of the MANOVA, two one-way repeated measures analysis of variances (ANOVA's) were then conducted to investigate whether observed emotional expressiveness and self-reported well-being changed over time (pre, mid, post) during RO-DBT therapy. Post hoc analyses were subsequently employed for statistically significant results to discern where the differences lay.

As scores could only be obtained for pre and post AEQ scores, a paired samples t-test was utilised to investigate differences between the self-reported emotional expressiveness pre and post RO-DBT therapy.

Aim 2: To investigate whether a change in emotional expressiveness was correlated with changes in perceived mental wellbeing and self-reported emotional expressiveness.

In order to investigate whether increased emotional expressiveness is correlated with increased perceived mental wellbeing, bivariate correlations were calculated between the differences in scores across time-points for self-reported mental wellbeing and emotional expressiveness.

2.5 Results:

2.5.1 Results Cronbach's alpha analyses:

The newly adapted behavioural coding scheme's internal consistency was assessed utilising Cronbach's alpha in SPSS. This analysis yielded a Cronbach alpha coefficient of .782. Although this is an acceptable internal consistency it is preferable to have values over .8 (Pallant, 2007). Upon further inspection of the inter-item correlation matrix several negative correlations were found, indicating that the different questions or items in our scale measured very different constructs. Arguably this scale sets out to look at non-verbal and verbal behaviour, specifically tapping into over-controlled traits, thus this incorporates a wide range of behaviours. The Corrected Item-Total Correlation revealed that deleting Question 7 would result in a Cronbach's alpha of .787 and deleting item 10 would result in Cronbach's alpha of .788, both only slightly higher than the initial Cronbach's alpha of .782; as the

scale had an acceptable Cronbach's alpha of .782 all items were kept for the purpose of this study.

2.5.2 Results for inter-rater reliability:

Two-way random effects intra-class correlations (ICC's) were used to assess the inter-rater reliability of the three raters on the behavioural coding scheme. ICC's were conducted on all 15 separate items of the scale and on the total score of the scale. Table 2 presents the ICC's and the quantitative and qualitative levels of consistency based on Landers (2015) and Shrout and Fleiss (1979). Overall inter-rater reliability was good to excellent, with only questions 5 and 6 indicating poor consistency between raters.

Table 5: *Results of a Two-way random effects Intraclass correlations- Inter-rater reliability*

	Intra-class correlation Confidence Interval		95%	F- test Sig	Level of consistency
	Lower Bound df1	Upper Bound df2	Value		
Q1	.551 22	.948	.833	11 .001	Excellent
Q2	.161 22	.899	.679	11 .012	Good
Q3	.399 22	.927	.768	11 .002	Excellent
Q4	.164 22	.895	.670	11 .011	Good
Q5	-.453 22	.782	.353	11 .156	Poor
Q6	-.384 22	.495	.302	11 .168	Poor
Q7	.071 22	.865	.598	11 .011	Good
Q8	.320 22	.919	.743	11 .001	Excellent
Q9	.039 22	.893	.652	11 .021	Moderate-Good
Q10	.039 22	.893	.652	11 .021	Moderate-Good
Q11	.595 11	.952 22	.847	.001	Excellent

Q12	.220		.912	.714	.008	Excellent
11	22					
Q13	.312		.912	.726	.003	Excellent
11	22					
Q14	.659		.958	.868	.001	Excellent
11	22					
Q15	.637		.956	.859	.001	Excellent
11	22					
All items	.750		.972	.910	.001	Excellent
11	22					

2.5.3 Results for Main analyses: Hypothesis 1

Hypothesis 1: There will be a change in observed Emotional Expressiveness, indicating less maladaptive social signalling behaviour. Well-being will increase accordingly and ambivalence over emotional expressiveness will decrease from pre-RO-DBT treatment to post-RO-DBT treatment.

Table 6 below presents the descriptive statistics of all three dependent variables for each time point. The ambivalence over emotional expressiveness data was only available pre- and post-treatment.

Table 6: Descriptive statistics and results of analysis for Maladaptive Social Signalling, Depression (PHQ-9) and Ambivalence over Emotional Expressiveness (AEQ) at all time-points (Pre, Mid & Post therapy).

	Time	Mean	Std. Deviation	N	Test Statistic	p	η^2
Maladaptive Social Signalling	PRE	11.83	4.65	30	F=8.75	.001	.413
	MID	9.07	4.71	29			
	POST	6.85	4.10	27			
Total score all							
PHQ9	PRE	17.60	5.70	30	F=5.72	.001	.366
	MID	13.52	5.49	29			
	POST	12.33	7.41	27			
AEQ	PRE	94.70	16.28	26	t=2.234	.030	
	POST	83.80	19.91	26			

For Maladaptive Social Signalling (MSS) and Depression a MANOVA was conducted with Time as the repeated measures variable. Box's M test revealed that the assumption of equality of covariance matrices was not violated ($p=.647$) and thus Pillai's trace was used as the test statistic. The MANOVA revealed a statistically significant effect of Time with a medium effect size (Pillai's Trace $=.21$, $F(4, 166) = 4.78$, $p<.001$; $\eta^2=.10$). The univariate analyses indicated that both Maladaptive Social Signalling and Depression contributed to this effect ($F(2,83) = 8.75$, $p<.001$, $\eta^2=.17$ and $F(2, 83) = 5.72$, $p < 0.01$, $\eta^2=.12$, respectively).

Because PHQ-9 data was missing for some cases thereby reducing the number of analysable cases for MSS, two separate one-way repeated measures ANOVA's were conducted to further investigate the differences over time for each of the two variables. Mauchly's test of sphericity indicated that the assumption of sphericity was met for both variables ($p>.5$).

A statistically significant effect of Time for Maladaptive Social Signalling was found, with a large effect size ($F(2,58) = 20.40$, $p<.001$, $\eta^2=.41$). That is, 41.3% of the variability in the data can be explained by changes over time when attending RO-DBT. Pairwise comparisons revealed a significant decrease in maladaptive social signalling at all three time points. Post-hoc analyses yielded a statistically significant difference between Pre and Mid treatment (Mean difference = 2.70, $p<.030$), Pre and Post treatment (Mean difference = 5.33, $p<.001$), and between Mid and Post treatment (Mean difference = 2.63; $p < .007$). Thus, RO-DBT exposure appears to reduce maladaptive and over-controlled social signalling behaviours in individuals with RD and comorbidities. Please refer to Figure 2 for a visual representation of the data.

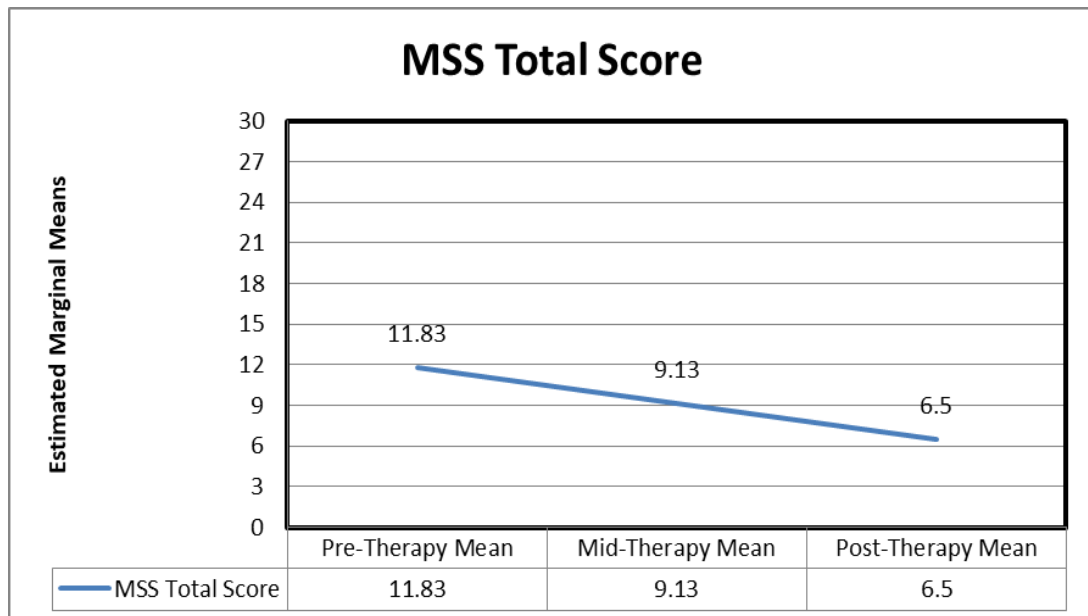


Figure 2: Maladaptive Social Signalling (MSS) scores over time

A statistically significant effect of Time was also found for depression scores with a large effect size ($F(2, 50) = 14.42$, $p < .001$; $\eta^2 = .37$). Bonferroni pairwise comparisons indicated a significant decrease in depression scores from Pre to Mid treatment (Mean difference = 3.92, $p = .001$) and Pre to Post treatment (Mean difference = 5.04, $p < .001$), but not from Mid to Post treatment (Mean difference = 1.11; $p = .71$). Results are indicative that participation in the RO-DBT intervention is related to decreasing depression scores on the PHQ-9 and increasing mental well-being over time for individuals with RD. Please see Figure 3 for a visual representation of the data.

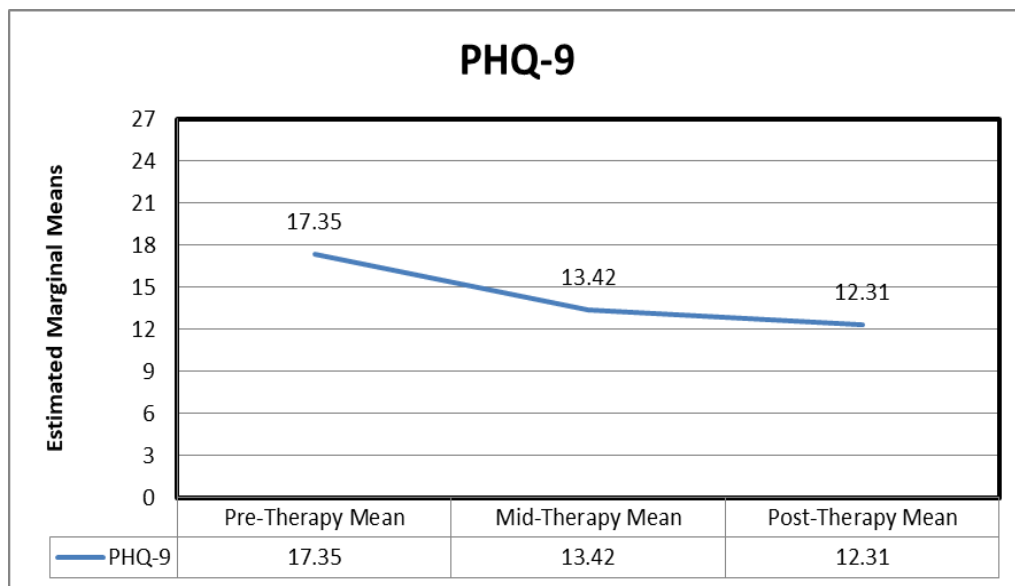


Figure 3: Depression scores over time

A paired samples *t*-test was conducted to investigate if there were any differences in self-reported ambivalence over emotional expressiveness scores, as measured by the AEQ, after receiving RO-DBT treatment. Levene's *F* test indicated that the assumption of homogeneity was met ($F(53) = 1.411, p = .24$). The *t*-test showed that self-reported ambivalence of emotional expressiveness significantly decreased after receiving the RO-DBT intervention, $t(53) = 2.234, p = .030$. For a visual representation of the data, please refer to Figure 4.

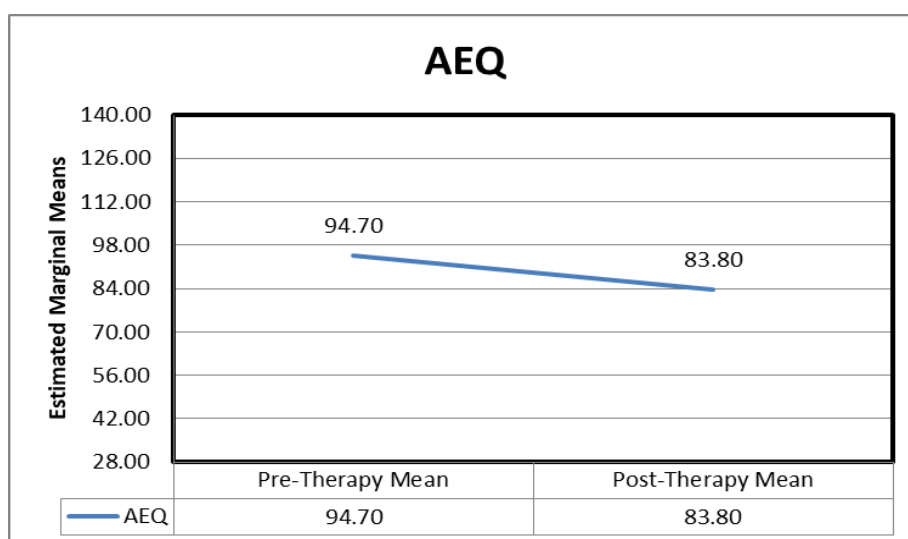


Figure 4: Ambivalence over emotional expression (AEQ) scores over time.

2.5.4 Results for Main analyses: Hypothesis 2

Hypothesis 2: Maladaptive social signalling behaviour will be positively correlated with depression scores on the PHQ-9 and emotional expression on the AEQ.

In order to answer the second research question whether a change in emotional expressiveness was correlated with increased perceived mental wellbeing and self-reported emotional expressiveness, difference scores were calculated between the Pre-, Mid- and Post-therapy time points for the MSS and PHQ-9. Difference scores for the AEQ could only be calculated for the Pre and Post therapy time points. Subsequently five correlations were run to see if a change in emotional expressiveness as measured by the MSS scale was associated with changes in depression scores (PHQ-9) and ambivalence of expressing emotions (AEQ), respectively. There were no significant correlations between observed emotional expressiveness (MSS scale) and depression difference scores for any of the time-intervals (Pre versus Mid therapy: $r=.319$, $n=29$, $p=.092$; Pre versus Post therapy: $r=.305$, $n=30$, $p=.101$; Mid versus Post therapy: $r=.281$, $n=29$, $p=.139$). Although no statistically significant relationship was found between the variables, we inspected scatterplots to see if the data showed any trends: these showed that the PHQ-9 and MSS appear to be going in the same direction, which will be discussed further in the discussion. Please see Appendix I for the scatterplots.

Similarly, no statistically significant associations were found for AEQ and MSS difference scores for Pre versus Post therapy ($r= -.005$, $n=25$, $p=.980$) or for AEQ and PHQ-9 difference scores ($r=.29$, $n=25$, $p=0.16$). The scatterplots did not indicate any clear trends. Please see Appendix H for scatterplots depicting the results.

3.0 Discussion:

The aim of the present study was to investigate one of the proposed mechanisms of change of RO-DBT, namely social signalling behaviour. RO-DBT is a new treatment that has been specifically designed for difficult to treat patients with an over-controlled personality style. One of the main premises of RO-DBT is based on the presumption that individuals strive for social belongingness. Literature confirms that individuals who suppress emotions are seen as disingenuous by others and their 'social signalling' is off, which eventually leads to a breakdown of social connectedness, and to loneliness and isolation (e.g., Lynch et al. 2015a; Butler, Egloff, Wilhelm, Smith, Erickson et al., 2003; Dan Glauser & Gross, 2011; Gross & John, 2003).

The first aim of this study was to determine whether emotional expressiveness is a possible mechanism of change in RO-DBT. This was achieved by investigating observed and self-reported emotional expressiveness and well-being before, during and after receiving RO-DBT treatment. Emotional expressiveness was measured by an adapted form of a behavioural coding scheme, which looked specifically at maladaptive social signalling in individuals with OC type behaviours and with the AEQ that assess the discrepancy of emotions and the ambivalence of expressing these. Depression scores (PHQ-9) were further included for the three time points to look at well-being.

Results of the first part of the study revealed that both maladaptive social signalling behaviours and depression scores decreased over time, after receiving RO-DBT treatment. These results are tentative at best, as this was a cross-sectional study. However, they may be indicative that emotional expressiveness is a possible

mechanism of change in RO-DBT and that exposure to RO-DBT may not only reduces maladaptive social signalling, but may also increases mental wellbeing in individuals with RD and comorbidities. Similarly, results showed that individuals who received RO-DBT treatment felt less ambiguous about expressing their emotions, as measured by the AEQ pre and post intervention. Once again, results need to be interpreted with caution due to the study design employed.

In the case of maladaptive social signalling scores, post hoc analysis demonstrated change at all time points, showing that changes were occurring throughout the course of therapy. The continued decrease of maladaptive social signalling may be reflective of the continuous teaching and acquisition of different skill sets throughout the course of RO-DBT treatment. However, for depression scores, the largest change appeared to take place during the initial part of the RO-DBT treatment, between pre and mid therapy time points. Upon closer inspection of means, depression scores could be seen to be reducing at all time points, albeit not at a statistically significant level for mid to post therapy. The initial decrease of depression scores during the first phase of therapy is in line with previous research on depression and CBT treatment, where treatment gains are also found earlier on in therapy (e.g., Ilardi & Craighead, 1994). Ilardi & Craighead in their influential (1994) paper demonstrated that patients show most of their improvements within the first 4 weeks of therapy and that these improvements can be utilised to predict the overall long-term gains of therapy. This has been further replicated in several papers, with different therapeutic techniques (e.g., Crits-Christoph, P., Connolly, M. B., Gallop, R., Barber, J. P., Tu, X., Gladis, M., et al. 2001; Grilo, C. M., Masheb, R. M., & Wilson, T. G. 2006). On the other hand, several authors critique the use of ANOVA's in psychological studies posing that this only provides a "snapshot" of

time and that it does not reflect the nuances of change. These researchers highlight that change is not always gradual and linear and that there are many individual differences that are being missed by using group based average data and this type of analysis (e.g., Hayes, Laurenceau, Feldman, Strauss, & Cardaciotto, 2007). For instance, research studies on CBT treatment and depression have found certain periods of ‘sudden gains’ (Tang, DeRubeis, Beberman & Pham, 2005) and contrarily other periods where depression symptoms appear to ‘spike’ up again during the course of therapy, thus demonstrating a non-linear pattern of change (e.g., Hayes, Feldman, Beevers, Laurenceau, Cardaciotto & Lewis-Smith, 2007). Our results for the depression scores may reflect some of these ‘sudden gains’ as well as the ‘spikes of depression’ and this may explain why no statistical changes can be seen from the mid-post therapy time points.

The second aim of this study was to explore whether Social Signalling behaviour was correlated with depression scores on the PHQ-9 and emotional expression on the AEQ. None of the measures were significantly correlated with each other. However, after creating scatterplots for the correlations it appeared that observed maladaptive social signalling behaviour and depression scores are following the same direction. That is, they decrease with time in therapy. This is also evident when looking closer at the means. One of the major issues with the current study is the number of participants and it is plausible that if a larger sample size was utilised it may have shown a positive correlation between the variables. This does not seem to be the case for self-report of emotional expressiveness and observed emotional expressiveness: there appeared to be no trend to indicate that the data will be correlated if larger sample sizes are employed. These results could potentially indicate that this particular cohort of patients that present with OC type behaviour

have very little awareness of their own social signalling. Therefore, what they report and what they do is very different. One of the main difficulties for individuals with OC type traits is their awareness of their own emotional states and the discrepancy of what they ‘want to communicate to others’ and ‘what they actually communicate’. That is, they may long to build connections and relationships, but often fail to do so, as others’ interpret their behaviour as threatening, odd or distant. Thus, we hypothesise that these results may indicate that even though those participating in RO-DBT treatment may have changed their ‘observed’ social signalling behaviours (as measured by the maladaptive social signalling scale), for instance, they may display more relaxed and approachable body language, they may not be aware of this change yet and still “feel” as if they are not acting in line with their emotions. The AEQ measures the self-reported ‘ambivalence of emotional expression’, thus, even though there is an observed change in behaviour and they may feel less depressed, the individual may not have begun to identify with these feelings yet and still experience an ambivalence over expressing their emotions. Hence, the AEQ scores do not correlate with depression scores on the PHQ-9.

3.1 Weaknesses of the present research and future directions:

There were several limitations of the study which need to be addressed. A larger sample size would have meant greater power and more generalisability for the study. Larger sample sizes may have yielded more conclusive results for the self-report measures. However, due to the time limitations, this was not achievable for the present study.

Another limitation of the study was that no control group was employed. Hence causal relationships cannot be established because we cannot be sure that

these changes would not have occurred over time naturally. Observed changes may be due to time itself or the mere interaction with the therapist and other individuals in the skills classes. By participating in this study, trust and relationships may have developed, which may have impacted the individuals' mood, general well-being and emotional expression, and as such, changes observed cannot be attributed fully to the therapeutic intervention. In addition, we cannot imply that the direction of the perceived changes can be attributed to emotional expressiveness, as this association has not yet been established.

For future research, it may be problematic to use the same paradigm with healthy controls as they are unlikely to need psychological treatment. However, one possibility would be to utilise different type of therapies (e.g., CBT and DBT) to see if emotional expressiveness changes over time regardless of what treatment is delivered. Thus, future research should aim to assess emotional expressiveness in larger cohorts of patients with OC type behaviours and use other therapies as 'control groups' to assess the actual efficacy of RO-DBT to reduce maladaptive social signalling behaviours. Future research could also utilise other patient cohorts with OC type behaviours, for instance, individuals with eating disorders. In this case it would be interesting to use family therapy as the control group, as this is one of the preferred treatment modalities for adolescents with eating disorders.

Utilising a cross-sectional design inherently limits any conclusions that can be drawn from the study. This is reviewed in Chapter 1. Future studies should aim to conduct longitudinal and or prospective studies.

Many factors impact on emotional expression, such as, genetics, environment and social and cultural norms. The implications of these factors are beyond the

control of this research study, thus it should be highlighted that this is a significant limitation of this thesis. In particular, it has been shown that different cultures are inclined to prefer different types of emotions (low or high arousal emotions) and that these are dependent on what the individuals' are striving to achieve, that is, conforming towards the group (collectivist societies) or becoming more autonomous (individualistic societies). Thus, the implication this will have on the generalisability for research on MDD and emotional expression is crucial, as in many cultures, these emotions are not even recognised or are detrimental to the cultural norms. Hence, the concept of 'emotional expression' in MDD will have to be assessed cross-culturally, to see the inherent differences, before any conclusions can be drawn. This further implies that the very nature of this specific type of therapy (RO-DBT) may in fact not be valid or even effective cross-culturally. Furthermore, the study sample in the current study included mostly white British participants' and can as such not be generalised to the rest of the population. The researchers hypothesised that the reason for this was that white British individuals may be more inclined to seek external help for their mental health difficulties, whereas individuals representing other ethnic and cultural groups in Britain have a more collectivist style of dealing with their difficulties. This may mean that they do not seek help at all, as it is not "culturally acceptable", that they do not recognise depression as a condition in their culture or that they have other means of receiving help for their difficulties. Future studies should aim to include individuals from other ethnic backgrounds and cultures, both within Britain and in other countries.

Psychological research is often limited due to patients being on different types of medications. Controlling for medication is not an easy task, as it is both unethical and often impractical to change patients' medication intake or to ask them

take a ‘medication break’ during a research study. Thus, researchers should at least aim to report participants’ medication usage, to make the reader aware of the potential limitations this has for any conclusions that can be drawn from the study. Patients being on different medications can bring with it problems, when trying to analyse the data and when conclusions are drawn, as it complicates the picture significantly. Different medications can impact both positively and negatively on areas such as, mood and cognitive functioning and this should be accounted for in the research.

A further limitation of this study was the newly adapted ‘maladaptive social signalling scale’. This scale had not been piloted properly prior to inclusion in this study. Another difficulty with the scale is the ‘subjective’ judgment of each item. Even though the researchers have included a description and suggestions for how to score the individuals non-verbal and verbal behaviour, this is open to interpretation and can be influenced heavily by what the assessor deems an emotional expression to be. That is, we all have different thresholds for what is a “normal” or “abnormal” expression of emotions that is heavily influenced by our background, both socio-emotional and cultural. Thus, what one individual interprets as a frown, may be very different from another. To avoid or at least account for these pitfalls in future research the description and scoring manual for the scale needs to be further expanded upon and developed. Arguably, assessors should also be specifically trained in judging these minute behavioural expressions. For instance, training tools that help recognise distinct expressions and facial expressions could be utilised (e.g., micro-expression training tools).

3.2 Strengths of the current research study:

A particular strength of this research study is that the RCT from which the data comes (see Lynch et al., 2015a) has chosen to include individuals with long-term history of RD, complex disease patterns and accompanying comorbid diagnoses, making the results more generalizable to the patient population that generally presents itself to mental health care professionals and services.

Nevertheless, a recent study by Van Bronswijk, Lemmens, Viechtbauer, Huibers, Arntz, et al. (2018) did not find that patients with MDD and PD's affected treatment results, irrespective of what treatment was used (CBT and IPT).

Another strength of the study was the different measures used, including both observed and self-reported measures of emotional expressiveness and mental wellbeing. Utilising an observational coding scheme to investigate changes in maladaptive social signalling is a strength of the current study. Research indicates that individuals with depression and indeed with OC personality traits do not necessarily show how they feel on the inside, often masking emotions and feel ambivalent over the emotions they express. Thus, by employing an observational method that investigates different verbal and non-verbal aspects of communication in more detail, we are better able to draw conclusions about their actual state of mind. Furthermore, the newly adapted coding scheme specifically looked at common maladaptive traits of OC personality types. The inter-rater reliability of this scale was very high.

Albeit a relatively new therapeutic intervention, RO-DBT in itself has several strengths. Firstly, it is a manualised intervention which means that there will be fewer differences in the delivery and administration of the therapy, in comparison to

other currently available interventions. Secondly, the therapy includes both individual sessions and skills classes which is beneficial for the patient, as it introduces more ‘life like situations’ and helps the individual reintegrate back into society by modelling relationships and the importance of group belongingness.

This study adds to the literature on both refractory depression and emotional expression in individuals with MDD.

3.3 Conclusion and Implications

In chapter one, we reviewed the literature looking specifically at depression and emotional expressiveness and social signalling. The literature search yielded plenty of papers investigating emotion recognition in different patient cohorts, however, very little research appears to have been conducted on the way we express emotions and how this may have a significant impact on our wellbeing. This research study is the first to specifically explore one of the mechanisms of actions in RO-DBT, that is, emotional expressiveness and social signalling.

The results of the study have implications for mental health care in general, as it highlights the importance of how we interact with others and how maladaptive social signalling and emotional expressiveness can have a significant effect on the individual as well as others interacting with them. In the case of depression, this study is particularly important as it demonstrates the possibility of RO-DBT as a new treatment option for individuals with OC characteristics and potential that this therapy has to improve mental health. For example, social signalling appears to be an important factor when it comes to building relationships, yet apart from RO DBT there aren’t any treatments out there that focus on this particular issue. Thus, this

study has implications for future treatment options for individuals with OC characteristics, in particular RD.

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[illegible]

**2 60 – 79%
agreement**

**3 less than 60%
agreement**

4 Not applicable

5 Can't tell

B) Study Design:	No	No	No	No	Yes	No	No	Yes	No	No	No
Was the study described as randomized?	Rating: Moderate	Rating: Moderate	Rating: Moderate	Rating: Moderate	No	Rating: Moderate	Rating: Moderate	Yes	Rating: Moderate	Rating: Moderate	Rating: Moderate
No/Yes (No go to C)					Moderate			Rating: Strong			

If Yes, was the method of randomization described?

No/Yes

If Yes, was the method appropriate?

No/Yes

C) Confounders	Q1. 1	Q1. 1	Q1. 1	Q1. N/A	Q1. N/A	Q1. 1	Q1. 1	Q1. 1	Q1. 1	Q1. 1	Q1. 1
Were there important differences between groups	(7 Health status) Q2. 1	(7 Health status) Q2. 1	(1 Race and 7 Health status)		Student population	(1 Race) Q2. 1	(8 pre intervention scores)	Q2. 1	Q2. 1	Q2. 1	Q2. 1,7
								Rating:	Rating:	Rating:	<i>Rating:</i>

prior to the
intervention?

Rating:
Moderate

Rating:
Moderate

Rating:
Moderate

1 Yes

2 No

3 Can't tell

The following are
examples of
confounders:

1 Race

2 Sex

**3 Marital
status/family**

4 Age

**5 SES (income or
class)**

6 Education

7 Health status

**8 Pre-
intervention
score on
outcome
measure**

(Q2) If yes,
indicate the
percentage of
relevant

Moderate Moderate Moderate Moderate

Q2.1

Rating:
Moderate

Rating:
Moderate

confounders that were controlled (either in the design (e.g.

stratification, matching) or analysis)?

1 80 – 100% (most)

2 60 – 79% (some)

3 Less than 60%

D) Blinding	Q1. 1	Q1. 1	Q1. 2	Q1. 1	Q1. 1	Q1. 1	Q1. 3	Q1. 1	Q1. 1	Q1. 1	Q1. 2
(Q1) Was (were) the outcome assessor(s) aware of the intervention or exposure status of participants?	Q2. 2	Q2. 2	Q2. 2	Q2. 2	Q2. 2	Q2. 2	Q2. 2	Q2. 2	Q2. 2	Q2. 2	Q2. 2
	Rating: Moderate	Rating: Moderate	Rating: Strong	Rating: Moderate	Students were not aware and were told a different purpose of the study than its actual purpose.	Rating: Moderate	Rating: Moderate	Rating: Moderate	Rating: Moderate	Rating: Moderate	Rating: Strong
1 Yes											
2 No											
3 Can't tell											
(Q2) Were the study participants aware of the					Rating: Strong						

drop-outs reported in terms of numbers and/or reasons per group?	Rating:	Rating:	Rating:		Rating:	Rating:	Rating:	Rating:	Rating:	Rating:	Rating:
	Weak	Weak	Weak	Rating:	Weak	Strong	Weak	Strong	Weak	Weak	Weak
				Moderate							

1 Yes

2 No

3 Can't tell

**4 Not Applicable
(i.e. one time
surveys or
interviews)**

(Q2) Indicate the percentage of participants completing the study. (If the percentage differs by groups, record the lowest).

1 80 -100%

2 60 - 79%

3 less than 60%

4 Can't tell

**5 Not Applicable
(i.e.**

**Retrospective
case-control)**

G) Intervention Integrity	Q1. 1	Q1. 1	Q1. 1	Q1. 1	Q1. 1	Q1. 1	Q1. 1	Q1. 1	Q1.1	Q1. 1	Q1. 1
	Q2. 1	Q2. 1	Q2. 1	Q2. 1	Q2. 3	Q2. 1	Q2. 1	Q2. 1	Q2. 2	Q2. 1	Q2. 1
(Q1) What percentage of participants received the allocated intervention or exposure of interest?	Q3. 5	Q5. 5	Q3. 5	Q3. 5	Q3. 5	Q3. 5	Q3. 5	Q3. 5	Q3. 5	Q3. 5	Q3. 5
	Rating:	Rating:	Rating:	Rating:	Rating:	Rating:	Rating:	Rating:	Rating:	Rating:	Rating:
	Strong	Strong	Strong	Strong	Weak	Strong	Strong	Strong	Moderate	Moderate	Moderate

1 80 -100%

2 60 - 79%

3 less than 60%

4 Can't tell

(Q2) Was the consistency of the intervention measured?

1 Yes**2 No****3 Can't tell**

(Q3) Is it likely that subjects received an unintended

intervention
(contamination or
co-intervention)
that may
influence the
results?

4 Yes

5 No

6 Can't tell

[illegible]

methods
appropriate for
the study design?

1 Yes

2 No

3 Can't tell

(Q4) Is the
analysis
performed by
intervention
allocation status
(i.e. intention to
treat) rather than
the actual

intervention
received?

1 Yes

2 No

3 Can't tell

Overall rating of
paper

MODERATE

MODERATE

MODERATE

MODERATE

WEAK-
MODERATE

MODERATE

MODERATE

MODERATE-
STRONG

MODERATE

MODERATE

MODERATE

GLOBAL RATING

COMPONENT RATINGS

Please transcribe the information from the gray boxes on pages 1-4 onto this page. See dictionary on how to rate this section.

A	Selection Bias	Strong=1	Moderate=2	Weak=3
B	Study Design	Strong=1	Moderate=2	Weak=3
C	Confounders	Strong=1	Moderate=2	Weak=3
D	Blinding	Strong=1	Moderate=2	Weak=3
E	Data Collection Method	Strong=1	Moderate=2	Weak=3
F	Withdrawals and dropout	Strong=1	Moderate=2	Weak=3

APPENDIX B: Ethics This study

From: ERGO [ergo@soton.ac.uk]
Sent: 18 March 2017 11:56
To: Maher H.
Subject: Your Ethics Amendment (Ethics ID:25804) has been reviewed and approved

Submission Number 25804:

This email is to confirm that the amendment request to your ethics form (Secondary Data Analysis: Assessing Increased Emotional Expressivity as one of the Proposed Mechanisms of Change of Radically-open Dialectical Behavioural Therapy (RO-DBT). (Amendment 1)) has been approved by the Ethics Committee.

Please note that you cannot begin your research before you have had positive approval from the University of Southampton Research Governance Office (RGO) and Insurance Services. You should receive this via email within two working weeks. If there is a delay please email rgoinfo@soton.ac.uk.

Comments

None

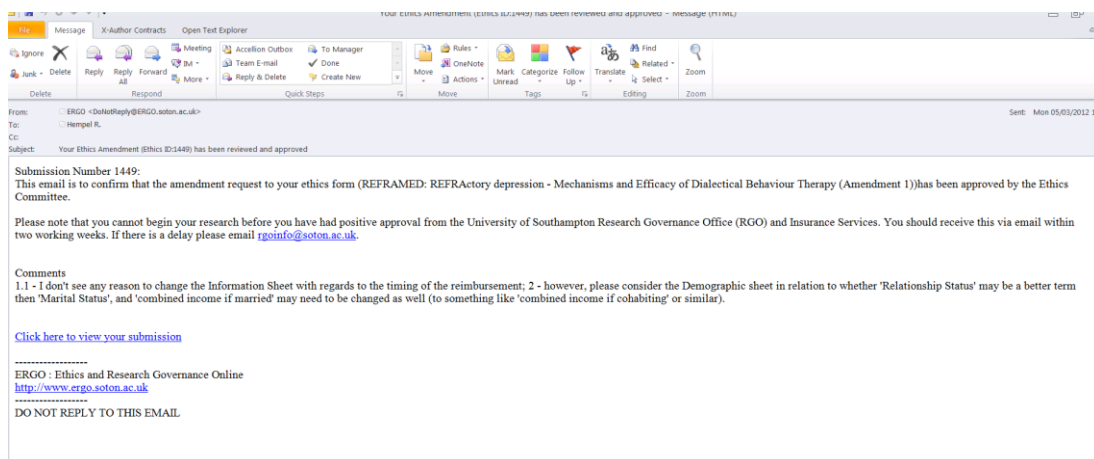
Click here to view your submission<<http://www.ergo.soton.ac.uk>>

Coordinator: Helena Maher

ERGO : Ethics and Research Governance Online
<http://www.ergo.soton.ac.uk>

DO NOT REPLY TO THIS EMAIL

APPENDIX C: ETHICS REFRAMED



11 SC 0146 SL14
 Favourable opinion aft

APPENDIX D: Consent Form for REFRAMED**Participant Consent
Form**

Title of project: REFRAMED:
REFRactory
depression -
Mechanisms and
Efficacy of
Dialectical
Behaviour
Therapy

Trial Registration
Number: ISRCTN85784627

Chief Investigator: Professor
Thomas R.
Lynch, University
of Southampton

Patient ID:

Centre: Dorset / Hampshire / North
Wales

**PART 1: To be completed by
ALL patients before the
baseline assessment****Please initial
the box**

1. I have read and understood the information sheet dated **9 December 2014 (Version 4)** for the above study, and been given a copy to keep ☐
2. I have had the opportunity to consider the information, and ask any questions. I have had satisfactory answers to all of my questions ☐
3. I have received enough information about the study ☐
4. I understand that I may not be eligible to take part in the study ☐
5. I understand that details of my participation will be stored anonymously on file and may be used in the final analysis of data ☐
6. I agree to complete the screening interview and questionnaires ☐
7. I give my permission for this interview to be audio-recorded for research purposes. ☐

APPENDIX E: PHQ-9

PHQ-9: Nine Symptom Checklist*

Name _____

Date _____

Over the last 2 weeks, how often have you been bothered by any of the following problems?

	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things.....	0	1	2	3
2. Feeling down, depressed, or hopeless.....	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much.....	0	1	2	3
4. Feeling tired or having little energy.....	0	1	2	3
5. Poor appetite or overeating.....	0	1	2	3
6. Feeling bad about yourself — or that you are a failure or have let yourself or your family down.....	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television.....	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual.....	0	1	2	3
9. Thoughts that you would be better off dead or of hurting yourself in some way.....	0	1	2	3

(For office coding: Total Score _____ = ____ + ____ + ____)

If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

**Not difficult
at all**

☐

**Somewhat
difficult**

☐

**Very
difficult**

☐

**Extremely
difficult**

☐

The PHQ was developed by Drs. Robert L. Spitzer, Janet B.W. Williams, Kurt Kroenke and colleagues. Reproduced with permission of Dr. Spitzer for use in clinical practice. Copyright held by Pfizer Inc, but may be photocopied ad libitum.

Physician assessment of score needs to consider number of positive responses, severity, context, and how disabling the symptoms are. General guidance is: <5 – no depression; 5-9: mild depression; 10-14: mild to moderate; 15-19: mod-severe; >20: severe. You can generally follow the mild depression or refer for counseling and if mod-severe start pharmacotherapy with the goal of remission. This tool can assist initial diagnosis and follow effectiveness of treatment to remission. A combination of pharmacotherapy and cognitive behavior therapy is generally more effective than either alone for moderate to severe depression. As with any screen, it is an assist to clinical judgment, but does not replace it :>)

APPENDIX F: AEQ

Ambivalence Over Emotional Expressiveness (AEQ)

King & Emmons (1990)

Directions: Please rate your answers on the scale below. A 1 means **never** and a 5 means **very often**. Answer each item with a view of its whole meaning. Each item typically consists of 2 thoughts, please give the item a high rating only if BOTH thoughts on the item apply to you. Please answer all questions.

	NEVER	RARELY	SOMETIMES	OFTEN	VERY OFTEN
1. I want to express my emotions honestly but I am afraid that it may cause me embarrassment or hurt.	1	2	3	4	5
2. I try to control my jealousy concerning my spouse/partner even though I want to let them know I'm hurting.	1	2	3	4	5
3. I make an effort to control my temper at all times even though I'd like to act on these feelings at times.	1	2	3	4	5
4. I try to avoid sulking even when I feel like it.	1	2	3	4	5
5. When I am really proud of something I accomplish I want to tell someone, but I fear I will be thought of as conceited.	1	2	3	4	5
6. I would like to express my affection more physically but am afraid others will get the wrong impression.	1	2	3	4	5
7. I try not to worry others, even though sometimes they should know the truth.	1	2	3	4	5

8. Often I'd like to show others how I feel, but something seems to be holding me back.	1	2	3	4	5
9. I strive to keep a smile on my face in order to convince others I am happier than I really am.	1	2	3	4	5
	NEVER	RARELY	SOMETIMES	OFTEN	VERY OFTEN
10. I try to keep my deepest fears and feelings hidden; but at times I'd like to open up to others.	1	2	3	4	5
11. I'd like to talk about my problems with others, but at times I just can't	1	2	3	4	5
12. When someone bothers me, I try to appear indifferent even though I'd like to tell them how I feel.	1	2	3	4	5
13. I try to refrain from getting angry at my relatives even though I want to at times.	1	2	3	4	5
14. I try to show people I love them, although at times I am afraid that it may make me appear weak or too sensitive.	1	2	3	4	5
15. I try to apologize when I have done something wrong but I worry that I will be perceived as incompetent.	1	2	3	4	5
16. I think about acting when I am angry but I try not to.	1	2	3	4	5
17. Often I find that I am not able to tell others how much they really mean to me.	1	2	3	4	5
18. I want to tell someone when I love them, but it is difficult to find the right words.	1	2	3	4	5

19. I would like to express my disappointment when things don't go as well as planned, but I don't want to appear vulnerable.	1	2	3	4	5
20. I can recall a time when I wish that I had told someone how much I really cared about them.	1	2	3	4	5
	NEVER	RARELY	SOMETIMES	OFTEN	VERY OFTEN
21. I try to hide my negative feelings around others, even though I am not being fair to those close to me.	1	2	3	4	5
22. I would like to be more spontaneous in my emotional reactions but I just can't seem to do it.	1	2	3	4	5
23. I try to suppress my anger, but I would like other people to know how I feel.	1	2	3	4	5
24. It is hard to find the right words to indicate to others what I am really feeling.	1	2	3	4	5
25. I worry that if I express negative emotions such as fear and anger, other people will not approve of me.	1	2	3	4	5
26. I feel guilty after I have expressed anger to someone.	1	2	3	4	5
27. I often cannot bring myself to express what I am really feeling.	1	2	3	4	5
28. After I express anger at someone, it bothers me for a long time.	1	2	3	4	5

APPENDIX G: Non-verbal Behavioural Coding Scheme (adapted by Greville-Harris et al., 2016).

PARTICIPANT CODE: _____

TIME:

Give one rating for each 1-2 minute extract on the following scales:

Facial Expressions

Not smiling at all

Smiling a lot

1 2 3 4 5

Not laughing at all

Laughing a lot

1 2 3 4 5

Not frowning at all

Frowning a lot

1 2 3 4 5

Eye Contact

No Eye Contact at all

Lots of eye contact

1 2 3 4 5

Fidgeting

No fidgeting at all

Fidgeting a lot

1	2	3	4	5
---	---	---	---	---

Head MovementHead straight ahead
experimenter

Head towards

1	2	3	4	5
---	---	---	---	---

Head straight ahead

Head away from experimenter

1	2	3	4	5
---	---	---	---	---

Head upright

Head looking down towards the floor

1	2	3	4	5
---	---	---	---	---

APPENDIX H: ‘Maladaptive Social Signalling Scale’ Adapted from the Non-verbal Behavioural Coding Scheme (Greville-Harris et al., 2016) to tap into OC behaviours (Excessive prosocial signalling/absence of prosocial signalling).

PARTICIPANT CODE: _____

TIME: _____

Give one rating for each 20 minute extract on the following scales:

Facial Expressions

Question 1:

Smiling inappropriately smiling at all		Smiling appropriately		Flat face/Not
1	2	3	4	5

Question 2:

Laughing constantly laughter		Joining in/laughing appropriately		Not joining in
1	2	3	4	5

Question 3:

Flat/no smiling frozen/polite smiles		Smiling appropriately		showing teeth /disingenuous/or frozen overly polite smiles
1	2	3	4	5

Question 4:

Not frowning/flat face	Normal use of frowning	Mouth turned down/frown/ furrowed eye brows		
1	2	3	4	5

Question 5:

Not breaking eye contact		Appropriate eye contact	Avoiding Eye Contact	
1	2	3	4	5

Question 6:

Fixated/intense stare/rigid		Not lowering eyelids	Frequently lowering eyelids	
1	2	3	4	5

Question 7:

Sitting stiff/motionless		No fidgeting	Fidgeting a lot	
1	2	3	4	5

Question 8:

Upright/unnaturally stiff posture Normal posture Shrunk/slackened posture

1 2 3 4 5

Question 9:

Leaning in excessively Normal distance to therapist Withdrawn, closed off

1 2 3 4 5

Question 10:

No nodding at all Normal use of head nodding Excessive head nodding

1 2 3 4 5

Question 11:

Dramatic display of emotion Appropriate display of emotions Flat/Masking emotions

1 2 3 4 5

Question 12:

Excessively agreeing Responsive/engaging in therapy Unresponsive/unengaging

1 2 3 4 5

Question 13:

Overly dramatic gestures Normal hand movements/gestures Not moving hands

1 2 3 4 5

Question 14:

Raising eyebrows excessively Normal eyebrow flashes Absence of eyebrow-
flashes

1 2 3 4 5

Question 15:

Monotone voice/tone Voice/tone congruent with emotion Exaggerated/unnatural .
Pitch/tone/intonation

1 2 3 4 5

**‘Maladaptive Social Signalling Scale: Non-verbal and Verbal behaviour
descriptions for the Scale & Scoring:**

Note: Check frequency of a particular behaviour, if the behaviour is unnatural and occurs 1-2 times during the session (e.g., overly polite, frozen, disingenuous smile) then score 1, if it happens more than twice and occurs multiple times then behaviour would warrant a score of 2. However, if the behaviour is normal and appropriate, then score 0.

Question 1: Smiling; this item is looking at the frequency of the behaviour (i.e. smiling)

1. Smiling inappropriately, not in line with conversation or emotion at the time:
Score=2
2. Score=1
3. Smiling appropriately, in line with the conversation and emotional state:
Score 0
4. Score=1
5. Not smiling at all, flat face. This item is looking at the frequency of the behaviour (i.e. smiling): Score=2

Question 2: Laughing

1. Constantly laughing, even when it is inappropriate to do so: Score=2
2. Score=1
3. Joining in with laughter appropriately: Score=0

4. Score=1

5. Not laughing at all, not joining in with laughter: Score=2

Note: Is there any opportunity to join in with laughter/smiling? Does the therapist smile/laugh?

Question 3: Smiling; this item is looking at the quality of the behaviour (i.e. smiling), (how natural does it feel?).

1. Flat face, no smiling at all or frozen/polite smiles. Smiling in despair; smile isn't sincere, lacking candour: Score=2

2. Score=1 (shy/polite/timid smile)

3. Normal and appropriate smiling in line with emotion, situation and conversation; joining in with laughter. Score=0

4. Score=1

5. Showing teeth; stiff; smiling (showing teeth) even when talking about something sad or difficult. Displaying emotions that are incongruent with the emotion, situation or conversation; frozen overly polite smiles. Score=2

Question 4: Frowning

1. Not frowning at all, even when expected to do so, for instance; when upset, confused, not agreeing, when displeased or disapproving. Face is very emotionless and flat. Score=2

2. Score=1

3. Normal use of frowning, that is, within context: Score=0

4. Score=1

5. Mouth turned downwards as a frown and eyebrows furrowed all of the time:
Score=2

Question 5: Eye Contact/gaze

1. Staring; Not breaking eye contact; holding gaze for too long (uncomfortable for the other person). Score=2
2. Score=1
3. Appropriate eye contact, occasionally looking away to break eye contact “normal”. Score=0
4. Score=1
5. Avoiding eye contact “looking away”. Head straight ahead or looking through/over/up above or to the side of the therapist, disengaged; avoiding eye contact by looking down at floor; staring at floor; “don’t hurt me”. Unusual eye gaze/flickering back and forth: Score=2

Question 6: Eye contact/Eye lids

1. Fixated stare; rigid and intense stare. Score=2
2. Score=1
3. Not lowering eyelids or casting eyes downwards. Normal appropriate eye contact and gaze in conversation. Score=0
4. Score=1
5. Frequently lowering eyelids or casting eyes downwards; covering of face or hiding face/eyes e.g., behind hands, hair, hoodie/hat (‘don’t hurt me’). Score=2

Question 7: Fidgeting

1. Sitting stiff; Motionless; tense, hands clamped between legs. Score=2
2. Score=1
3. No fidgeting at all. Occasional hand/feet/leg movements in conversation.
Occasional shifting of position. Score=0
4. Score=1
5. Make small movements with hands a feet; wriggle; squirm; twitch; shuffle.
Score=2

Question 8: Posture

1. Upright; unnaturally stiff and upright; shoulders pulled back excessively.
Score=2
2. Score=1
3. Normal posture. Score=0
4. Score=1
5. Shrunk/slackened posture; shoulders hunched forward. Score=2

Question 9: Distance to therapist

1. Excessively leaning in, 'in your face', with the head/body towards therapist.
Leaning in towards therapist. No sense of personal space. Score=2
2. Score=1
3. Normal distance to therapist, respecting the 'personal space'. Head towards therapist/head upright; looking at therapist; normal range of head movements, not excessively fixed or fixated. Score=0

4. Score=1

5. Withdrawn, leaning back excessively, Closed off, arms crossed and looking away. Score=2.

Question 10: Head nodding

1. No head nodding or shaking of head at all, not even in agreement or disagreement of conversation. Score=2

2. Score=1

3. Normal use of head nodding. Score=0

4. Score=1

5. Excessive head nodding/shaking of head; overly attentive, flattering behaviour. Score=2

Note: Keep in mind that if therapist is for instance teaching patient or doing Psychoeducation, it is natural for the patient to nod in agreement. Use your clinical judgement to see if it is excessive or lacking in frequency.

Question 11: Display of emotion

1. Dramatic show or display of emotions/feelings; excessive/unnatural or unpredictable display of emotions. Score=2

2. Score=1

3. Normal and appropriate display of emotion; Genuine expressions of emotions, feels natural and anger/crying etc. may occur in a therapeutic setting. Score=0

4. Score=1

5. Frequent masking of emotions; not reacting in an expected or natural way to difficult conversations/situations; not revealing any emotions; flat, deadpanned expression and face. Masking emotions with excessive humour: Score=2

Question 12: Engaging in therapy

1. Excessively nodding/agreeing with therapist (overly agreeable); repeating back; overly attentive; pleasing therapist. Score=2

2. Score=1

3. Engaging appropriately, answering questions, being attentive and reciprocal. Score=0

4. Score=1

5. Frequently unresponsive/unengaging; Flat/tense face; smirk; looking bored (hand on face); looking away; shrugging shoulders; one word responses; avoiding questions and answering a question with a question. Sighing constantly; interrupting and no 'willingness' to listen or hear what therapist has to say ; deep annoyed sighs; rolling eyes; being defensive (feeling judged); on the edge. Score=2

Question 13: Gestures

1. Overly dramatic gestures/hand movements; over the top. Score=2

2. Score=1

3. Normal hand movements/gestures. Score=0

4. Score=1

5. Closed-handed; not moving hands/arms at all; hands clamped between legs.

Score=2

Question 14: Eyebrow Flashes/Wags

1. Raising eyebrows excessively; excessive eyebrow movements. Score=2
2. Score=1
3. Eyebrow flashes in conversations; normal eyebrow movements. Score=0
4. Score=1
5. Absence of eyebrow flashes; flat non expressive face. Score=2

Question 15: Voice

1. Speaks in a monotone voice/tone and/or incongruent of conversation and emotion. Regardless of topic there will be very little change in the tone/intonation/voice: Score=2
2. Score=1
3. Voice/tone/intonation congruent with emotion and topic of conversation:
Score 0
4. Score=1
5. Exaggerated high/low pitch, unnaturally animated, odd/unusual or unnatural tone/intonation, regardless of subject and emotion. May appear disingenuous.

Appendix I: Scatterplots to depict linear relationship between the different variables.

Hypothesis 2: Maladaptive social signalling behaviour will be positively correlated with depression scores on the PHQ-9 and emotional expression on the AEQ.

