Examining cultural dimensions and depression in Iran

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Thesis declaration form

I confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

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Overview

This thesis explores the relationship between depression and cultural orientation in Iran. This overview provides a summary of all three parts of the first volume of this thesis: a literature review, an empirical paper and a critical appraisal. The literature review examined the relationship between culture and emotion in the context of depression. This was important given the many overlapping psychological and emotional processes being implicated in the current models of depression. Results from the review revealed cultural differences in the conceptualisation of depression, as well as cultural variability in the perception, experience and regulation of emotion. This suggested that perceptions and experiences of emotion are shaped through the interplay of biologically innate processes, as well as the reinforcement of appraisals and belief systems consistent with cultural contexts.

However, challenges in cross-cultural psychology remain in the replication and validation of existing findings, which may account for the cultural variability. The empirical paper thus explored cultural orientation and depression in Iran. Findings validated a range of cultural measures in line with calls in the literature to provide replicability. In addition, a data-driven approach was used to derive meaningful latent structures across cultural measures that, importantly, provided a unique examination of the relationship between culture and depression. Results provide compelling evidence suggesting multi-dimensionality in Iran, necessitating a reconsideration of previous cultural conceptualisations. Finally, the Critical Appraisal considers the whole research process, providing further background to the implementation of this project and personal reflections on developing as a scientist-practitioner.

Clinical Impact Statement

In this thesis, the relationship between culture and emotion processes are explored in a clinical sample of depressed individuals compared with healthy controls in Iran. Cultural conceptualisations of Iran have not been thoroughly explored of recent – despite significant societal, political and subsequently, cultural shifts. This may impact on the generalizability, as well as replicability of the limited existing research findings within the Iranian context (P. Greenfield, 1999; P. M. Greenfield, 2017). As such, the present findings provide an up-to-date characterisation of Iran's cultural dimensions, which will supply a benchmark for further research. In addition, the psychometric evaluation and validation of underlying cultural constructs of cultural measurement tools can be used in cross-cultural research both within and beyond the Iranian context. Evaluating the current implementation of cultural measures in the literature and outlining challenges in cross-cultural psychology would contribute to the methodology employed when undertaking cross-cultural research in the future.

Moreover, the recruitment of diverse samples can be challenging in any context (Knight et al., 2009), but this challenge is heightened for clinical populations, let alone in environments where mental health continues to be faced with significant stigma (Ciftci, Jones, & Corrigan, 2012; Hughes-Morley, Young, Waheed, Small, & Bower, 2015; Rüsch, Angermeyer, & Corrigan, 2005). In Iran, there was no national data on the prevalence of mental disorders until 2004. In this thesis, the clinical samples were identified through both diagnostic clinical interviews and self-report. Our findings regarding the relationship between cultural orientation and depression are important, as they allow researchers and clinicians to develop and implement culturally-sensitive interventions targeting

mental health. For example, considering treatment approaches for depression, incorporating our understanding of cultural self-construal and communal self-esteem will have wide-reaching implications for treatment success both in Iran and beyond.

To achieve this, the knowledge generated from this thesis will be disseminated through the publication in scientific journals. Part of this work has already been submitted for academic publication with future publications targeted, focusing more on the cultural measures. However, findings can also be incorporated outside of academia, for example, in the training of mental health professionals working within various cultural contexts. Incorporating findings in the teaching methods aimed at training culturally-competent clinicians builds on the existing competency frameworks for the delivery of effective psychological intervention, championed by UCL.

In sum, results presented in this work specifically contribute to the knowledge base and expertise regarding mental health disorders and cultural orientation in Iran. However, the findings presented here also validate the use of cultural measures and propose a framework for understanding cultural orientation in the context of mental health more generally. It is expected that this would provide novel avenues for future scholarship, both in the context of furthering our understanding of depression as well as in other research areas exhibiting cultural variability.

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Part One: Literature Review

A literature review of cross-cultural differences in emotional processing in depression

Abstract

Aim

This review aimed to examine the relationship between culture and emotion processing in the context of depression. This was important given the many overlapping psychological and emotional processes implicated in the current models of depression and cultural frameworks.

Method

A conceptual literature review examined to what extent emotional disturbances in depression may be culturally-determined. Relevant articles were identified by systematic literature searches of the databases PsychInfo, PubMed, and SCOPUS, followed by a hand-search. This resulted in 1450 search results overall, of which 18 studies met inclusion criteria and were included in this review.

Results

Findings revealed considerable cultural differences in the conceptualisation and prevalence of depression, as well as cultural variability in the perception, experience and regulation of emotion. Collectivistic cultural orientation and/or greater interdependent self-construal was associated with greater levels of social support, which acted both a protective as well as a risk factor for depression.

Conclusions

This review found that emotional processes in depression showed considerable cultural variability. However, more research is required to address adequately the methodological challenges evident in cross-cultural psychology. Implications for further research on the relationship between emotional disturbances in depression and cultural orientation were discussed.

Major Depressive Disorder (MDD)

Major Depressive Disorder (MDD) is an affective disorder, characterised by persistent lowered mood, loss of pleasure in all or almost all activities, and lack of emotional reactivity to pleasurable stimuli; these emotional disturbances are accompanied by cognitive distortions, including negative thoughts about the world, self and future (Beck, 1987); behavioural symptoms, including social withdrawal and inactivity, psychomotor retardation or agitation; and physical symptoms, including disruptions in sleep patterns, significant weight loss or gain, and feelings of lethargy and tiredness. As such, MDD severely impacts on an individual's mood, thoughts and behaviours and is associated with an array of social, occupational and functional impairments (APA, 2013).

With an early onset in childhood or early adolescence (Kessler et al., 2005) and estimated lifetime prevalence rates reaching 20.8% (Ferrari et al., 2013), MDD is also characterised by heterogeneity of symptoms, leading to the emergence of multiple depressive subtypes (Dowrick & Frances, 2013). However, these occur at much lower prevalence rates compared to the majority of depression. However, epidemiological studies have noted considerable cultural differences in prevalence rates, varying 15-fold across different sites: from 1.6 % in Nagasaki, Japan; 5.3 % in Berlin, Germany; 6.4 % in Seattle, USA, to 17.1 % in Manchester, UK and 26.3 % in Santiago, Chile (Simon, Goldberg, Von Korff, & Üstün, 2002). There are difficulties in fully understanding the cultural determinants of discrepancies in prevalence rates in depression, despite these also being present in other disorders, such as Post-traumatic Stress Disorder (PTSD) (Dückers, Alisic, & Brewin, 2016). In seeking to understand this cultural variability, researchers frequently point towards the under-recognition or misidentification of psychological distress or

emotional disturbances across different cultural contexts (Kirmayer, 2001). As such, researchers strive to better understand depression by incorporating our understanding of cultural differences in the perception, experience and regulation of emotion (Mesquita & Walker, 2003).

A review examining the East-West divide in prevalence rates provided an initial compelling account of cultural differences in emotion (De Vaus, Hornsey, Kuppens, & Bastian, 2018). The authors argued that more holistic, Eastern cultures are less vulnerable to developing depression relative to Western cultures as a result of their culturally-bound thinking patterns. Eastern cultures are better able to cope with negative emotion by accepting that positive and negative emotions can co-occur, are subject to change and context-specific. Importantly, the authors ruled out methodological concerns that may account for cultural differences, including equivalence of diagnostic tools, the use of culturally-competent interviewers and structured clinical interviews and the use of self-report measures to rule out response-biases due to stigma and non-disclosure of mental health difficulties. The review suggested that these cognitive thinking patterns arose from cognitive biases emerging at the cultural level to differentially impact on the perception, experience and regulation of emotion.

Cognition and Emotion in Depression

The notion put forward by the review above differs from traditional approaches conceptualising emotional disturbances in depression as the result of altered cognitive processes, independent of culture (Roiser & Sahakian, 2013). These depression-specific differences in cognition include preferential attention towards negative information or 'negative response biases'. Negative response biases are

illustrated, for instance, in lower accuracy rates for correct identification and recognition of 'happy' faces (Surguladze et al., 2004), compared to the relative ease of recognising sad or negative facial expressions (Joormann & Gotlib, 2006). While this literature has typically relied on affect-laden facial expressions, these biases have been replicated in the domain of affective body movements (Atkinson, Dittrich, Gemmell, & Young, 2004; Troje, Westhoff, Westhoff, Lavrov, & Lavrov, 2005). It was found that depressed individuals rated social interactions, depicted through moving point-light displays, as more negative overall and negative depictions specifically as more emotionally intense, relative to controls (Kaletsch et al., 2014).

In addition, depression is noted for its reduced reactivity to positively rewarding information or pleasurable activities (McFarland & Klein, 2009). This is argued to emerge as a result of reduced reward sensitivity, as well as encoding difficulties and positive reinforcement learning (Dillon et al., 2015; Huys, Pizzagalli, Bogdan, & Dayan, 2013; Pizzagalli, 2014). However, this dual process of a heightened response to negative information and reduced reactivity to positively valenced information has been challenged in the emotion context-insensitivity hypothesis (Bylsma, Morris, & Rottenberg, 2008). Here, the authors suggested that depression is distinguished by deficits in emotional reactivity *independent* of valence, with overall lowered reactivity in response to both negative and positive information in depression compared to healthy controls (Bylsma et al., 2008; Rottenberg, Gross, & Gotlib, 2005). This lowered reactivity may be mirrored in depressed individual's reduced awareness of other's emotions and ability to empathise (Schreiter, Pijnenborg, & Aan Het Rot, 2013), associated with greater symptom severity (Cusi, MacQueen, Spreng, & McKinnon, 2011).

In contrast, understanding one's personal emotional experience in depression is thought to remain intact (Donges et al., 2005). In fact, individuals with depression exhibit heightened self-focused orientation towards internally generated or self-relevant information, albeit associated with greater negative affect and negative appraisal (Beck & Clark, 1997; Clark, 2001; Mor & Winquist, 2002; Spurr & Stopa, 2002). Perhaps unsurprisingly then, depression is strongly associated with difficulties in emotion regulation and the ability to engage with adaptive goal-directed regulatory behaviour within a social context (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Bardeen, Fergus, & Orcutt, 2012; Gratz & Roemer, 2004; Gratz, Rosenthal, Tull, Lejuez, & Gunderson, 2006). Goal-directed regulatory behaviour, e.g. down-regulating anger to avoid conflict in the short-term, can be used to pursue harmonious relationships in the long-term. To achieve this, emotion regulation strategies include cognitively reappraising a particular meaning assigned to an emotional context; actively disengaging or shifting attention away from the negative stimuli, or 'putting feelings into words', thereby reducing distress (Gross, 1998; Moyal, Henik, & Anholt, 2014). As such, emotion regulation encompasses both voluntary and automatic processes, involved in regulating various aspects of an expressed emotional response, including the occurrence, magnitude, and duration (Gross, 1998; Sheppes, Suri, & Gross, 2015).

In sum, difficulties in the perception, experience and regulation of emotion in depression emphasise the importance in adaptively responding to one's environment, with cognitive biases known to persist beyond recovery (LeMoult, Joormann, Sherdell, Wright, & Gotlib, 2010). This contributes to a profile of impaired emotion processing in depression (Bylsma, Morris, & Rottenberg, 2008)

and appears to be correlated with depression severity (Gollan, McCloskey, Hoxha, & Coccaro, 2010).

Social Functioning in Depression

A further hallmark symptom of MDD is a persistent deficit in social functioning: an inability to fulfil a variety of roles across diverse, complex and dynamic social contexts (Hirschfeld et al., 2000). These difficulties are shared across several other psychiatric and developmental disorders, for which social competency has long been conceptualised as a key diagnostic criterion, such as Autism Spectrum Disorder (ASD), several anxiety disorders, and even Alzheimer's syndrome (Kennedy & Adolphs, 2012). Moreover, risk factors, such as significant adverse life events involving social rejection, loss or failure, and in particular early adverse life stress (Heim & Binder, 2012; Luterek, Harb, Heimberg, & Marx, 2004; Van Harmelen et al., 2014, 2010) are known to precipitate the onset of depressive episodes (Slavich & Irwin, 2014; Slavich, O'Donovan, Epel, & Kemeny, 2010).

Impairments in social cognition in depression include conscious and non-conscious psychological processes directed towards and derived from encounters or interactions with social agents and expressed in social behaviour (C. D. Frith & U. Frith, 2007; U. Frith & C.D. Frith, 2010; Kennedy & Adolphs, 2012). These impairments are thought to be due to individual differences in detecting and responding to social signals. Previously operationalised along a dimension of interpersonal rejection sensitivity, this encompasses either enhanced or diminished sensitivity to the behaviour and emotions of others: difficulty with receiving social feedback, heightened concern about the behaviour and verbal statements of others, and fears of perceived or actual criticism (Boyce & Parker, 1989).

Greater interpersonal rejection sensitivity may result in feelings of inadequacy, inferiority and the misinterpretation of social cues signalling rejection and/or inclusion, correlated with low mood (Gilbert & Allan, 1998). Behaviourally, individuals with high rejection sensitivity tend to socially withdraw in an attempt to avoid actual social exclusion (Slavich & Irwin, 2014). This gradual withdrawal may be especially heightened in those already experiencing social anhedonia, the loss or decreased interest in engaging in social activities, with depressed individuals reportedly experiencing more positive affect and less negative affect in the absence of other people (Kwapil et al., 2009).

The withdrawal, loss or disconnection from social networks, as well as the mere threat of social exclusion, is argued to activate an immune response to adversity in the same way as experiencing actual physical threat or injury, thereby protecting the physical and emotional integrity of an individual (Slavich & Irwin, 2014). In fact, early social deprivation or the severing of existing social bonds are known to affect cognition, memory and development detrimentally and are associated with an increase in general psychopathology and functional impairment (Carlson & Earls, 1997; Van Ast et al., 2014). In contrast, social connectedness is associated with a range of positive emotions, such as the experiences of joy, love, and friendship (Correa-Velez, Gifford, & Barnett, 2010). Finally, social support plays a vital role in the maintenance or rehabilitation of positive psychological well-being following adverse life events (Chao, 2012; Heilemann, Frutos, Lee, & Kury, 2004)

In sum, social rejection, loss or failure represent key risk factors in the development and maintenance of depression (Slavich & Irwin, 2014; Slavich et al., 2010) with impairments in social functioning thought to be underpinned by

lower-order cognitive biases and difficulties in detecting and responding adaptively to social signals as well as higher-order deficits in social cognition in the domain theory of mind, social perception and metacognition (Ladegaard, Roj, Videbech, & Lysaker, 2014; Lee, Hermens, Porter, & Redoblado-Hodge, 2012).

Theories of Depression

Cognitive Models

The cognitive model of depression represents one of the most established models to describe the development and maintenance of depression (Beck, Rush, Shaw and Emery, 1979). This model incorporates our understanding of how individuals see and understand themselves, others and the world or future, conceptualised in the 'cognitive triad' of core beliefs. Core beliefs (e.g. 'being unworthy of love'), encompassing thoughts, cognitions or schemas, are argued to develop in the interplay of early experiences (e.g. 'feeling neglected'), learned dysfunctional beliefs and assumptions (e.g. 'if I don't try harder people will reject me'), and critical or triggering events (e.g. 'a relationship breakdown'). Resultant maladaptive schemas in depressive thinking are captured by the vicious cycle of negative automatic thoughts, feelings and behaviour, which maintains the depressive symptomology.

Cognitive biases in emotional processing, described in the previous section, are thought to play a pivotal role in the maintenance of negative beliefs and maladaptive schemas. According to the model, cognitive distortions as a result of the biases may include arbitrary inference, selective abstraction, catastrophizing, magnification or minimisation, overgeneralization and all-or-nothing thinking (Beck, 1987; Beck, Rush, Shaw, & Emery, 1979). However,

biases in information processing exist in individuals with and without depression and across several domains, including memory and cognition (Walker, Skowronski, & Thompson, 2003). Therefore, these should not be considered pathological per se. Instead, it is worth considering the extent to which one's cultural environment contributes to the development and maintenance of depressive thinking, given the importance of beliefs about others and the world. In fact, depression was once aptly described as an 'illness of power' (Neitzke, 2016), whereby the feeling of powerlessness characteristic of depression was viewed as contingent on the cultural context and social perception (Carta, Coppo, Reda, Hardoy, & Carpiniello, 2001).

Social Theories

There are several competing accounts of how depression has evolved and is maintained within the context of complex social dynamics (Baumeister & Leary, 1995). Central to all theories is the notion that individuals are highly sensitive to how the social world perceives and values them, driven by their fundamental need to belong, and motivated by an evolutionary drive for self-preservation and survival within a hierarchy of needs (Maslow, 1943). Early theories of depression, such as Coyne's interactional model, posited that low mood and depression arise as a consequence of negative interpersonal interactions, in which the likelihood of social rejection and adverse life events increased due to maladaptive social behaviour (Coyne, 1998; Segrin & Dillard, 1992). In a similar vein, the social skills deficit model posited that poor social competency and/or the lack of a supportive social environment contribute to the development and maintenance of

depression (Lewinsohn & Libet, 1972; Libet & Lewinsohn, 1973; Youngren & Lewinsohn, 1980).

In contrast, the social risk (SR) hypothesis of depressed mood (Allen & Badcock, 2003) conceptualises depressed mood as an evolutionarily rooted risk-averse motivational state, which is informed by the social world (e.g. culture), social status or rank and interpersonal experiences. The risk-averse individuals with depressed mood tailor behaviour and cognition to the social context to maintain group membership. However, these social theories of depression and the impact on emotional processing have yet to be explicitly examined within varying cultural contexts. This, despite cultural orientation being known to impact on a range of emotional and cognitive processes, including self-construal, autobiographical memory, attention, appraisal and belief systems, as described below.

Cultural Frameworks

The polysemous term 'culture' first emerged in the domain of agriculture, but quickly ascended to describe patterns of human behaviour, beliefs and concepts (Jahoda, 2012). As such, an early definition of culture describes "patterns, explicit and implicit, of and for behaviour acquired and transmitted by symbols, constituting the distinctive achievement of human groups, including their embodiments in artefacts; the essential core of culture consists of traditional (i.e. historically derived and selected) ideas and especially their attached values." (Kroeber & Kluckhohn, 1952, p. 181).

Hofstede's cultural dimensions theory

In a seminal model of culture, Hofstede described six dimensions of national cultures: power distance, uncertainty avoidance, individualism/collectivism, masculinity/femininity, long/short term orientation, and indulgence/restraint (Hofstede, 1980). Most research that followed this model has tended to classify cultures as either collectivistic or individualistic, supported by the other domains suggested by Hofstede. 'Collectivistic' cultures or societies refer to those with shared meanings and practices that orient an individual towards their respective collective community or 'in-group'. To illustrate, based on Hofstede's model, China is characterised by high power distances, higher levels of masculinity, medium uncertainty avoidance, high long-term orientation and low indulgence. As such, it is argued to be a good example of a collectivistic society (Hofstede, 1980).

In contrast, 'individualistic' cultures emphasise practices, beliefs and meanings unique to the individual and independent of the collective (Cozma, 2011; Kitayama, Mesquita, & Karasawa, 2006; Matsumoto & Hwang, 2012; Triandis & Gelfland, 1998). For example, the United States tends to be viewed as an individualistic society as it scores low on power distance and long-term orientation, but high on individualism, high on uncertainty avoidance and high on indulgence with comparable scores on masculinity. As such, individualism and collectivism provide two cultural frameworks in which behaviour and emotion can be expected to vary.

Self-Construal Theory

Building on Hofstede's work, the self-construal theory emerged, originally posited as a model of 'embarrassability' (Sharkey & Singelis, 1995). Instead of framing individual differences in terms of cultural orientation per se, this theory focussed on the level of the individual itself. This was based on the theoretical concept of self-construal that refers to the thoughts, feelings, and actions as they relate to an individual's self-concept (Singelis, 1994). Interdependent self-construal implies viewing oneself in relationship with others, while independent self-construal encompasses views of oneself as bounded and distinct from others (Kitayama, Markus, & Kurokawa, 2000; Markus & Kitayama, 1991; Sharkey & Singelis, 1995). Individualistic societies would thus comprise of individuals with greater independent self-construal, while collectivistic societies would consist of individuals with more interdependent self-construal.

This seminal work represents the foundation of cross-cultural research investigating the impact of self-construal on various aspects of emotion, cognition and behaviour (see Cross, Hardin, & Gercek-Swing, 2011, for a review). For instance, East Asian individuals with a more interdependent self-construal were found to interpret events using more complex causal attributions implying indirect, distal consequences relative to their more independent counterparts (Maddux & Yuki, 2006). Interdependent self-construal was also shown to impact on one's social judgments, including ratings of similarity and resonance with others (Cross, Morris, & Gore, 2002; Obhi, Hogeveen, & Pascual-Leone, 2011). On the other end of the spectrum, the priming of independent self-construal was associated with increased self-awareness (Sui & Han, 2007), self-enhancement and self-promotion (A. Y. Lee, Aaker, & Gardner, 2000), impulsive consumption tendencies (Zhang

& Shrum, 2009) and a focus on exchange orientation, in which reciprocal exchanges were driven by an expectation of reward or repayment (Bresnahan, Chiu, & Levine, 2004). As a result, differences in self-construal could impact on (social) behaviour by either promoting 'ego-focused' (e.g. anger, pride) or other-focused emotional experiences (e.g. sympathy, shame), thus reinforcing an individual's internal attributes (Markus & Kitayama, 1991).

The Threat to the Conceptual Self (TCS) model explores self-construal in the context of emotional and cognitive processing in the aftermath of trauma (Jobson, 2009). According to this, cultural differences in self-construal can explain the development and maintenance of PTSD, as variation in independent/interdependent self-construal also impacts on processes known to be affected in PTSD. For instance, trauma experiences promote an autonomous goal hierarchy focused on personal safety and survival. As a result, trauma experiences and their psychological sequelae may present a challenge to the self-construal and self-schemas held in collectivistic cultures with predominantly other-focused goal hierarchies (Jobson, 2009). Reconciling the challenges stemming from the interaction of trauma, self-construal and cultural orientation presents a unique opportunity to examine our understanding of these principles in the context of other emotional disturbances such as depression.

Biocultural Model of Emotion

One model addressing the interplay of culture and emotional experience is the biocultural model of emotion (Matsumoto & Hwang, 2012). This model posits that emotions can be understood as unique affective phenomena, of which various types exist and which can be processed at various levels. It distinguishes three domains of emotions: i) instantaneous, innate emotional reactions, ii) subjective experience and iii) emotion meaning. The authors conceptualise the first domain as priming reactions, due to their automatic and instantaneous quality, alongside physiological changes and behaviour. In contrast, subjective experiences of emotion require greater levels of conscious awareness and judgment and are subject to goal-directed appraisals. Finally, emotion meaning includes higher-order construal, including concepts, preferences and beliefs about emotion, which contextualises the emotion and its meaning within the relevant social context.

The first domain of innate emotional processing was based on the long-held view argued that emotion perception should be considered a biologically determined universal trait consistent across cultures. Nummenmaa, Glerean, Hari, & Hietanen (2014) explored this assumption by examining emotion perception in the body, finding distinct somatotopic emotion maps universally identified across West European and East Asian samples. The authors argued that this provides evidence in favour of biologically hard-wired perception of emotion based on the 'universality hypothesis', best exemplified in seminal work by Ekman (1970). Ekman argued that basic emotional states (happy, surprise, fear, disgust, anger, and sad) are communicated cross-culturally through facial expressions. Nummenmaa et al. similarly argued that emotional reactions are hard-wired innate

reactions, resistant to cultural influences. However, Nummenmaa did not fully explore differences in cultural background.

Research re-examining the work by Ekman (1970) showed subtle yet distinct differences between individualist and collectivistic cultures in imagined facial movements and intensity of expression when reconstructing facial expressions using the 'mind's eye' (Jack, Garrod, Yu, Caldara, & Schyns, 2012). These findings provide evidence contrary to the universality principle. Similarly, a meta-analysis examining emotion recognition within and across cultures found that while an in-group advantage exists, this advantage is minimised in the face of cross-cultural exposure (Elfenbein & Ambady, 2002). In other words, cultural differences in the accuracy of emotion recognition were observed particularly when cultures were considered in isolation. While this appears to contradict the 'universality hypothesis', it may also point towards the impact of both biologically and culturally-determined factors impacting on the processing of emotion (Matsumoto & Hwang, 2012). As such, this model provides a framework in which to examine the contribution of culture to the emotional difficulties that characterise MDD.

Challenges in Cross-Cultural Psychology

This framework is important as the scientific field of cultural psychology has increasingly emphasised the need to generalise psychological findings both across time and contexts through replication and validation of existing findings (Sternberg, 2017). This is aimed at avoiding common pitfalls in cross-cultural psychology, most prominently, biases and poor cross-cultural equivalence (He & Van De Vijver, 2012; Van De Vijver & Tanzer, 2004), issues around ecological

validity (Bernal, Bonilla, & Bellido, 1995; Matsumoto & Hwang, 2013) and lack of cultural competency and thus generalisability. Lastly, questions regarding the dimensionality of existing cultural measures further emphasise the difficulty in capturing cultural concepts and constructs (Cozma, 2011).

Equivalence and Bias

Cross-cultural equivalence denotes the equivalence of measurement tools, scores and outcomes when comparing samples from various cultural groups. In contrast, bias captures differences in scores due to nuisance variables impacting on the equivalence of samples at various levels; construct biases at the theoretical level; item biases within the measurement tools; and method biases due to differences in administration or procedure (He & Van de Vijver, 2012; Van De Vijver & Tanzer, 2004). Construct biases may include not taking into account differences in either the conceptualisation of depression across cultural groups, or, e.g. not appreciating the use of somatic symptoms as culturally appropriate idioms of distress in Eastern relative to Western societies (Chentsova-Dutton, Ryder, & Tsai, 2015; Kirmayer, 2001).

As such, language presents a significant barrier to ensuring cross-cultural equivalence, given the importance of ensuring that concepts within an instrument are invariant between the original and translated language (Gjersing, 2010). In fact, the Sapir-Whorf hypothesis, or linguistic relativity hypothesis, goes as far as to argue that the particular language an individual speaks influences how they think about their reality (Gumperz, 1991). While this argument favours the notion of cross-cultural differences as a function of language, more recent evidence

suggested that culture impacts on reasoning *independent* of the testing language (Ji, 2004).

However, where biases do occur, in particular item biases, these are often the result of poor translation or adaptation of measurement tools, which have not undergone the rigorous process of cross-validation through, e.g. back-translation (C.-C. Lee, Li, Arai, & Puntillo, 2009.). Finally, method biases can arise through inconsistencies in procedures or through culturally determined behavioural responses to task- or experimenter-demand. For instance, differences in social desirability or greater self-enhancement in individualistic societies may negatively bias self-reported levels of depression (A. Y. Lee et al., 2000).

Ecological Validity

A further constraint in any experimental research is the use of ecologically valid paradigms (Bem & Lord, 1979; Bronfenbrenner, 1977). Typically, the 'emotion' literature has favoured the presentation of experimentally constrained stimuli to capture relevant psychological processes (Amodio, 2010; Poldrack, 2008). Studies investigating cross-cultural differences have either examined emotions using experimentally constrained emotional stimuli (Ekman, 1970) or investigated emotional constructs embedded within rich sociocultural contexts using experience sampling (De Leersnyder, Boiger, & Mesquita, 2013; McRae, Heller, John, & Gross, 2011; Saint Arnault, Sakamoto, & Moriwaki, 2006). However, both approaches represent a trade-off between the need for experimental control and the drive to preserve the psychological phenomenon of interest (Burgess et al., 2006).

Moving Forward

Several authors have provided further useful suggestions to reduce this trade-off, such as implementing a variety of tasks and stimuli capturing different aspects of the phenomenon of interest (Amodio, 2010; Poldrack, 2008). These include well-established as well as more novel methodological approaches, such as individual experience sampling (Trull & Ebner-Priemer, 2009), in which behaviour, cognition, and emotions are collected, preferably in real-time throughout the day, commonly through electronic devices; in virtual reality environments (Parsons, 2015), in which laboratory measures are married with emotionally engaging background narratives; and through the use of biological motion stimuli to assess e.g. emotion recognition in autism, in the absence of visual cues that contain culturally-sensitive information (Johnson, McKay, & Pollick, 2011; Nackaerts et al., 2012; Shah & Sowden, 2015; Troje, 2012). Finally, the 'consilience approach' aims to increase the validity of results by promoting the use of theory-driven mixed-methods designs using multiple sources of data (Leung & Van De Vijver, 2008).

Drawing on the consilience approach, cross-cultural researchers are also increasingly drawing attention to the fallacy that cross-cultural or 'cross-national' comparisons frequently assume two culturally distinct constructs (Leung & Van De Vijver, 2008). For example, any differences in cross-cultural comparisons have commonly been causally attributed to culture as opposed to, e.g. country-specific explanatory variables, including socio-demographic, economic, geographic factors (Matsumoto & Yoo, 2006). Their remedy suggests incorporating intra-cultural variability in cultural orientation, akin to individual differences in self-

construal, as posited by Markus and Kitayama (1991), to thoroughly examine cultural phenomena.

This is especially important considering the application of Western diagnostic frameworks to non-Western samples. For example, Thakker and Ward (1998) argue that the DSM- IV, the diagnostic manual for establishing the presence of mental disorders, is inherently flawed due to its underlying assumption of universality based on Western-delineated mental disorders. Despite recent efforts to incorporate more culturally sensitive measures, formulations, and nosology, this remains problematic given the possible cross-cultural differences in manifestations of emotional difficulties and/or distress. This emphasises the importance of incorporating cultural variability in the examination of emotion and depression requires a multi-level approach, which addresses potential reporting biases and issues around equivalence, validity and dimensionality.

Research Question

So far, the impact of emotional disturbances in depression has been outlined, and theoretical accounts of how these difficulties are developed and maintained have been described. In addition, cultural frameworks that seek to explain how culture impacts on the perception, experience, and regulation of emotion have been presented. Next, evidence will be discussed to show that emotional disturbances in depression may be culturally-determined. To this end, a conceptual review was conducted. First, the search strategy and results of the review will be presented. This will be followed by the presentation of the studies, an examination of the merits and potential concerns and lastly, findings will be contextualised within the different cultural frameworks as presented above.

Search strategy

To fully examine the literature on the relationship between culture, depression and emotion, relevant journal articles were identified by parallel systematic literature searches of three databases (PsychInfo, PubMed, SCOPUS). The last search of all databases was completed in May 2019, resulting in 1450 (PsychInfo: 770; Scopus: 406, PubMed: 229) search results. In addition, to include further studies not identified by the previous search, reference lists of relevant articles were searched using a snowballing technique, and relevant journals were individually searched. The search terms used for title, abstract and keywords were terms relating to culture, depression and emotion. See below for an example search query in SCOPUS.

(TITLE-ABS-KEY (cult OR "cultural variability" OR "cultural orientation") AND TITLE-ABS-KEY (cross-cultur* OR "cross-cultural differences" OR "cross-cultural comparison") AND TITLE-ABS-KEY (depression OR depress* OR "depressive symptom") AND TITLE-ABS-KEY (emotion* OR "emotion processing" OR "emotion meaning" OR "emotion experience")) AND (LIMIT-TO (LANGUAGE , "English"))*

Across the electronic searches, key terms around culture, depression and emotion were then further searched in the title and abstract in order to ensure that this was the main area of focus of the study. Titles and abstracts which did not contain the key terms, were excluded. Full texts of remaining studies were then screened for eligibility. Across all searches, the population was restricted to adults (>18 yrs.) and language was restricted to English, as literature published in foreign languages was beyond the scope of the present review. There were no restrictions on sample size or year limitations.

Overview of Studies

Overall, 18 studies were reviewed, published between 2004 and 2019. See Appendix A for details on the design, measures used to assess depression and cultural orientation, and participant characteristics. All studies used a cross-sectional and cross-cultural comparison design. Studies reviewed used adult (ages 18 and above) mixed-gender samples, except for two women-only studies (Campos et al., 2008; Saint Arnault et al., 2006). The average age across samples was 29.17 years (SD = 7.82 years). There was huge variability concerning sample size, ranging from N = 42 (Nezlek, Kafetsios, & Smith, 2008) to N = 10896 (Hsieh, 2015).

Measuring Depressive Symptoms

The majority of studies employed affective self-report measures (n = 12) to identify individuals exhibiting elevated depressive symptoms. The most frequently (n = 6) used self-report measure was the Beck Depression Inventory (BDI; Beck, Rush, Shaw, & Emery, 1979), a well-validated tool for assessing depression symptoms (Abe, 2004; Beshai et al., 2016; Chan & Mendoza-Denton, 2008; Chentsova-Dutton et al., 2007; Ford et al., 2015; Potthoff et al., 2016). Other studies implemented a range of other affective measures, with varying levels of cross-cultural equivalence. These included the Patient Health Questionnaire (PHQ-9) (Dejonckheere et al., 2017; Potthoff et al., 2016), Symptom Checklist-90-Revised (SCL-90) (Agüera et al., 2017; Potthoff et al., 2016); Brief Symptom Inventory (BSI) (Potthoff et al., 2016; Shacham et al., 2010), and Depression Anxiety and Stress Scale (DASS; Page, Hooke, & Morrison, 2007) (Zhu et al., 2016). There was limited information on how potential response biases or method

biases were addressed. As such, only three studies used diagnostic clinical interviews in addition to self-report measures. These studies also included a between-group design to specifically identify and compare depressed and non-depressed samples cross-culturally (Beshai et al., 2016; Chentsova-Dutton, Choi, et al., 2015; Chentsova-Dutton et al., 2007).

Measuring Cultural Orientation

The majority of studies assumed cultural belonging based on ethnicity or country of origin alone. Only eight out of the 18 studies used cultural measures to explicitly ensure that participants were oriented to the cultural contexts under which they had been grouped (Chan & Mendoza-Denton, 2008; Chentsova-Dutton et al., 2007; Chentsova-Dutton, Ryder, et al., 2015; Heu et al., 2019; Lam & Zane, 2004; Nezlek et al., 2008; Parker, Chan, Tully, & Eisenbruch, 2005; Zhu et al., 2016). When used, the most frequent cultural measure (n = 4) was the Self-Construal Scale (SCS; Singelis, 1994), which included adaptations and/or only one of the two subscales of the SCS. The SCS is a 30-item scale to measure an individual's independent and interdependent self-construal (see section on Cultural Frameworks).

Cross-Cultural Comparisons

The mean number of cultures compared was 2.6 (SD = 1.3), with the largest study pooling independent study data from six different European countries (Potthoff et al., 2016). As such, the majority of cross-cultural comparisons took place within Western countries, mainly in the U.S.A. (Abe, 2004; Ford et al., 2015; Lam & Zane, 2004; Saint Arnault et al., 2006; Shacham et al., 2010; Zhu et al., 2016). The

most frequent comparison to the U.S.A consisted of either an Asian American sample or Chinese samples (Agüera et al., 2017; Hsieh, 2015; Parker et al., 2005; Zhu et al., 2016). Across comparisons, the majority of studies drew on middle-class, mixed-gender undergraduate student populations. Notably, most studies did not report information beyond ethnicity or cultural background, such as the socioeconomic status of participants. This is opposed to recommendations derived from the consilience approach to include such information to rule out country-specific explanatory variables, which may account for any observed cultural differences.

Results of Literature Search

The following section reviews the evidence gathered across the studies regarding the relationship between depression and culture.

Emotional Reactivity and Regulation

The first level of the biocultural model (page 25) argued that instantaneous, innate emotional reactions are culturally universal, biologically determined traits. However, the following studies provide evidence to the contrary.

Potthoff et al. (2016), pooling data from six independent studies, compared six European general population samples with their respect to their emotion regulation preferences. Evidence strongly suggested that the use of specific maladaptive strategies, such as suppression, were predictive of depression independent of culture. While this may appear consistent with the biocultural model, the study also found a small North-South divide in the use of these strategies. Specifically, Southern Europeans employed more maladaptive

strategies, associated with greater depressive symptoms. This finding suggested that the assumption of universal emotions might need reconsideration in light of these nuanced cultural differences in emotional regulation across the continent. It may also be that this cultural difference was underestimated because of the cultural assimilation of the various European regions, resulting in greater overlapping or shared social values and less cultural distinctions. Also, the study pooled data from independent studies, involving the use of different depression measures. This makes it difficult to ascertain the true equivalence of measurement, despite findings being strengthened by the use of cross-validation analyses.

In contrast, Lam & Zane (2004) explored the use of coping strategies in Asian American and European American samples. Drawing on mediation analyses, the authors found that self-construal strongly mediated the relationship between culture and coping strategy. This echoes the findings discussed above and extends these by explicitly using measures to assess independent/interdependent orientation. In addition, the use of European American and Asian samples eliminated the possibility of cultural overlap given the geographic and societal differences between these two groups.

Chentsova-Dutton et al. (2007) compared emotional reactions in depressed and non-depressed Asians American of East Asian descent, and European Americans in response to negative film clips. In eliciting automatic and intense negative emotions, the authors found culture-specific distinctions in emotional reactivity. Depressed individuals from European American backgrounds exhibited heightened negative emotional reactivity compared to non-depressed European Americans, while depressed East Asians (Asian Americans) showed reduced emotional reactivity compared to non-depressed Eastern individuals. Chentsova-

Dutton et al. (2007) suggested that basic emotional reactions may conform to cultural norms such that reduced emotional reactivity may not be universally indicative of depression.

These findings are important, considering that heightened emotional reactivity to negative information represents a hallmark symptom of depression (Roiser & Sahakian, 2013). However, the emotion elicitation paradigm used by Chentsova-Dutton et al. drew on excerpts from negative film clips, which may not represent culturally neutral stimuli. For example, responses may be influenced by contextual factors, such as the quality of the voice, body movement, and cultural context known to influence the experience of emotion (Barrett, Mesquita, & Gendron, 2011; Kleinsmith, De Silva, & Bianchi-Berthouze, 2006).

Thus, overall, the reviewed studies here support the notion that cultural differences may impact on innate emotional reactions, and in turn, on the likelihood of experiencing depressive symptoms, contrary to the notion of cultural universality proposed as part of the first domain of the biocultural model.

Subjective Experience and Emotion Meaning

The second and third domain of the biocultural model is concerned with the subjective emotional experience, and the meaning we attribute to emotional experiences argued to involve higher-order cognition and thus subject to cultural influence, beliefs or expectations.

Dejonckheere et al. (2017) suggested that individualistic, relative to collectivistic societies, prohibit the experience of negative emotions, including sadness or anxiety. This social pressure to *not* feel sad was paradoxically associated with heightened levels of depression symptoms. This indicated that

culturally prescribed expectations around the experience of emotion might negatively impact on mood and subsequent development of depression. Further, Shacham et al. (2010), comparing U.S. and Kenyan samples, found that the expression of psychological distress was heightened in the U.S. samples, however, the disclosure of distress in Kenya might be suppressed due to the stigma around mental health informed by social and cultural expectations. However, given non-disclosure and response biases, both studies illustrate the difficulty in ascertaining 'true' psychopathology using commonly administered self-report measures.

In contrast, Chentsova-Dutton, Choi, et al. (2015) examined anhedonia and depressed mood in Americans of European, Asian, Hispanic and Russian background using experience sampling methods. Findings revealed cross-cultural variability in the momentary experience of emotions, with less pleasure experienced by Russian Americans relative to Hispanic and European Americans, with Russian Americans also presenting with a higher prevalence of depression. Agüera et al. (2017) found the converse relationship, such that emotional suppression appeared to be related to lower rather than higher psychopathology. This was particularly relevant to eating disorders wherein participants from Western countries, including the U.K. and Spain, showed higher levels of body dissatisfaction, somatisation depressive symptoms compared with Chinese patients who suppressed or minimised their depression, anxiety and other psychopathological symptoms. This may speak both to the use of emotion regulation strategies (e.g. suppression of negative emotion) in the more collectivist society, as well as the impact of culturally-held beliefs around health, physical appearance and social desirability in the individualistic society. However, while

the authors aimed to examine the impact of social expectations cross-culturally, they did not include any measure of social desirability or cultural orientation.

Saint Arnault et al. (2006) suggested that while the presence of negative emotions could be considered universal, cultural variability emerges in the way specific emotions are clustered together. This study also used experience sampling in American and Japanese female participants. Overall, Americans revealed emotion clusters around feeling upset, depression, hostility and dependency, while their Japanese counterparts reported depression, sad/angry, gloomy, hate and interpersonal clusters. Further, the 'depression' cluster appeared to include sadness in the American but not the Japanese sample. Despite its use of convenience sampling in females only, the value of this study lies in the considerations of different idioms of distress. This is important, as the use of culturally specific idioms or somatising distress has long been posited as more acceptable expressions of distress, thought to differentiate Eastern from Western societies (Chentsova-Dutton, Ryder, et al., 2015; Kirmayer, 2001).

Finally, Beshai et al. (2016) found cultural variation at the cognitive level. They compared Egyptian and Canadian samples using both self-report measures and diagnostic interviews. While they found no differences for negative thoughts and beliefs, there was evidence for greater endorsement of dysfunctional assumptions in Egyptians. This may suggest that assumptions precipitating the meaning we ascribe to emotions are prone to cultural influence while negative automatic thoughts or beliefs *per se* are not.

While the wide range of cultural contexts and different concepts discussed in the context of subjective experience limit the generalizability of the findings, the studies do raise important implications for treatment, especially given that

culturally prescribed norms, beliefs and expression of emotion may impact on distress.

Emotions as Social Phenomena

In fact, emotions have previously been conceptualised as multi-dimensional constructs, or indeed social phenomena where perceptions of self are indeed anchored in the cultural orientation and context (Markus & Kitayama, 2003; Mesquita, Boiger, & De Leersnyder, 2016). For instance, in collectivistic cultures, general positive emotions (e.g. elated, calm) have been associated with interdependence and interpersonal engagement in positive emotions (e.g. friendly feelings), while individuals from individualistic cultures emphasise socially disengaging emotions (e.g., pride and anger) (Kitayama et al., 2000, 2006).

With this in mind, Ford et al. (2015) proposed that in collectivist relative to individualistic cultures, greater well-being and satisfaction in the pursuit of happiness was determined by individuals' engagement in meaningful social relationships. The authors administered a range of questionnaires to samples from the U.S., Germany, Russia and Taiwan, and within these countries, at multiple sites, in line with suggestions to increase ecological validity and generalisability (Bernal, Bonilla, & Bellido, 1995; Dech, Ndetei, & Machleidt, 2003; Matsumoto & Hwang, 2013). The study addressed measurement invariance by excluding culturally invariant items, as well as using the BDI to assess depressive symptoms with measures demonstrating modest to good reliability. However, the authors grappled with defining happiness, which they acknowledge may be achieved through multiple pathways not explored in this study. Nonetheless, their findings illustrate how cultural variability in subjective experience and emotion meaning

can impact on well-being, with collectivistic cultures emphasising other-oriented socially-engaged pathways to happiness.

Similarly, Abe (2004), and Hsieh (2015) examined societal expectations regarding relatedness and interdependence in large adult and older adult populations in Eastern societies. Using well-validated measures, the authors found that these greater societal expectations predicted lower well-being and greater depressive symptoms. In contrast, greater levels of family or social cohesion were found to dampen emotional distress and depressive symptoms. Using mediation analyses, Zhu et al. (2016) found similar results. They studied a sample of well-matched Chinese and American individuals and found that perceived levels of social support and greater interdependent self-construal buffered the effect of attachment anxiety on depression. This highlights the important relationship between cultural orientation and cultural values emphasising social support, the absence of which can negatively impact on mental health.

Campos et al. (2014) went further to examine *familialism*, a cultural value especially present in Latina cultures that emphasises close family relationships and social engagement. The authors tasked individuals from the U.S., Europe and Asia with completing measures on familialism and perceived connectedness, social support, perceived stress, mental health, and depressive symptoms. Using structural equation and multiple-group analyses, the authors found that independent of cultural background, greater reported closeness to family members and social support mediated the relationship between familialism and psychological health. This suggests that it is perhaps the nature and quality of social relationships, above and beyond cultural group membership that determines well-being. Conversely, the detrimental impact of social isolation is noted not just

in psychological health but also in physical health, with loneliness posited as the 'emotional pathway' to increased mortality (Steptoe, Shankar, Demakakos, & Wardle, 2013).

Emotional Acculturation and Self Construal

A further point of interest regards the migration of individuals from collectivistic societies into individualistic societies, which may change the way emotion is perceived and experienced. While individualist societies were characterized by greater levels of loneliness overall, Heu et al. (2019) found that immigrant collectivistic communities living within majority individualist societies experienced a real or perceived 'loss' of social support and were thus at a higher risk of depression (see also, Goodwin, Cook, & Yung, 2001; Sah, 2000).

Chan & Mendoza-Denton (2008) further argued that Asians and Asian Americans are distinguishable through their experiences as a majority (= Asians within Asia) compared to a minority ethnic group (= Asians within the U.S.). The authors examined depressive symptoms and cultural identity, using the Multigroup Ethnic Identity Measure (MEIM; Phinney, 1992; Roberts et al., 1999) and found that Asian Americans exhibited relatively greater internalizing symptomatology and elevated levels of depression in response to perceived discrimination. Interestingly, Parker, Chan, Tully, & Eisenbruch (2005) found that this increased somatisation of depressive symptoms appeared less prevalent in Asian samples which had undergone a process of cultural acculturation. Finally, the opposite phenomenon of individualistic immigrants living in collectivistic cultures has not been studied in a similar way – i.e. studies of individualistic immigrants living in collectivistic cultures.

As such, the lack of 'emotional fit' within a majority culture can have a detrimental effect on an individual's well-being, especially in a relational context (De Leersnyder, Mesquita, Kim, Eom, & Choi, 2014). This notion of emotional fit echoes earlier notions of self-construal, whereby independent self-construal predicted positive affect in the UK, considered more individualistic, but not in Greece, considered more collectivistic (Nezlek et al., 2008). This indicates that the more cultural norms are aligned with an individual's self-construal, the more positive their emotional experience, as argued within the Threat to the Conceptual Self (TCS) model (Jobson, 2009). Further, this alignment appears to be malleable. It was found in immigrant minority individuals that frequent positive social interactions could increase emotional fit and thereby improve well-being (Jasin, De Leersnyder, & Mesquita, 2018).

Discussion

Overall, the studies suggest that patterns of relating and emotional responses to social interactions are influenced by culturally-determined values, beliefs and appraisals, especially around social relationships (De Leersnyder et al., 2013; Nezlek et al., 2008; Wang & Ratanasiripong, 2010; Zeng, North, & Kent, 2013). Moreover, when these patterns change or are perceived to change, the subtle yet important interplay of cultural values, individual differences in self-construal and emotional experience may interact to develop depressive symptoms. However, there exists considerable variability, both geographically and conceptually as to how the relationship between culture and depression was examined and interpreted across studies.

In general, it was accepted that our ability to engage in successful social interactions within culturally-specific contexts is driven by our understanding of emotion and ability to share and empathise with other people's cultural inclinations (Hein & Singer, 2008). This includes cultural differences in the subjective experience of emotion, differences in emotional reactivity; preferences in emotion regulation strategies, as well as differences concerning expectations around social cohesion or support. Further studies on emotional acculturation point to the difficulty faced by migrant communities in adjusting to changes in societal structures and cultural diversity. This can lead to interpersonal disengagement or suppressed emotional experiences that impede the ability to maintain mutually engaging social relationships, and thus negatively impact on psychological well-being (Kitayama et al., 2000, 2006).

The impact of cultural orientation and social interactions merits further understanding of the existing models and theories of depression – both cognitive and social. For example, cognitive biases are frequently found in response to socially affective stimuli, such as faces or body movements. With subjective experience, emotional expression and meaning governed by culturally-informed beliefs, cognitive biases may then powerfully impact on mood, as outlined in the earlier section on the development of depression. These findings suggest a greater fit with the biocultural model of emotion, which argued that emotions should be understood as unique affective and social phenomena, of which various types exist and which can be processed at various levels.

On a theoretical level, the social risk hypothesis of depressed mood would argue that individuals are guided by an evolutionarily rooted risk-averse motivational state, aimed at maintaining his or her beneficial group membership

at all cost. As such, socially supportive and cohesive environments, such as those encountered in collectivistic societies, may provide a buffering mechanism against depression by ensuring communal well-being and inclusion. This may account for lower overall prevalence rates compared to individualist societies. However, the same societies might also increase the risk of depression when there is a change to the social 'status quo', by which an individual's group membership is threatened. In other words, in societies where individual well-being is contingent on communal well-being, the 'sudden' violation of social expectations, loss of support or experience of social rejection may present a greater challenge in collectivistic cultures as compared to their individualist counterparts.

Thus, culturally-determined patterns and rules of engagement may act both as a buffer against psychopathology and as a risk factor. This also fits with the 'threat to conceptual self' model (Jobson, 2009), in which the loss of social connectedness or support challenges an individual's sense of self or self-construal, thus increasing the likelihood of developing an affective disorder. This model particularly points to changes in self-construal in the presence of trauma or in response to a perceived threat (Berntsen & Rubin, 2008). This may be extended to the case of depression, wherein altered self-construal and self-focus are similarly heightened when individuals perceive a threat to self (Horowitz, 1991; Watkins & Teasdale, 2004; Wisco, 2009).

The impact of the threat of social rejection on well-being itself exhibits cultural differences. For instance, Japanese students reported reduced positive affect, greater depressive symptoms, a reduced sense of belonging and meaningful existence, and lowered self-esteem in response to social rejection relative to American students (Garris, Ohbuchi, Oikawa, & Harris, 2011). This is again best

understood in the context of collectivistic societies placing greater value in one's ability to engage in meaningful social relationships, to which social rejection presents a significant threat. While there are few cross-cultural experimental studies examining the specific effects of social rejection, earlier studies posited social threat as a significant risk factor for depression (Heim & Binder, 2012; Luterek et al., 2004; Van Harmelen et al., 2014, 2010).

Interestingly, Way & Lieberman (2010) examined the consequences of social rejection in the context of genetic contributions using a genetic association approach, in which candidate genes are identified that may account for phenotype traits observed across populations (Cordell & Clayton, 2005). Way & Lieberman (2010) argue that differences in cultural orientation may be due to the variable expression of putative social sensitivity alleles. Social sensitivity alleles refer to polymorphisms found in serotonin transporter genes (5-HTTLPR and MAOA-uVNTR), which contain different possible genotype combinations and are associated with a range of psychological phenomena, including heightened sensitivity to social cues. Results found a higher prevalence of these social sensitivity alleles in East Asian individuals, suggesting greater sensitivity to socially relevant cues in an environment that promotes social cohesion.

Importantly, the study posited that the protective effect of the social sensitivity alleles might be specific to collectivistic cultures. In contrast, individuals with a high proportion of sensitivity alleles living in individualistic cultures might be at greater risk of pathology, akin to the collectivistic immigrant populations living in the West (Goodwin et al., 2001; Sah, 2000). As such, this study presented a novel approach to characterising cultural differences and its impact on depression, reconciling behavioural findings around the importance of

cultural orientation, social support and depression, albeit recognising the limitations posed by its correlational design.

Acknowledging the variety in approaches and methodologies presented above, the present review also aimed to highlight common pitfalls in cross-cultural psychology, including measurement equivalence and response biases. Despite the use of well-established self-report measures, the recommended approach combines both self-report and clinical interviews to limit biases in measurement – to which only a small proportion of studies adhered. This may be due to Eastern societies frequently needing to satisfy higher diagnostic thresholds, due to underreporting on items relating to depressed mood and suicidality, which is more acceptable in Western samples (Chang et al., 2008). In addition, the diagnostic equivalence of existing measures continues to be a source of contention with only limited evidence that cross-national equivalence exists (Cozma, 2011; Hambrick et al., 2010; He & Van de Vijver, 2012).

Also, the majority of studies drew on white middle-class American samples, with the 'cross-cultural' comparison derived from individuals with different ethnic backgrounds yet sampled from within the same geographic region. This complicates the ability to generalise findings to other regions especially when cultural orientation is not explicitly measured (Agüera et al., 2017; Mian & Grossman, 1998; Parker et al., 2005; Shacham et al., 2010). Finally, findings derived from the use of convenience sampling or elevated symptomology in general population studies may not apply to clinical populations. This again complicates the ability to ascertain 'true' culturally-determined differences in psychopathology.

Summary

In sum, this review aimed to examine the relationship between culture and emotion in the context of depression. This was particularly important given the many overlapping psychological and emotional processes being implicated in the current models of depression. Considerable cultural differences were found in the conceptualisation and prevalence of depression, as well as cultural variability in the perception, experience and regulation of emotion. Overall, collectivistic cultural orientation and/or greater interdependent self-construal was associated with greater levels of social support, which in turn provide both a protective as well as a risk factor for the development of depression. Finally, it was argued that the development of these distinct socio-cultural manifestations of emotional disturbances may be driven by subtle yet important genetic differences.

This raises the interesting, outstanding question of whether vulnerability to depression may result from the interaction between an individual's social environment and genetic predisposition. This would suggest that emotion perception and emotional experience are shaped through the interplay of biologically innate processes, including genetic differences, as well as the reinforcement of appraisals and belief systems consistent with cultural orientation and social contexts. As such, this topic merits further investigation, both on an experimental and theoretical level. To date, several methodological challenges have impeded such investigations, and advanced methodologies immune to the usual pitfalls would have to be employed in future cross-cultural investigations.

Objectives

The second part of the thesis presents an empirical paper investigating the relationship between culture and depression using both validated self-report measures, diagnostic interviews, but also cultural measures assessing cultural orientation. However, rather than choosing a country, such as the U.K. or the U.S.A, which has experienced significant acculturation and diversification, the paper draws on data derived from experimental studies previously carried out in Iran. The cultural dimension in Iran warrants particular investigation given the significant social change yet relative economic, political and social isolation, outlined in more detail in the following section. This may prompt both an examination and/or revision of the existing cultural conceptualisation of Iran using common cultural measurement tools, as well as the impact of cultural orientation on depression. In doing so, this thesis aims to incorporate the lessons learned from the studies reviewed above, while also addressing additional challenges identified in cross-cultural psychology.

Firstly, the psychometric properties of a range of cultural measures will be examined to validate their use in the Iranian sample, consisting of depressed and non-depressed individuals. In addition, the empirical paper will investigate any differences between depressed and non-depressed individuals on the cultural, affective and process measures, outlined in more detail in the following section.

Secondly, a Confirmatory Factor Analysis (CFA) will be used to determine which factor-structure best represents the data in an Iranian sample of depressed individuals when collapsing across a range of cultural measures. This will involve comparing alternative statistical models to identify meaningful constructs across

cultural measures. This approach will also again examine the impact of depression on any latent factor structures within these alternative models.

Thus, this thesis aims to deepen our understanding of the relationship between emotional processing and cultural orientation in individuals with and without Major Depressive Disorder (MDD) and any cultural variability contained within the Iranian context, guided by current theoretical frameworks and using sophisticated statistical analysis tools.

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Part Two: Empirical Paper

Examining cultural dimensions and depression in an Iranian sample

Abstract

Aims

This study examined the relationship between depression and cultural orientation in Iran. The aims were three-fold; i) to validate existing cultural measures in an Iranian sample; ii) to compare the latent factor structure of alternative statistical models that could account for variability *across* cultural measures and iii) to establish the relationship between cultural orientation, and depressive symptoms.

Method

This secondary data set consisted of 45 Iranian participants with Major Depressive Disorder (MDD) and 47 Iranian never-depressed control participants. Participants were administered a battery of social, affective and cultural measures. Sub-scale total scores of the cultural measures were entered into a Confirmatory Factor Analysis (CFA) to compare the model fit of a single, two-, and three-dimensional statistical model, followed by a measurement invariance analysis between groups.

Results

Findings revealed that the individual measures exhibited good overall reliability. Moreover, a three-factor model, comprising the constructs of individualism, collectivism and communal self-esteem, showed the best fit to the data. Finally, the three-factor model showed measurement invariance, suggesting observed differences in depression are not due to measurement error or poor scale validity.

Conclusions

This study provided evidence supporting a multi-dimensional framework to conceptualise differences in cultural orientation. This will help guide future research in cross-cultural investigations of depression in particular, and psychopathology in general.

Introduction

This paper aims to address the relationship between cultural orientation and depression in a sample of Iranian participants with and without Major Depressive Disorder (MDD). This is based on existing literature described within the biocultural model of emotion (Matsumoto & Hwang, 2012), which argues that emotion is both universal and culture-specific. As outlined in more detail in the first part of the thesis, emotional experiences (Barrett, Mesquita, Ochsner, & Gross, 2007), emotional meanings (Shweder, Haidt, Horton, & Joseph, 2008) and emotional appraisals (B. Mesquita & Walker, 2003) vary significantly across cultures. Moreover, emotions have been proposed as social phenomena such that perceptions of self are anchored in the cultural orientation and context (Markus & Kitayama, 2003). As such, culture is thought to impact on the perception, expression and regulation of emotion at various levels.

It is also well-established that *depression* impacts on emotional expression and reactivity. This is illustrated in the heightened sensitivity to negative emotional cues (Roiser & Sahakian, 2013) and self-relevant information (Beck & Clark, 1997; D. M. Clark, 2001; Mor & Winquist, 2002; Spurr & Stopa, 2002), as well as differences in detecting and responding to interpersonal social signals (Boyce & Parker, 1989; Kitayama, Markus, & Kurokawa, 2000; Kitayama, Mesquita, & Karasawa, 2006). While heightened interpersonal sensitivity is strongly related to feelings of low mood, inadequacy and inferiority (Gilbert & Allan, 1998), it also exhibits substantial cultural variability (Chan & Mendoza-Denton, 2008). Similarly, difficulties in emotion regulation, long associated with depression (Joormann & Gotlib, 2010), also exhibit cultural variability in the relational domain (Tsai & Lau, 2013). For example, it is found that emotion suppression is

the preferred regulation strategy in collectivist societies relative to individualist cultures (Matsumoto, Yoo, & Nakagawa, 2008). Individualist cultures, in turn, tend to rely on reappraisal or self-enhancement to buffer against emotional distress (Tsai & Lau, 2013).

This altered profile of social, cognitive and emotional processes is typically captured using the Beck Depression Inventory (BDI-II) (Beck, Steer & Brown, 1996), with some studies additionally assessing anxiety symptoms using the Beck Anxiety Inventory (BAI) (Beck, Epstein, Brown & Steer, 1988), Moreover, measures concerned explicitly with these social and cognitive processes include the Interpersonal Sensitivity Measure (IPSM) (Boyce & Parker, 1989) and Difficulty in Emotion Regulation Scale (DERS) (Gratz & Roemer, 2004). The former assesses heightened interpersonal sensitivity to other's behaviour, feedback and actual or perceived negative evaluation, while the latter captures multiple aspects of emotion regulation and dysregulation. Taken together, these measures help characterise an individual's depressive profile, and ability to engage in and maintain mutually beneficial relationships (Bylsma, Morris, & Rottenberg, 2008; Kitayama et al., 2000, 2006).

Pulling together these findings indicates that emotional processing is sensitive to both cultural variation and depression. This raises the interesting question of how cultural orientation and depression interact. While several theoretical accounts provide frameworks for understanding the altered profile in depression, they are yet to be comprehensively examined across varying cultural contexts. In fact, results from the review presented earlier revealed huge variability in the measurement and operationalisation of culture, complicating the interpretation of findings in the literature. Further, the field of cross-cultural

psychology has recently emphasised the need to replicate psychological findings and validate existing findings across cultural contexts (Sternberg, 2017). This warrants an empirical examination of the relationship between culture and depression using techniques that overcome at least some of the challenges that plague cross-cultural psychology.

Several cultural measures have emerged that seek to measure cultural orientation and individual-level factors, building on the seminal model of culture proposed by Hofstede (1980). While Hofstede described six dimensions of national cultures (see the conceptual introduction for more information), most measures focus on one- or two-dimensional conceptualisations of culture. For instance, the communal orientation scale (COS) uses a single dimension to examine the extent to which other people's needs and feelings carry greater importance in communal relationships relative to individual needs and feelings (M. S. Clark, Ouellette, Powell, & Milberg, 1987). In contrast, the self-construal scale (SCS) (Singelis, 1994) proposes two dimensions assessing *independence* and *interdependence*.

However, a cross-national and cross-cultural meta-analysis revealed only moderate two-dimensional individualism (IND)-collectivism (COL) effects, raising doubts as to the overall validity and usefulness of such a dichotomy (Oyserman, Coon, & Kemmelmeier, 2002). Oyserman et al. found that China strongly endorsed strong collectivist beliefs, while 'European' Americans endorsed more individualist and less collectivistic values in line with previous conceptualisations. However, they also found that European Americans were *not* more individualist than African American, Latino or even non-Chinese Asians, such as Japanese or Koreans, contrary to expectations. This undermines the

validity of cross-cultural research findings, as the latter two groups, in particular, have traditionally been characterised as collectivist. As such, researchers are increasingly arguing that the traditional two-dimensional model of independence (or individualism) and interdependence (or collectivism) exhibits poor overall validity and should be complemented by incorporating other constructs (Fiske, 2002; Tafarodi & Walters, 2002).

One attempt to measure this model is provided by the individualism and collectivism scale (INDCOL) (Triandis, H. C. & Gelfland, M. J., 1998) consisting of four dimensions. These are horizontal individualism, horizontal collectivism, vertical individualism, vertical collectivism. The vertical and horizontal dimensions address the complexity of cultural groups and identity, incorporating beliefs around equality and inequality among group members (Triandis, 1995; Triandis & Gelfand, 1998). The vertical dimensions assume the existence of inequality, with a focus on hierarchies and competition. Individuals scoring high on the vertical dimensions view themselves as autonomous and as different from others. In comparison, horizontal dimensions emphasise notions of equality minimising focus on competition (Triandis, 1995; Triandis & Gelfand, 1998). High-scoring individuals tend to view themselves as equal to other individuals and as a part of an integral community while maintaining a level of individuality. Both vertical and horizontal dimensions can be orthogonally combined with individualistic and collectivistic cultural orientations resulting in the four constructs.

Another scale that employs four dimensions of culture is the collectivism self-esteem scale (CSE) (Luhtanen & Crocker, 1992) that measures membership self-esteem (e.g. how good or worthy a member of the group one is); private

collective self-esteem (e.g. how good one's social groups are), public collective self-esteem (e.g. how one believes others evaluate one's social groups) and importance to identity (e.g. how important one's group is to one's self-concept). Communal or collective self-esteem, communicating the feeling of self-worth based on group memberships as opposed to personal self-worth, has been proposed as an important candidate construct to address the gap in previous conceptualisations of culture (Konrath, 2012; Markus & Kitayama, 2003). This is in part due to the strong association between communal self-esteem and subjective well-being, as well as well-established cultural differences in communal self-esteem across various cultural contexts (Diener & Diener, 1995; Hermann, Lucas, & Friedrich, 2008; Orth & Robins, 2013; Yamaguchi, Akutsu, Oshio, & Kim, 2017; Zhang et al., 2016).

These multi-dimensional constructs have overcome some of the limitations posed by previous cultural conceptualisations but remain subject to improvement despite their wide application. For instance, Kashima et al. (1995) raised the importance of *relational* interdependence in cultural constructs by proposing a three-dimensional model comprised of "collectivism", akin to previous conceptualisations, "agency," best described by individualistic tendencies and "assertiveness," characterised as the willingness to oppose group beliefs or assumptions. Given the importance of self-worth based on group memberships, assertiveness may also be considered a variant of relational self-esteem, with greater self-esteem presumably positively correlated with greater assertiveness. Cross, Bacon, and Morris (2000) captured this tendency to conceive of oneself in relation to close others as 'relational-interdependent self-construal'. Similarly,

Bresnahan, Chiu, and Levine (2004) considered an alternative model consisting of independent, relational, and collective self-construal factors.

Taken together, a three-dimensional model with a focus on relational self-esteem may, therefore, provide an alternative characterisation of group belonging and cultural orientation, potentially more relevant in the context of depression. It can be thought of as a combination of the previous cultural dimensions of individualism and collectivism, as well as conceptualisations around relational or 'communal self-esteem', which propose that an individual's real or perceived position in the group or situation dictates behaviour within a given context. However, given the array of measures and proposed models above, it is evident that culture is a complex construct, eluding a simple operationalisation, much to the chagrin of researchers in the field. In fact, despite the theoretical and empirical support for multidimensionality (Cozma, 2011; Gratz & Roemer, 2004; Morris, Ross, Hosseini, & Ulieru, 2014), cross-cultural researchers frequently continue to characterise their samples using individualistic-collectivistic dichotomy.

Another major drawback of previous investigations is their geographical limitations to Western or Asian societies, such as the USA, Japan or China that might not be representative of international variety in cultural orientations (Butler, Lee, & Gross, 2007; Cozma, 2011; Kitayama et al., 2000; Batja Mesquita, Boiger, & De Leersnyder, 2016). As a result, the cultural dimensions in other countries such as Iran have not been as thoroughly examined. Based on Hofstede's model, Iran was previously conceptualised as a collectivist society (Gudykunst & Ting-Toomey, 1996; Hofstede, 1980, 2001). It is characterised by a high observed power distance and uncertainty avoidance. This is thought to reflect the rigid authoritarian political and societal structure that limits individualist or public

expression of needs and desires. Instead, the norms direct the society inward to the private sphere with a focus on the importance of family, religious piety and dignity (Ghobari & Bolhari, 2001).

In Islamic and Iranian culture, increased scores on the 'femininity' dimension further reflect the well-known Iranian traits of hospitality, charitability and generosity. Altogether, such a characterisation of Iran is in line with Asian or other more 'collectivist' countries (Gudykunst & Ting-Toomey, 1996). However, this characterisation ignores the significant social, economic and political change and development in Iran over the past decades. Despite remaining an authoritarian state under theocratic rule, the gap between the public and private sphere is gradually decreasing (Brumberg & Farhi, 2016; Chatty, Crivello, & Hundt, 2005; Haghighatjoo, 2016).

With increased opportunities for public and individual expressions of discontent (e.g. the green movement), the political landscape has thus gradually shifted towards democratisation and societal change (Brumberg & Farhi, 2016; Chatty et al., 2005; Haghighatjoo, 2016). This might have important implications for societal norms and welfare policies, and ultimately, cultural orientation. Besides, with a proposed association between national net worth and cultural values, the decline in real income and GDP per capita alone may have impacted on Hofstede's cultural dimensions (Tang & Koveos, 2008). The social and cultural change may decrease the generalizability of findings from collectivistic countries like China to Iran, as well as replicability of the limited existing research findings within the Iranian context (Greenfield, 1999, 2017). This highlights the need for a re-evaluation of cultural dimensions in Iran using typical cross-cultural measurement tools.

One approach to investigating the psychometric properties such as reliability and validity of existing measurement tools is to use confirmatory factor analysis (CFA). CFA is an established approach within the more general methodology of Structural Equation Modelling (SEM), aimed at characterising, representing, estimating and measuring the relationship between measured variables and possible latent constructs (Awang, 2014). CFA minimises measurement error and aims to reduce the number of observed variables into latent variables based on potential commonalities across measures.

Applied in the present study, such an approach would allow for the characterisation of the cultural dimension(s) in Iran, benchmarked against culturally well-characterised populations (Cozma, 2011). It would also allow an examination of the validity of the measurement indices and, in the absence of sufficient validity, it would aid further development of meaningful hypothesis-based testing instruments and measurement tools (Chen, 2008). Most importantly, CFA would allow a comparison of theoretically proposed alternative *a priori* models describing underlying constructs, assisting a comparison of resultant latent variables to examine whether this improves or changes the fit of any proposed model(s) (Schmitt & Kuljanin, 2008). This provides an exciting avenue to explore the impact and relationship between depression and cultural orientation in Iran using the existing measures described above.

In sum, the literature to date has revealed divergent findings regarding how culture may be conceptualised and how it may contribute to emotional processing. In addition, the relationship between culture and emotion has yet to be thoroughly examined in the context of depression (Matsumoto & Hwang, 2012). Finally, the cultural dimensions in Iran warrant further investigation to account for the

significant social change observed in recent years following its original conceptualisation as a collectivistic culture. This would prompt an examination and/or revision of the existing cultural conceptualisation of Iran using common cultural measurement tools. As such, this study aims to investigate the role of culture and depression in a sample of Iranian individuals with and without Major Depressive Disorder.

Objectives

All analyses will be carried out on secondary data gathered from an Iranian sample with and without Major Depressive Disorder who were administered a battery of well-established affective and process measures, as well as cultural measures subject to further validation.

First, psychometric analyses will be used to examine the dimensional structure of culture within the Iranian context using the four cultural measures introduced above: the self-construal scale, individualism and collectivism scale, collectivism self-esteem and communal orientation scale. Describing and examining the psychometric properties of these cultural measures will provide information about the reliability and validity of these measures in this Iranian cultural sample.

Secondly, between-group comparisons will be carried out on the affective measures, BDI and BAI, to confirm that the two groups (depressed and non-depressed) differed in depressive and anxiety symptomatology only and were well-matched in terms of other characteristics. Similarly, between-group comparisons in the two process measures, IPSM and DERS, will be used to examine the group

variation in interpersonal sensitivity and difficulties in emotion regulation in line with the depression literature.

Next, CFA analysis will be used to determine which factor-structure best represents the data in the Iranian sample when collapsing across cultural measures. This will compare three alternative statistical models to identify meaningful constructs as detailed below. See Figure 1 for a graphical illustration of proposed cultural models.

Model 1 proposes that all cultural measures and subscales load on to a unidimensional or domain-general factor. This would be in line with previous unidimensional models suggesting that cultural identity may be captured in terms of one's general orientation to the community (M. S. Clark et al., 1987).

Model 2 proposes that all cultural measures and subscales load onto two distinct underlying factors. This would be in line with the predominant two-dimensional model of cultural orientation that distinguish independent/individualistic thought from interdependent/collectivistic thought (Singelis, 1994, Markus & Kitayama, 1991; Hofstede, 1980, 2001).

Model 3 proposes that all cultural measures and subscales load on to three factors within a multi-dimensional construct (Triandis & Gelfland, 1998; Luhtanen & Crocker, 1992). In line with previous suggestions (Bresnahan, Chiu, & Levine, 2004; Cross, Morris, & Gore, 2002; Kashima et al., 1995), this could be thought of as incorporating the individualistic and collectivistic dimensions as in Model 2, along with a third dimension encapsulating communal self-esteem, capturing self-worth in relation to group belongingness.

Comparing the three models will examine whether culture represents i) a unidimensional 'Culture General' construct illustrated in Model 1, comprised of

all cultural measures (and their respective subscales); ii) a two-dimensional construct illustrated in Model 2, capturing the IND-COL dimensions, Communal Orientation and Collective Self-Esteem subscales; or, iii) a three-dimensional construct, consisting of 'Independent Individualism', 'Interdependent Collectivism', and 'Communal Self-Esteem'. This approach will aid in understanding whether previously proposed factor-structures underlying cultural constructs can account for the data gathered from an Iranian sample. Additionally, this will allow for an examination of the impact of depression on these latent factor structures within the alternative models. Finally, this study will aim to assess the relationship between scores on measures of depression, interpersonal sensitivity, and emotion regulation with the latent factors derived from the three proposed models of cultural orientation.

Research Questions

1. Are the psychometric properties and results of the affective, process and cultural measures in this Iranian sample in line with previous findings?
2. Are there meaningful latent factors within alternative statistical models that can account for the variability *across* the cultural measures? One-, two-, and three-factor models will be compared (see Figure 1).
3. Does depression impact on the resultant latent factor structure *across* cultural measures?
4. What is the relationship between resultant latent factor scores and depression, interpersonal sensitivity, and emotion regulation?

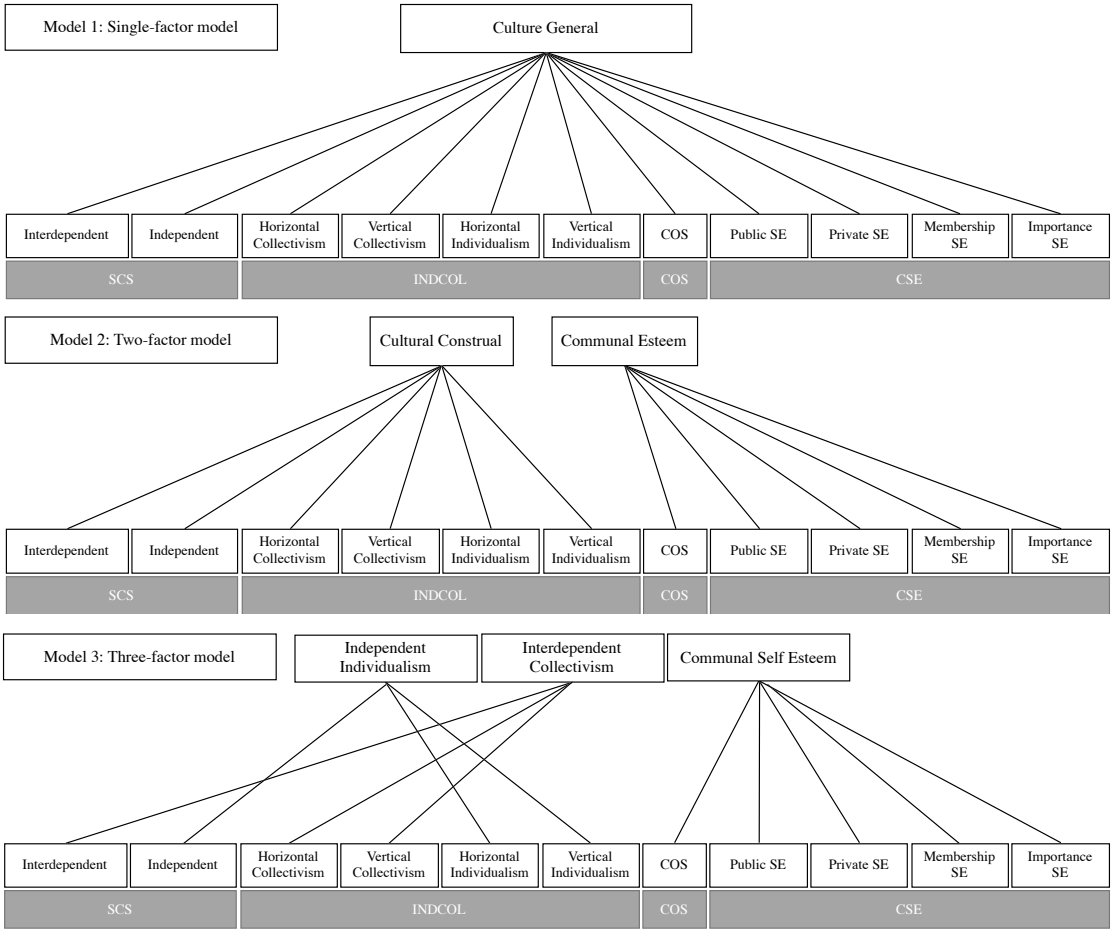

Figure 1 **Graphical Illustration of Proposed Cultural Models.**

Method

Secondary Data Set

Data was collected in Iran as part of a collaborative cross-cultural investigation carried out in Iran, Malaysia and Australia. This collaborative project consisted of the present author, Julia Gillard (then: University of Cambridge, UK), Dr Tim Dalgleish (University of Cambridge, UK), Dr Laura Jobson (Monash University, Australia), and Dr Alireza Moradi (Kharazmi University, Tehran, Iran).

The project examined the impact of culture on emotion processing in depression at three levels: priming reactions to emotional stimuli (study 1), subjective experience of emotion (study 2) and emotion meaning (study 3) (Mohan et al., under submission). Within Australia, Iran and Malaysia, three independently recruited samples participated in the three separate empirical studies outlined above. In Iran only, all participants were additionally administered a battery of affective, process and cultural measures following each experimental study at the behest of the present author who was coordinating the data collection in Iran along with Dr Moradi. Thus, for this empirical paper, only data on the battery of affective, process and cultural measures will be presented. See *Part Three*: Critical Appraisal for more information on the research process and origin of data.

Participants

Across the three studies, forty-seven Iranian participants experiencing a current Major Depressive Episode and meeting criteria for a diagnosis of Major Depressive Disorder (MDD; 8:39 male:female; mean age 32.92 ± 7.91 years) on the Structured Clinical Interview for the DSM-IV (SCID-I; (First et al., 1995), and 45 healthy controls who had never met criteria for MDD (8:37 male:female; mean

age 32.33 ± 7.36 years) were recruited from volunteer panels at Kharazmi University, Iran. All participants were aged between 18 and 60 years and had normal or corrected-to-normal vision. Participants were excluded if they had a diagnosis of substance dependence, a history of psychosis, and/or organic brain injury.

Procedure

Participants completed all questionnaires in a single research session. First, participants were assessed with the mood module of the SCID-I (First, Spitzer, Gibbon, & Williams, 1996) by clinically trained research assistants. The SCID-I is a standardised diagnostic interview schedule designed to assist clinicians and researchers in making reliable DSM-IV Axis I psychiatric diagnoses. The SCID-I involves a series of questions concerning current and past symptoms of a range of psychological disorders and usually takes between ½ and 1 hour. The SCID interview is only administered by experienced research staff that has undergone comprehensive SCID training. The mood module was used to verify whether participants are currently experiencing low mood of clinical severity or not. Of all the audio-recorded clinical interviews carried out in Iran, Malaysia and Australia, 25% were independently coded by clinical psychologists with complete inter-rater agreement.

Then, participants completed the Beck Depression Inventory (BDI-II; Beck, Steer & Brown, 1996), assessing current and residual symptoms of depression (Beck, Guth, Steer, & Ball, 1997). All participants completed the battery of process and cultural measures following a series of experimental behavioural tasks. All participants provided written informed consent and received

monetary compensation. The study was carried out in accordance with the Declaration of Helsinki and Good Clinical Practice and approved by the Research Ethics Committee at Monash University, Australia, and Kharazmi University, Iran. Results from the behavioural tasks are not reported here; however, details on individual studies are outlined in Appendix B.

This next section will present an overview of the affective, process and cultural measures. For copies of individual measures, see Appendix C. All tasks and measures were administered in Farsi. In the absence of existing and validated translations, except for the BDI-II and BAI, the English tasks and remaining measures were forward-translated into Farsi by a native speaker fluent in English, and back-translated into English by a second translator, unfamiliar with the original versions. A research assistant then examined the translated versions and resolved any ambiguities, for example, with regards to language specific idioms of distress that may differ between Farsi and English. While there is no published data on the translated measures' validity and reliability in other Iranian samples, preliminary psychometric properties from this sample are presented in the Results section (see Table 2). Overall, the translated measures would benefit from further validation and psychometric evaluation in the future.

Affective measures

Beck Depression Inventory (BDI-II) (Beck, Steer, & Brown, 1996)

The BDI-II is a 21-item multiple-choice self-report measure assessing depressive symptomatology, including low mood. Participants indicate how they have been feeling over the past two weeks, including today. It is one of the most widely used instruments for measuring the severity of depression with good internal

consistency, test-retest reliability and convergent validity with standardised clinician assessments (Beck et al., 1997; Richter, Werner, Heerlein, Kraus, & Sauer, 1998; Storch, Roberti, & Roth, 2004), enabling comparison across studies. The internal consistency has been estimated at around 0.9, with retest reliability ranging from 0.73 to 0.96, as well as high correlations between BDI-II and the BDI-I (Wang & Gorenstein, 2013). The Farsi version of the BDI-II (Ghassemzadeh, Mojtabai, Karamghadiri, & Ebrahimkhani, 2005) was previously validated in a sample of 125 student volunteers with high internal consistency, α=0.87, and good test-retest reliability, r=0.74. As such, the BDI-II is widely used as an assessment tool by health care professionals and researchers in a variety of settings and is well-suited as a screening to for depression in the general population sample, with high predictive diagnostic value (Lasa, Ayuso-Mateos, Vázquez-Barquero, Díez-Manrique, & Dowrick, 2000). As this study included the recruitment of currently depressed individuals, the BDI was used to assess current and/or residual symptoms of depression.

Beck Anxiety Inventory (BAI) (Beck, Epstein, Brown, & Steer, 1988)

The BAI is a 21-item self-report measure assessing current or state anxiety symptomatology. Like the BDI-II it is widely used in research with well-established psychometric properties, reliability and validity (Osman et al., 2002), including the ability to assess the severity of anxiety in adult and adolescent populations (Muntingh et al., 2011) and a relatively good ability to discriminate anxious from depressive presentations (Beck et al., 1988). Participants indicate the extent to which they have experienced symptoms of anxiety over the previous week on a scale ranging from 0 (‘Not at All’) to 3 (‘Severely’). Scores on the BAI

indicate a change in mood symptoms over time. The Farsi version of the BAI was validated in a North Iranian sample of adolescents and demonstrated moderate test-retest reliability (r=0.67), good internal consistency (α=0.88), as well as acceptable convergent (0.40-0.44), and divergent validity (r = 0.216) with the BDI-II (Khesht-Masjedi, Omar, & Kafi Masoleh, 2015). As this study recruited MDD and never-depressed individuals, the BAI was used to assess the presence of anxiety symptoms in addition to current depressive symptoms assessed by the BDI-II.

Process measures

Interpersonal Sensitivity Measure (IPSM) (Boyce & Parker, 1989)

The IPSM is a 36-item measure assessing excessive sensitivity to the interpersonal behaviour of others, to social feedback and to (perceived or actual) negative evaluation by others. The IPSM generates a total score as well as five sub-scale scores: interpersonal awareness, need for approval, separation anxiety, timidity and fragile inner-self. Its reliability is demonstrated by high internal consistency in two separate groups, and by stability in scores over time in a non-clinical group. The 36 items are completed on a 4-point Likert-type scale (1= 'very unlike me', 2='moderately unlike me', 3='moderately like me', 4='very like me'). The IPSM demonstrates high internal consistency for the total score in clinical and non-clinical groups of 0.86 and 0.85, respectively. Stability was indicated by a six-week retest reliability of 0.70 in a student sample (Boyce & Parker, 1989). As this study is investigating individual differences in cultural variability within a novel socio-cultural context, this measure provides a baseline measure of sensitivity to social signals.

Difficulty in Emotion Regulation Scale (DERS) (Gratz & Roemer, 2004)

The DERS is a brief, 36-item, self-report questionnaire designed to assess multiple aspects of emotion regulation and dysregulation. The DERS items reflect difficulties within the following dimensions of emotion regulation: (a) awareness and understanding of emotions (e.g., "I pay attention to how I feel" [reversed]); (b) non-acceptance of emotions (e.g., "When I'm upset, I feel guilty for feeling that way"); (c) the ability to engage in goal-directed behaviour (e.g., "When I'm upset, I have difficulty concentrating") and refrain from impulsive behaviour (; e.g., "When I'm upset, I become out of control"), when experiencing negative emotions; and (d) access to emotion regulation strategies perceived as effective (e.g. "When I'm upset, it takes me a long time to feel better"). Participants rate how often statements such as "I feel at ease with my emotions" apply to them on a 5-point scale (1='almost never', to 5='almost always'). The scale demonstrates good reliability and validity, with good internal consistencies (α's > .80) and stabilities (ρtt's > .69) across its subscales and significant correlations with other emotion regulation measures (Ehring, Fischer, Schnülle, Bösterling, & Tuschen-Caffier, 2008; Gratz & Roemer, 2004).

Cultural measures

Self-Construal Scale (SCS) (Singelis, 1994)

The self-construal scale is a 30-item scale, based on a two-dimensional model. Each dimension of self-construal is measured with 15 items for the independent and 15 items on the interdependent subscale, respectively, without any reverse-keyed items. Participants are asked to indicate how much they agree with 30 statements about themselves on a 7-point scale, ranging from 1 ('Strongly

disagree'); 2 ('Somewhat disagree'); 3 ('A little disagree'); 4 ('Neither agree or disagree'); 5 ('A little agree'); 6 ('Somewhat agree'); 7 ('Strongly agree'). Singelis (1994) based his two-dimensional model on the theoretical concepts of independence and interdependence presented by Markus and Kitayama (1991). The goal was to measure independent and interdependent self-construals at an individual level. The Self-Construal Scale (SCS) measures the cultural syndromes of independent and interdependent self-construal. The SCS previously demonstrated good reliability and validity, with $\alpha = .73$ and $\alpha = .69$ and $\alpha = .70$ and $\alpha = .74$ for the independent and interdependent factors, respectively, in two samples of European American and Asian American (Singelis, 1994). A larger comparison of six studies spanning cross-cultural comparisons in the United States, Australia, Mexico, Philippines, Malaysia, and Japan, revealed alpha reliabilities ranging from $\alpha = .61$ to $\alpha = .80$ for both independent and interdependent factors (Miramontes, 2011). In this paper, the scale was used to identify self-construal within the Iranian context.

Individualism and Collectivism scale (INDCOL) (Triandis & Gelfland, 1998)

A 16-item scale measuring four constructs underlying the dimensions of collectivism and individualism: horizontal individualism (HI), vertical individualism (VI), horizontal collectivism (HC), and vertical collectivism (VC). Individuals are asked to indicate what statements best matches their degree of agreement or disagreement with each statement on a 6-point scale, from 1 (='Strongly Disagree'); 2 ('Disagree Slightly'); 3 ('Disagree'); 4 ('Slightly Agree'); 5 ('Agree'); and 6 ('Strongly Agree'). Vertical collectivism refers to feeling part of a collective and willing to accept hierarchy and inequality; vertical

individualism assumes that individuals view themselves as fully autonomous, but recognize and accept that inequality will exist; horizontal collectivism includes perceiving all members of one's collective as equal and horizontal individualism considers seeing the self as fully autonomous, but striving for an idealised equality among individuals. The subscale reliabilities for the US sample were HI (α = .81), VI (α = .82), HC (α = .80), and VC (α =.73) (Cozma, 2011) . Further reliability was examined in a sample of US and Turkish students, revealing reliabilities of HI (a = .74), VI (α = .69), HC (α = .75), and VC (α =.76) (Li & Aksoy, 2007).

Collectivism Self Esteem (Luhtanen & Crocker, 1992)

The Collectivism Self Esteem scale is a 16-item scale that measures four types of self-esteem and evaluation of one's social groups or identities: public, private, membership and importance. It has been translated into several languages and can be adapted to assess collective self-esteem for a wide variety of identities. These four types are: membership self-esteem (e.g. how good or worthy a member of the group one is); private collective self-esteem (e.g. how good one's social groups are), public collective self-esteem (e.g. how one believes others evaluate one's social groups) and importance to identity (e.g. how important one's group is to one's self-concept). All items are answered on a 7-point Likert Scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). This scale is often used to measure group identification. Evidence for reliability and validity was provided by three studies with alphas ranging from .73 to .75 for the Membership subscale, .71 to .80 for the Private subscale, .78 to .80 for the Public subscale and .73 to .86 for the Importance to Identity subscale. Overall reliability across the three studies was α

= .85 (Luhtanen & Crocker, 1992). Other studies reported reliabilities in mainland USA (.77), Hawaii (.65), and Japan (.70) (Yamaguchi et al., 2017).

Communal Orientation Scale (M. S. Clark et al., 1987)

The Communal Orientation Scale (COS) is a 14-item scale. It measures beliefs around the importance of others' needs and feelings in social relationships, and the degree to which individuals should help and care for one another's welfare. Communal relationships are relationships in which members feel a responsibility for meeting the needs of communal partners and in which benefits are given non-contingently in response to partners' needs (M. S. Clark & Mills, 1979; Mills & Clark, 1986). Respondents' general tendency to follow communal norms in relationships with other is measured for each item on a 7-point Likert scale ranging from 1 (='Extremely uncharacteristic of me') to 7 (='Extremely characteristic of me'). The measure, developed and validated by Clark et al. (1987), reported an internal consistency in American undergraduate students (N = 561) of $\alpha = .78$ with a re-test reliability at 11 weeks of .68 (Clark et al., 1987). A study examining communal strength in adults reported $\alpha = .76$ (Mills, Clark, Ford, & Johnson, 2004).

Statistical Analysis

This study consisted of a mixed-methods, between and within-group design. All analyses were run using the software package R (Version 3.5.1) (R Development Core Team, 2016). Exploratory data analysis was carried out to assess whether the data met requirements for parametric data analysis, and where this was not the case, non-parametric statistics were implemented. An alpha level of $p = .05$ was

set as the statistical threshold of significance. Demographic data were analysed using Pearson's chi-squared significance test to assess for differences between populations using the frequency of cases. Self-report affective and cultural measures were analysed using Pearson correlational analyses and independent samples t-tests with group (controls/MDD) as the between-subjects factor. Due to the limited sample size, CFA could not be used to replicate factor structures within each cultural measure, even when collapsing participants across groups. Instead, psychometric analyses of validity and reliability were used to examine the usefulness of the cultural measures in the Iranian context, given its limited implementation to date.

This was followed by CFA across the cultural measures outlined above (i.e. SCS, INDCOL, CSE and COS) to compare the fit of three alternative statistical models (see Figure 1), using the R package 'Lavaan' (version 0.6-3) (Rosseel, 2012). Across CF analyses, a maximum likelihood estimation with full information maximum likelihood (FIML) for missing data was used, while the use of standardised latent factors allowed for a free estimation of all factor loadings. Indices chosen to evaluate the goodness of fit included the Tucker-Lewis index (TLI) and the RMSEA (Root mean square error of approximation) and the Comparative Fit Index (CFI) (He & Van De Vijver, 2012). Based on the literature, recommended values of >= .95 for CFI and TLI and <= .06 for RMSEA indicate a better fit (Lewis, 2017; Marsh, Balla, & McDonald, 1988). RMSEA measures how closely the model reproduces the covariance amongst indicators with lower scores indicating a better fit. The RMSEA represents an absolute measure of fit centred on the non-centrality parameter. Specifically, it has been suggested that

values of .01, .05 and .08 indicate an excellent, good or poor model fit, respectively (MacCallum, Browne, & Sugawara, 1996).

Also, to investigate the impact of depression on cultural orientation, a multi-group confirmatory factor analysis (MG-CFA) was used to investigate the degree to which the self-report measures are invariant across groups (MDD, controls). MG-CFA represents an extension of SEM (Hirschfeld & von Brachel, 2014). As such, depression was added as a latent variable to examine whether this improves or changes the fit of the model(s) using measurement invariance (MI) analysis. MI analysis was applied using a series of nested models, which increasingly restricts its parameter specifications across groups to examine the comparability of underlying factor structures between groups (Schmitt & Kuljanin, 2008; Vandenberg & Lance, 2000).

This analysis was run using the package 'SemTools' (version 0.5-1) (Jorgensen et al., 2018). For every iteration of the increasingly restricted model fits, a $\Delta\chi^2$ test is reported, as well as changes in other fit indices (e.g. ΔCFI), comparing the current model with the previous one, and to the baseline 'Model 1'. Reporting alternative fit indices (AFI), such as differences in the comparative fit index (CFI) compared to chi-square-based tests, are recommended as these are much less sensitive to sample size and more sensitive to non-invariance. The authors propose a cut-off of delta CFI < .01 for accepting the assumption of measurement invariance (Cheung & Rensvold, 2002). See the following for sequences of model comparison tests:

- *Model 1:* configural invariance. The same factor structure is imposed on all groups.
- *Model 2:* weak invariance. The factor loadings are constrained to be equal across groups.
- *Model 3:* strong invariance. The factor loadings and intercepts are constrained to be equal across groups.
- *Model 4:* Factor loadings, intercepts and means are constrained to be equal across groups.

Across analyses, an in particular to run the CFA and multi-group CFA, data were scaled and assessed for multivariate normality using Mardia's multivariate skewness and kurtosis coefficients and corresponding statistical significance, and univariate Shapiro-Wilk normality tests. This was implemented with the MVN package in R (Korkmaz, Goksuluk, & Zararsiz, 2019). Outliers were identified and corrected using the Winsoring approach, in which an outlier is converted to the value of the highest data point not considered to be an outlier, i.e. its nearest non-suspect neighbour (Pusparum, Kurnia, & Alamudi, 2017).

Power Analysis

Sample size considerations are important when implementing CFA. However, sample size estimates for CFA vary depending largely on the number of indices, latent variables proposed and factor loadings. For instance, a recent review estimated sample size starting at 30 cases for a one-factor CFA with four indicators loading at .80 (Wolf, Harrington, Clark, & Miller, 2015). Additionally, increases in the number of indicators per factor may compensate for a limited sample size while preserving power (Marsh et al., 1998). The one-, two- and three-factor CFA

models are based on between four to eleven indicators per variable. The sample size for CFA (N=92), assuming a factor loading of .80, was therefore considered sufficient, in line with established criteria for small, medium and large effect sizes (Cohen, 1992).

This consideration of sample size was also based on the use of scale or subscale totals, rather than individual items, which substantively increases the number of parameters required, thus impacting on the resultant model fit. While individual items allow for a more fine-grained differentiation of concepts using CFA, scale totals (or subscale totals) are used where a group of items demonstrate uni-dimensionality or homogeneity (Cabrera-Nguyen, 2010). In other words, when (sub) totals are thought to reflect the same underlying construct or property. This can be validated through examining the internal consistency reliabilities of individual measures (see Results section for individual measure reliabilities). As subscales in this study were assumed to reflect meaningful constructs, the use of scale totals rather than individual items was considered well-suited to explore the relationships between the cultural measures outline above.

Results

Participant Characteristics

Demographic data for the 45 healthy control participants and 47 participants in the MDD group are presented in Table 1. As can be seen, groups were well-matched in age and in other characteristics.

Table 1

Demographic characteristics. Numbers are ns unless otherwise stated.

	MDD n=47	Controls n=45	Total N=92	t/X2	p	Cohen's d
Age, years						
Mean	32.92	32.33	32.63	0.37	0.72	0.08
SD	7.91	7.36	7.61			
Gender						
Male	8	8	16	0.01	0.92	
Female	39	37	76			
Education, years						
Mean	13.85	13.71	13.78	-0.35	0.73	-0.07
SD	2.04	1.80	1.92			
Marriage						
Single	20	17	37	0.40	0.82	
Married	22	24	46			
Divorced	5	4	9			
Employment Status						
Unemployed	25	31	56	2.49	0.29	
Employed	22	14	36			
Language(s) spoken						
1	21	18	39	0.21	0.90	
2	5	5	10			
3	21	22	43			

Psychometric Properties of Cultural Measures

To examine the psychometric properties within cultural measures in the Iranian sample, reliability analyses using Cronbach's alpha were applied, revealing overall good internal consistency within measures. See Table 2 for an overview of scale reliability. In addition, correlational analyses examined the heterogeneity and convergent validity of the cultural measures, revealing strong inter-correlations within and across measures. See Appendix D for the correlation matrix.

The independent and interdependent SCS subscales exhibited moderate to high reliability with Cronbach's $\alpha = .78$ and $\alpha = .81$, suggesting good internal consistency. All items appeared worthy of retention. There was also a significant positive association between the interdependent and independent subscales ($r = .43$, $p < .001$). Internal consistency and reliability were considered good for the three subscales of the INDCOL: HI ($\alpha = .86$), HC ($\alpha = .73$), and VC ($\alpha = .81$). The VI ($\alpha = .60$) subscale exhibited acceptable reliability. Moreover, the horizontal and vertical individualism scales ($r = .22$, $p = .04$) were moderately correlated, while the horizontal and vertical collectivism subscales ($r = .59$, $p < .001$) were strongly correlated, suggesting good convergent validity for the individualism and collectivism constructs. There were no significant correlations within the horizontal (HI-HC, $r = .19$, $p = .07$) or vertical (VI-VC, $r = .10$, p - .33) dimensions, suggesting divergent constructs within each dimension.

On the CSE, three subscales revealed acceptable reliability: Membership Self-Esteem subscale ($\alpha = .65$), Private Collective Self-Esteem ($\alpha = .71$), and Public Collective Self-Esteem ($\alpha = .62$). In contrast, the Importance to Identity subscale revealed poor reliability ($\alpha = .42$). Reliability was only marginally improved ($\alpha = .46$) when dropping the reverse-scored item "Overall, my group

memberships have very little to do with how I feel about myself.”. Looking at the relationships between subscales, all subscales exhibited significant positive intercorrelations ($p < .001$): Membership Self Esteem relative to Private Self Esteem, $r = .45$, Public Collective Self Esteem, $r = .59$, and Importance to Identity, $r = .40$; Private Collective Self Esteem relative to Public Collective Self Esteem ($r = .36$) and Importance to Identity ($r = .44$) and finally, Public Collective Self Esteem relative to Importance to Identity ($r = .42$). Finally, the COS showed overall acceptable reliability ($\alpha = .64$). All items appeared worthy of retention.

Table 2

Overview of scale reliability statistics.

Measure	mean	sd	Cronbach's α	95 % CI		Average interitem correlation
				Lower	Upper	
Inter. SCS	4.75	.75	.81	.75	.86	.23
Ind. SCS	4.65	.62	.78	.70	.84	.19
INDCOL HI	6.65	.48	.86	.81	.90	.61
INDCOL VI	5.85	1.39	.60	.44	.72	.28
INDCOL HC	6.11	.35	.73	.63	.81	.40
INDCOL VC	6.63	.26	.81	.73	.86	.51
CSE Memb. SE	3.98	.81	.65	.52	.76	.32
CSE Priv. Coll. SE	4.06	.80	.71	.60	.80	.39
CSE Pub. Coll. SE	3.91	.78	.62	.48	.74	.29
CSE Imp. To Id.	4.03	.27	.42	.19	.59	.15
COS	3.81	.93	.62	.50	.73	.11

Note. SCS, Self-Construal Scale; Inter. SCS, Interdependent SCS; Ind. SCS, Interdependent SCS; INDCOL, Individualism and Collectivism Scale; HI, Horizontal Individualism; VI, Vertical Individualism; HC, Horizontal Collectivism; VC, Vertical Collectivism; CSE, Collective Self Esteem; Memb. SE, Membership Self Esteem; Priv. Coll. Self Esteem, Private Collective SE; Pub. Coll. SE, Public Collective SE; Imp. To Id., Importance to Identity; COS, Communal Orientation Scale; Of the observations, 90 were used, 2 were excluded listwise, and 92 were provided.

Affective, Process and Cultural Measures

Table 3 presents the independent t-test results across groups for the battery of affective, cultural and process measures. Results revealed significant group differences between MDD and healthy control participants on all affective measures, with MDD scoring significantly higher on the BDI and BAI. This suggests greater levels of depression and anxiety symptoms, as expected, in the MDD group relative to healthy controls. MDD participants also scored significantly higher on the IPSM and DERS process measures, capturing difficulties commonly associated with depression. This suggests MDD relative to healthy controls have, on average, greater difficulties in emotion regulation and higher interpersonal rejection sensitivity, in line with reported findings in the literature.

However, a different pattern emerged for cultural measures. Healthy controls scored significantly higher relative to MDD on the independent subscale of the SCS, the vertical collectivism (VC), horizontal individualism (HI) and horizontal collectivism (HC) subscales of the INDCOL, the Membership Self Esteem and Public Collective Self Esteem subscales of the CSE, and the COS. This suggests that on average healthy controls endorse higher levels of independent self-construal emphasising individual needs, as well as greater levels of horizontal patterns of individualism and collectivism relative to MDD. In contrast, results did not reveal any significant differences between groups on the interdependent subscale of the SCS, the VI subscale, the Private Collective Self Esteem and Importance to Identity CSE subscales or on the COS.

Previously, it was argued that higher scores on the vertical dimension implied individuals accepted the existence of inequality while also emphasising

achievement, status, hierarchy, comparison and competition with others. In contrast, high-scoring individuals on horizontal dimensions value equality, the freedom to be themselves without the need for comparison or competition (Triandis & Gelfand, 1998). As healthy Iranians scored comparably high on both horizontal and vertical dimensions, results suggest that Iranians in the absence of depression assume that individuals can be meaningfully arranged within a hierarchy, in which both equality and inequality exists, while simultaneously emphasising their uniqueness and autonomy.

Moreover, Iranians in this sample did not exhibit as strong a cultural tendency towards patterns of (horizontal) collectivism as previously assumed, where the self is viewed more or less like every other self (Hofstede, 1980). Instead, along with patterns of independent and interdependent self-construal, findings aligned with similar results found in Malaysia, Japan, the Philippines, Australia and the United States (Miramontes, 2011), as well as Switzerland and South Africa (Györkös et al., 2013). In contrast, MDD participants were less able relative to controls to accept themselves as part of collective, instead endorsing autonomous values while also emphasising inequality amongst individuals. While intriguing, these results beg the question whether depression impacts on cultural orientation, as suggested by the above results, or whether the measures administered across groups are insufficient at capturing cultural differences in a depression sample, perhaps due to differences in the underlying factor structure. It is also important to note that these findings may not generalise to the general public, as this sample was recruited from University panels and may therefore capture a demographic more exposed to individualist beliefs and concepts, relative to the general Iranian population.

Table 3

Descriptive and independent t-test results for all measures.

Measure	Group	Mean	SD	SE	t	p	d	
Beck Depression Inventory	MDD	33.81	9.97	1.46	13.12	< .001	2.74	**
	Controls	9.69	7.41	1.10				
	Total	22.01	14.96	1.56				
Beck Anxiety Inventory	MDD	31.55	14.57	2.13	7.96	< .001	1.66	**
	Controls	11.71	8.39	1.25				
	Total	21.85	15.52	1.62				
Interpersonal Sensitivity Measure	MDD	95.15	15.58	2.27	3.02	.003	.63	*
	Controls	85.71	14.30	2.13				
	Total	90.53	15.62	1.63				
DERS	MDD	107.60	23.00	3.36	3.35	.001	.70	*
	Controls	91.76	22.34	3.33				
	Total	99.85	23.92	2.49				
Independent SCS	MDD	.29	.06	.01	-3.32	.001	-.69	*
	Controls	.33	.05	.01				
	Total	.31	.05	.01				
Interdependent SCS	MDD	.31	.06	.01	-.63	.53	-.13	
	Controls	.32	.06	.01				
	Total	.32	.06	.01				
Horizontal Individualism	MDD	23.32	6.97	1.02	-2.67	.01	-.56	*
	Controls	26.98	6.13	.91				
	Total	25.11	6.79	.71				
Vertical Individualism	MDD	24.00	5.81	.85	-.84	.40	-.18	
	Controls	25.00	5.62	.84				
	Total	24.49	5.71	.60				
Horizontal Collectivism	MDD	22.00	6.51	.95	-2.82	.01	-.59	*
	Controls	25.42	5.02	.75				
	Total	23.67	6.05	.63				
Vertical Collectivism	MDD	24.55	8.00	1.17	-2.57	.01	-.54	*
	Controls	28.24	5.49	.82				
	Total	26.36	7.10	.74				
Membership Self Esteem	MDD	4.26	1.42	.21	2.55	.01	.53	*
	Controls	4.91	1.00	.15				
	Total	4.58	1.27	.13				
Private Collective SE	MDD	4.51	1.40	.20	1.83	.07	.38	
	Controls	5.00	1.15	.17				
	Total	4.75	1.30	.14				
Public Collective SE	MDD	4.38	1.15	.17	3.37	.00	.70	*
	Controls	5.16	1.04	.16				
	Total	4.76	1.16	.12				
Importance to Identity	MDD	4.23	1.09	.16	.35	.73	.07	
	Controls	4.31	1.04	.16				
	Total	4.27	1.06	.11				
Communal Orientation Scale	MDD	63.83	12.21	1.78	2.53	.01	.53	*
	Controls	69.76	10.07	1.50				
	Total	66.73	11.54	1.20				

Note: DERS, Difficulties in Emotion Regulation Scale; SCS, Self-Construal Scale; SE, Self Esteem; All tests, variances of groups assumed equal except for BDI, BAI, and VC; * $p<0.05$, ** $p<0.001$. Df=90.

Confirmatory Factor Analyses across Cultural Measures

As we were unable to run within-measure CF analyses, we next compared alternative statistical models, which may better account for the data across measures. Specifically, we examined the underlying factor structures across cultural measures in three alternative statistical models proposed earlier: a single, two- and three-factor model (see Figure 1). The single factor model was measured using the subscales of all measures. The two-factor model was measured using the subscales of the SCS and INDCOL, capturing a proposed measure of 'cultural construal', and the subscales of the CSE and COS, capturing 'communal self-esteem'. The three-factor model measured three proposed factors: 'independent individualism', captured by the independent SCS, horizontal and vertical individualism subscales; 'interdependent collectivism', captured by the interdependent and horizontal and vertical collectivism subscales; and finally, 'communal self-esteem', captured by the COS and CSE subscales. Prior to analysis, scores were subjected to a z-score standardisation. See below for graphical illustration.

Results revealed a poor fit for the single-factor model ($\chi2(55) = 385$, $p < .001$; TLI = .61; RMSEA of .16 90% CI [.13, .19]). See Figure 2. In comparison, the two-factor model exhibited a slightly better but still overall poor fit ($\chi2(55) = 385$, $p < .001$; TLI = .85; RMSEA of .1 90% CI [.07, .13]). See Figure 3. The three-factor model achieved the best overall fit ($\chi2(55) = 385$, $p < .001$; TLI = .91; RMSEA of .08 90% CI [.34, .11]). See Figure 4. For the three-factor solution, the indicators all showed significant positive factor loadings, with standardised coefficients ranging from .25 to .95. See Table 4. There were also small albeit significant positive correlations among all three latent factors (see Table 5),

indicating that individuals who scored highly in one dimension were more likely to show high scores in the others as well. Taken together, these results are consistent with the characterisation of cultural orientation as comprising distinct factors for independent (individualistic) and interdependent (collectivistic) self-construal, which are distinct albeit related to communal self-esteem.

Table 4

Factor loadings for the three-factor solution.

Latent Factor	Indicator	B	SE	Z	Beta	p
Interdependent Collectivism	SCS Interdependent	1	0	NA	.65	NA
	INDCOL HC	1.3	.24	5.38	.85	***
	INDCOL VC	1.04	.2	5.18	.68	***
Independent Individualism	SCS Independent	1	0	NA	.95	NA
	INDCOL VI	0.26	.14	1.84	.25	
	INDCOL HI	0.35	.16	2.17	.33	*
Communal Self-Esteem	CSE Importance To Identity	1	0	NA	.34	NA
	CSE Membership Self Esteem	2.69	.82	3.27	.92	**
	CSE Private Collective Self-Esteem	2.57	.79	3.25	.88	**
	CSE Public Collective Self Esteem	2.3	.72	3.19	.78	**
	Communal Orientation Scale	1.32	.49	2.69	.45	**

Note: *** p < .001, ** p < .01, *p < .05

Table 5

Latent factor correlations for the three-factor solution.

Factor 1	Factor 2	Correlation	p
Interdependent Collectivism	Independent Individualism	.54	***
Interdependent Collectivism	Communal Self Esteem	.51	***
Independent Individualism	Communal Self Esteem	.38	***

Note: *** p < .001, ** p < .01, *p < .05

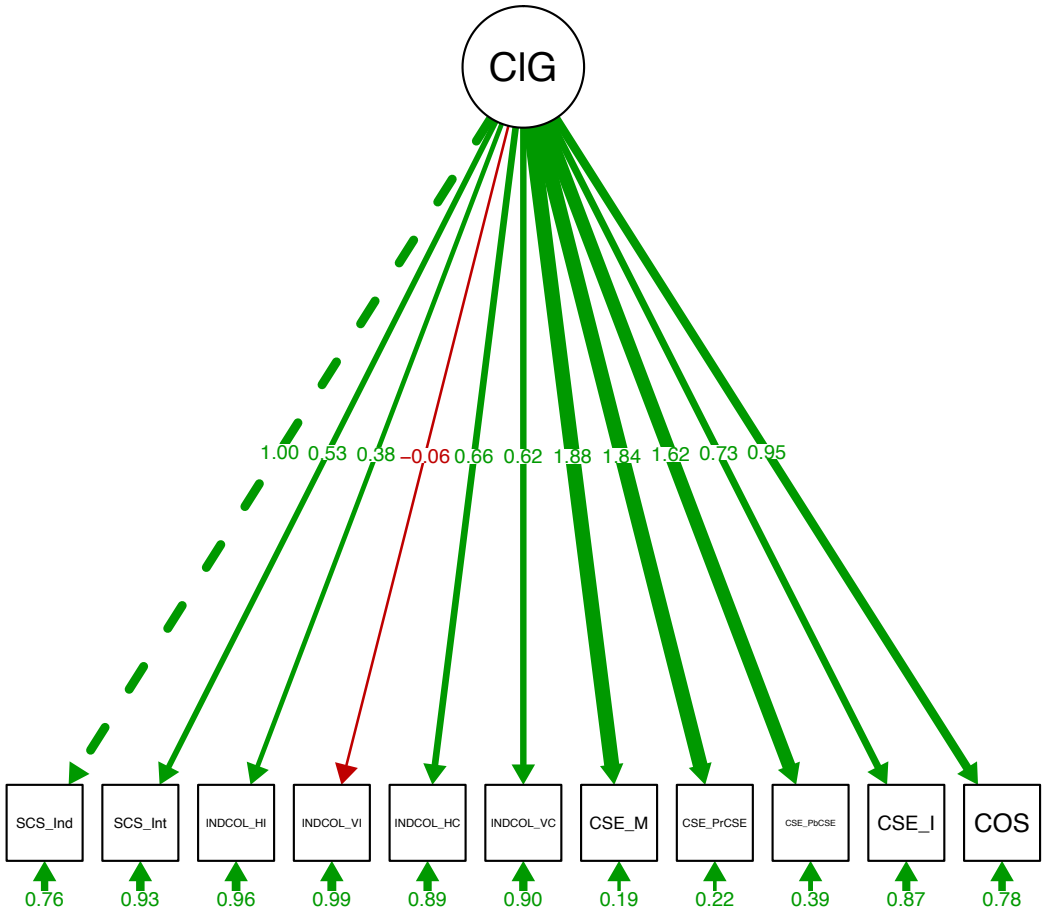

Figure 2 **Single-factor solution proposing a 'cultural general' factor (ClG).** Latent factors are shown in circles; squares represent observed variables with arrows denoting the strength of the loading.

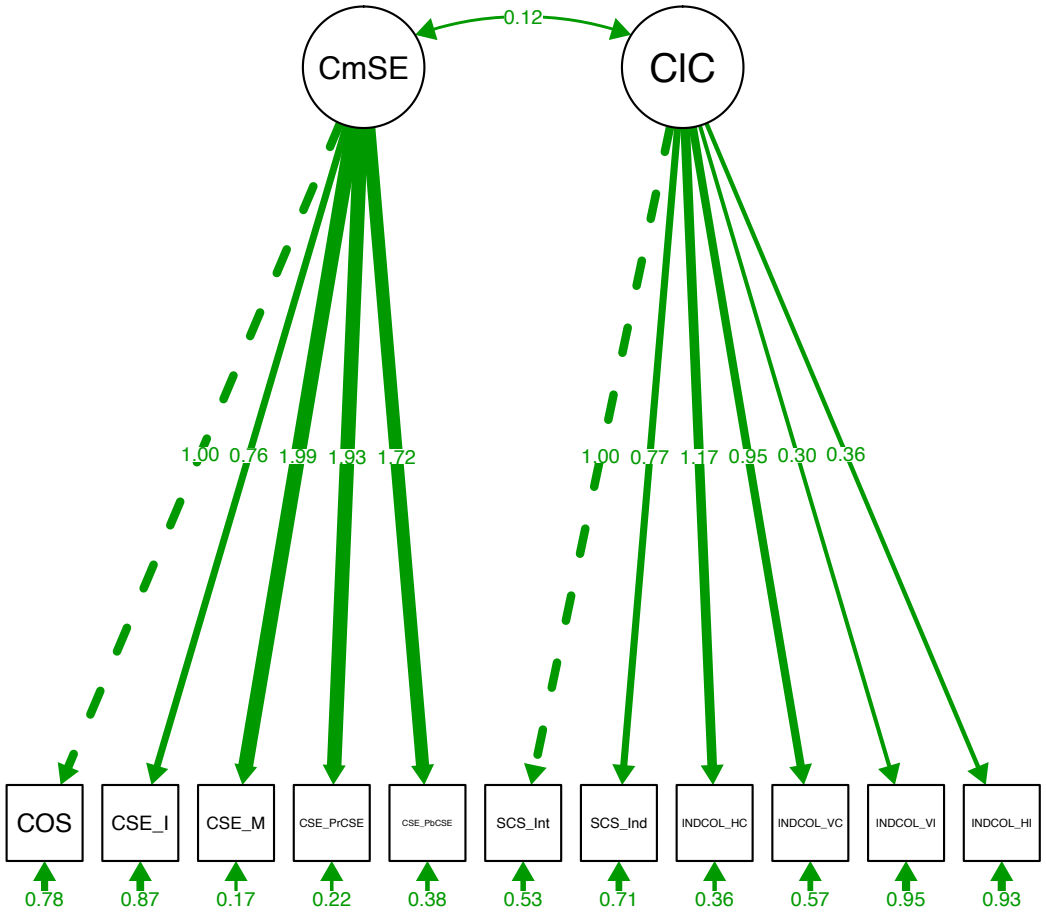

Figure 3 **Two-factor solution proposing a 'communal self-esteem' (CmSE) and 'cultural construal' (ClC) factor.** Latent factors are shown in circles; squares represent observed variables with arrows denoting the strength of the loading.

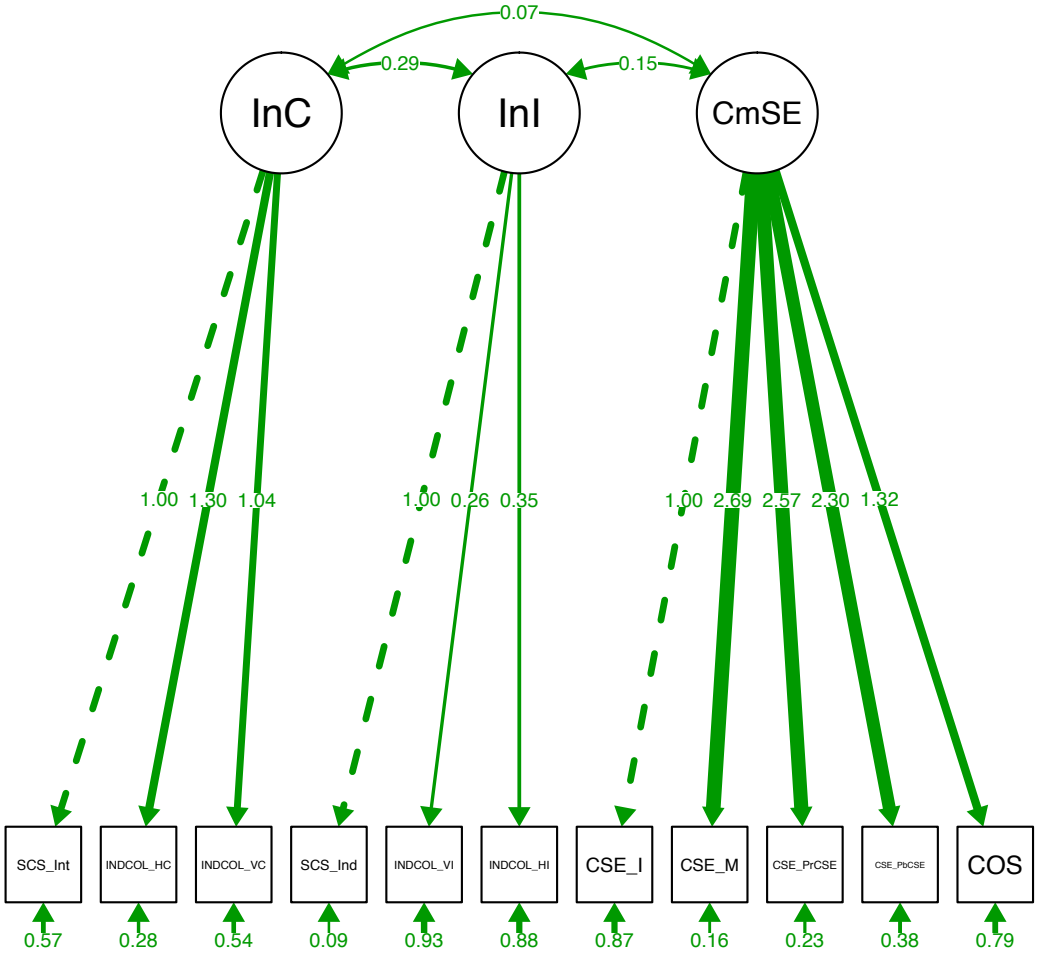

Figure 4 **Three-factor solution proposing 'interdependent collectivism' (InC), 'independent individualism' (InI) and 'communal self-esteem' (CmSE) factors.** Latent factors are shown in circles; squares represent observed variables with arrows denoting the strength of the loading.

Multi-group confirmatory factor analysis

Next, to examine whether depression impacts on the latent factor structures across the cultural measures in this Iranian sample, we analysed measure invariance across groups adopting the maximum likelihood estimate (ML) as before. Multivariate normality was assessed with respect to skewness (between -.91 and .11), kurtosis (between -.83 and 1.52) and individual scales transformed to meet the assumptions of normality as described in the statistical analysis section.

Prior to the invariance analysis, each model was applied separately for each group, in case this would increase or decrease the respective model fits examined earlier. However, results revealed that Model 1 still exhibited a poor fit, both in MDD ($\chi2(55) = 228$, $p < .001$; TLI = .63; RMSEA of .16 90% CI [.11, .2]) and Controls ($\chi2(55) = 198$, $p < .001$; TLI = .38; RMSEA of .19 90% CI [.15, .23]). In comparison, Model 2 revealed a poor fit in MDD ($\chi2(55) = 228$, $p < .001$; TLI = .71; RMSEA of .14 90% CI [.09, .19]), but an improved fit in Controls ($\chi2(55) = 198$, $p < .001$; TLI = .87; RMSEA of .09 90% CI [, .14]). In Model 3, MDD again exhibited a poor fit ($\chi2(55) = 228$, $p < .001$; TLI = .73; RMSEA of .14 90% CI [.09, .18]), while controls exhibited a slightly better fit ($\chi2(55) = 198$, $p < .001$; TLI = .85; RMSEA of .09 90% CI [.05, .15]).

The differences in fit indices suggest a different factorial structure across groups, suggesting that groups may not exhibit configurational invariance, as will be assessed in the next section. Figure 5-7 illustrate the factor weights for each model for MDD and healthy controls, respectively.

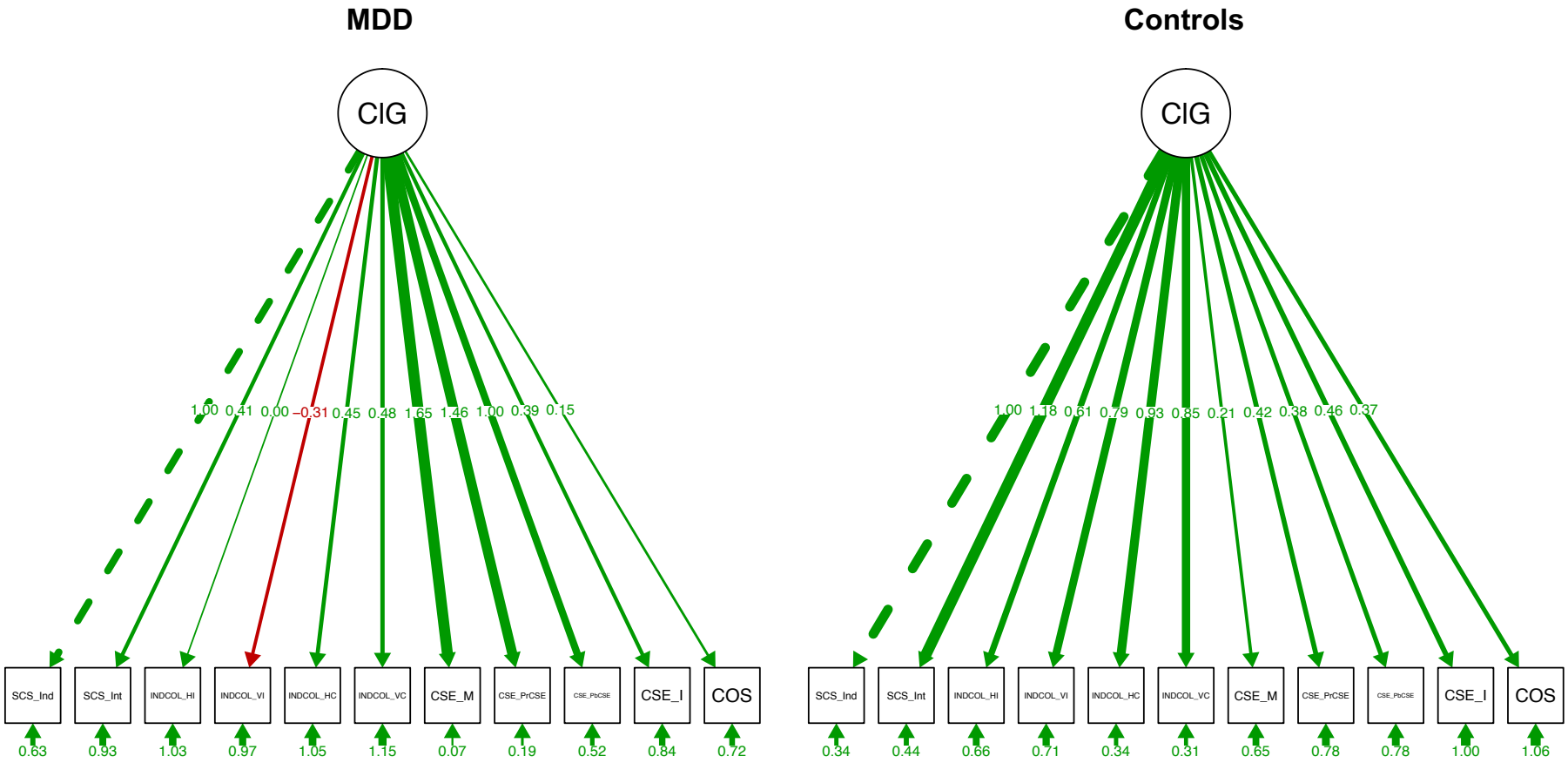

Figure 5 **Single-factor solution for MDD and healthy controls proposing a 'cultural general' factor (ClG).**

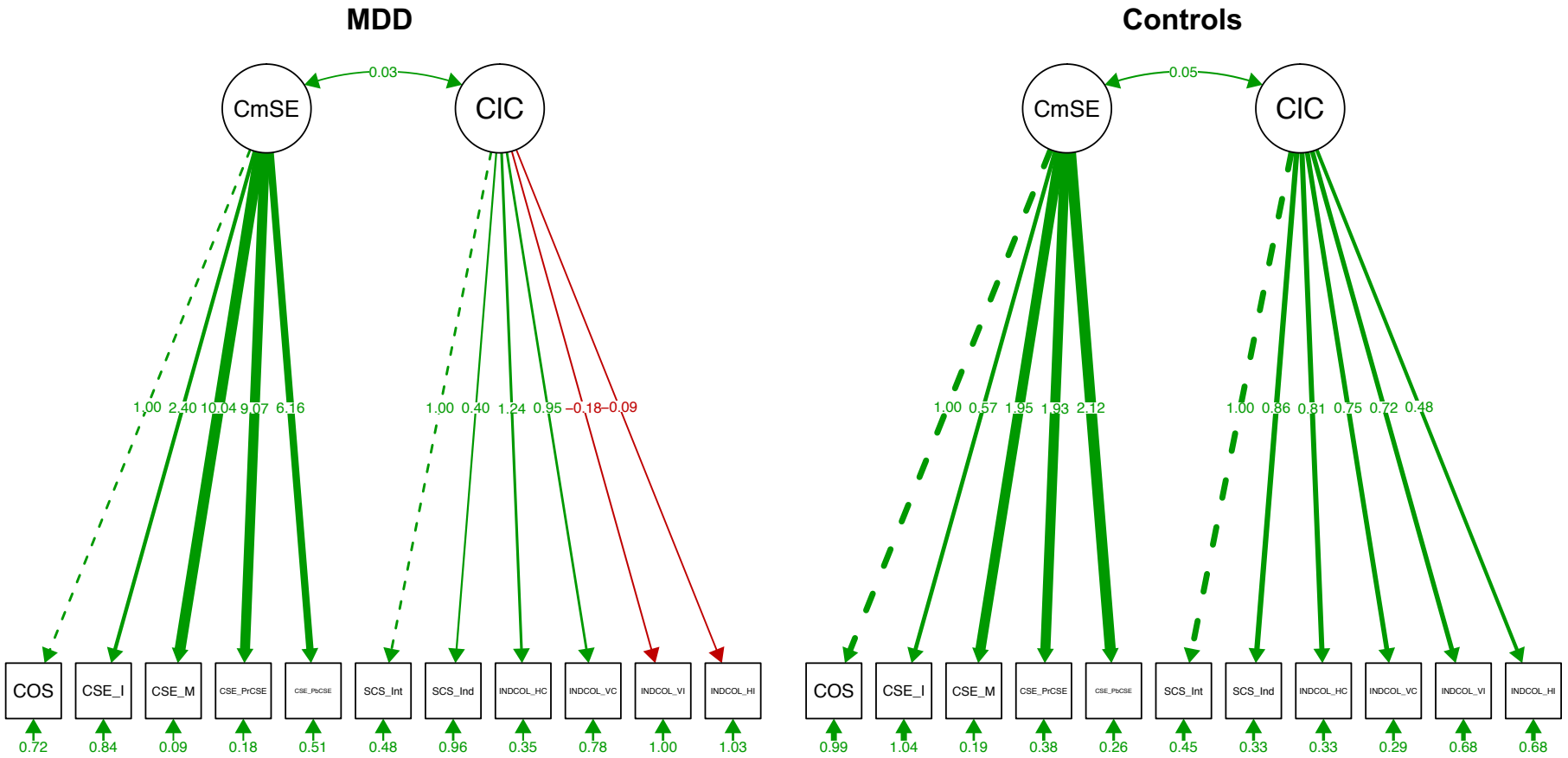

Figure 6 **Two-factor solution for MDD and healthy controls proposing 'communal self-esteem' (CmSE) and 'cultural construal' (ClC) factors.**

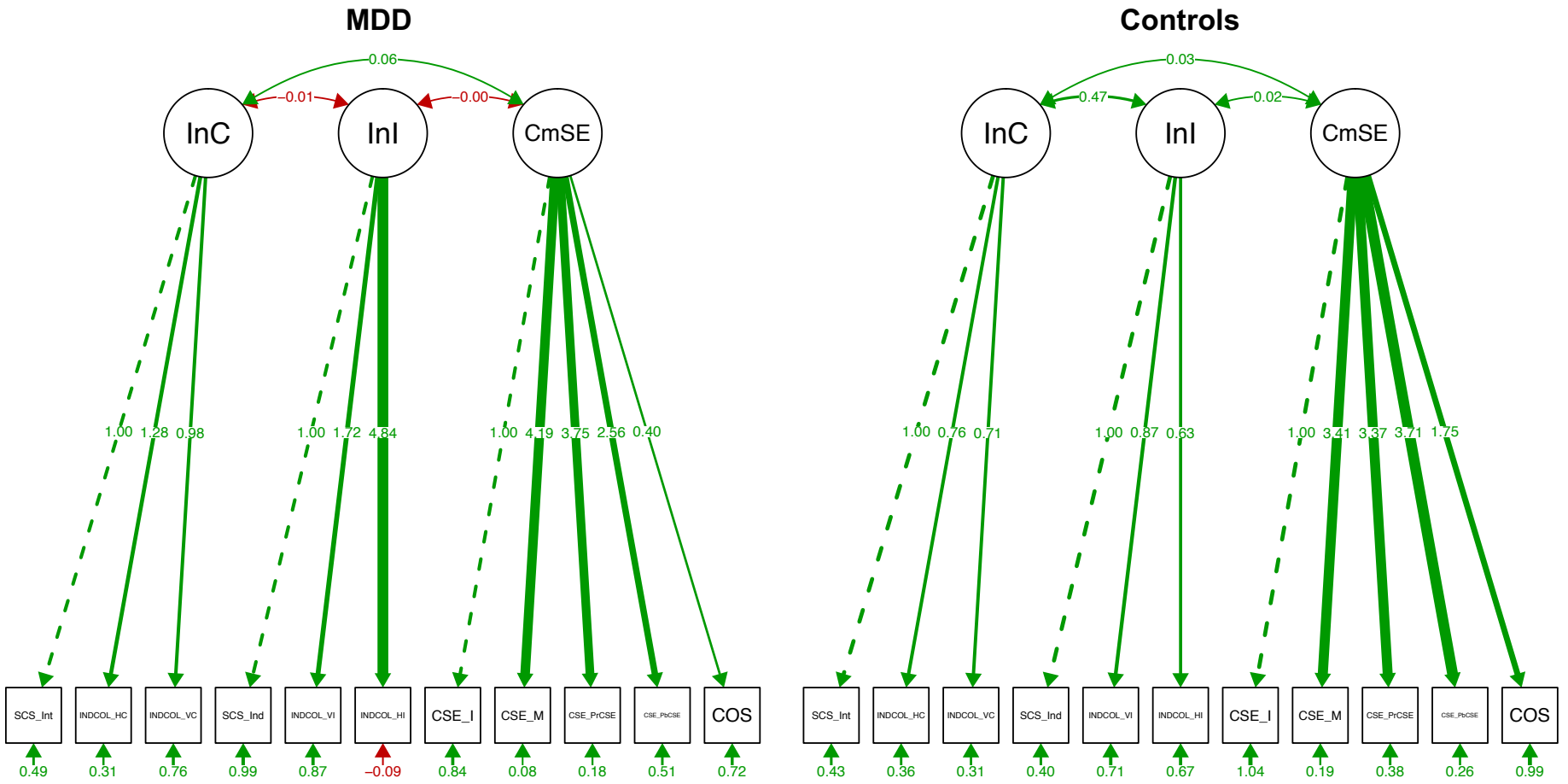

Figure 7 **Three-factor solution for MDD and healthy controls proposing 'interdependent collectivism' (InC), 'independent individualism' (InI) and 'communal self-esteem' (CmSE) factors.**

Measurement Invariance

Given the above, measurement invariance was analysed to establish whether the estimated factors are indeed measuring the same underlying latent construct within each group. For the single factor (Model 1) and two-factor solution (Model 2), the assumption of measurement invariance was not met across model comparisons (see Table 6). In contrast, Model 3 comparisons indicated equal factor loadings, given a non-significant chi-square test ($p = .76$) and a $\Delta CFI < .01$, the proposed cut-off for accepting the assumption of measurement invariance (Cheung & Rensvold, 2002). However, when constraining the intercepts to be equal across groups, the significant chi-square results and increases in ΔCFI propose that the strict invariance assumption is not met, given a proposed cut-off of delta $CFI < .01$ for accepting the assumption of measurement invariance (Cheung & Rensvold, 2002), as outlined in more detail in the Statistical Analysis section.

When the assumption of measurement invariance is not met, this suggests that a construct has a different underlying structure or meaning to the groups in question. As a result, an existing construct cannot be meaningfully tested across groups, and results need to be interpreted with caution. As such, results here suggest that differences between MDD and controls in Model 1 and 2 reflect differences in the underlying factor structure, as opposed to Model 3 with comparable factor loadings. In this model, group differences can be thought to reflect real differences in independent and interdependent orientation and communal self-esteem.

Table 6

Measurement invariance: series of model comparisons.

Single Factor Solution	$\chi 2$ ($\Delta\chi 2$)	Df (ΔDf)	p (Δp)	CFI (ΔCFI)
M1 Configural	206.69	88	<.001	.62
M2 Weak invariance (loadings)	(27.77)	(10)	(.002)	(.06)
M3 Strong invariance (loadings + intercepts)	(25.26)	(10)	(.01)	(.05)
M4 Strict invariance (equal loadings + intercepts + residuals)	(9.06)	(1)	(.003)	(.03)
Two Factor Solution				
M1 Configural	137.11	86	<.001	.84
M2 Weak invariance	(23.41)	(9)	(.01)	(.05)
M3 Strong invariance	(19.98)	(9)	(.02)	(.04)
M4 Strict invariance	(13.43)	(2)	(.001)	(.04)
Three-Factor Solution				
M1 Configural	129.6	82	.001	.85
M2 Weak invariance	(4.94)	(8)	(.76)	(.01)
M3 Strong invariance	(15.74)	(8)	(.05)	(.03)
M4 Strict invariance	(14.83)	(3)	(.002)	(.04)

Note. Cheung and Rensvold (2002) suggest a cut-off of ΔCFI < 0.01 to meet invariance assumption.

Correlation of Cultural Factors with Affective and Process Measures

Finally, predicted factor scores of the best fitting three-factor solution were entered into a Pearson correlation to examine the relationship between the three proposed cultural factors, and affective and process measures. See Appendix E for the correlation matrix.

Across groups, Interdependent Collectivism was significantly negatively correlated with the BDI ($r = -.31$, $p = .002$), with greater depressive symptoms associated with lower interdependent construal. In contrast, Independent Individualism was significantly associated with BDI ($r = -.40$, $p < .001$), BAI ($r = -.29$, $p = .01$), and IPSM ($r = -.22$, $p = .03$). Finally, Communal Self Esteem was significantly associated with BDI ($r = -.44$, $p < .001$), BAI ($r = -.34$, $p = .001$), IPSM ($r = -.37$, $p < .001$), and DERS ($r = -.27$, $p = .01$). See Appendix E.

Taken together, lower symptoms of depression, lower interpersonal rejection sensitivity and enhanced emotion regulation skills are associated with greater independent self-construal and greater communal self-esteem; while in controls, lower depressive symptomology is associated with greater interdependent construal. However, contrary to expectations, greater emotional dysregulation was associated both with independent and interdependent construal. Other comparisons were not significantly correlated.

Discussion

This study explored the relationship between cultural orientation and depression in a novel sample of Iranians with and without Major Depressive Disorder. This aimed at understanding whether existing findings across different cultural contexts can be replicated and validated in an Iranian cultural context. It also aimed at addressing some of the challenges in cross-cultural psychology, in particular, the need for replication of research findings in different cross-cultural contexts (Sternberg, 2017).

The first research question examined whether the psychometric properties of the cultural measures and overall results in the Iranian sample fall in line with previous findings reported. While results suggested good overall reliability across measures, they also failed to replicate previous conceptualisations of Iran as a purely collectivistic culture. However, in line with the literature, depressed individuals exhibited elevated levels of depression, anxiety, interpersonal sensitivity and difficulties in emotion regulation.

The second research question compared three alternative models to evaluate the best fit of the data across cultural measures. This investigation chose to focus on one, two and three-dimensional models, as the cultural measures used in this study did not clearly map on to the horizontal and vertical scales of the four-dimensional model. Results revealed the three-factor solution as the best fit across for all participants, proposing 'independent individualism', 'interdependent collectivism' and 'communal self-esteem' as meaningful factors. While dimensionality in the conceptualisation and measurement of culture has long been debated (Cozma, 2011), this is the first empirical investigation to explicitly

compare these cultural measures, as well as examining the constructs in an Iranian, let alone clinical sample.

The third research question addressed whether depression would significantly impact on the latent factor structure of the proposed models. Here, the three-factor model again exhibited the best fit and importantly, also exhibited measurement invariance across groups.

Finally, the fourth research question examined the relationship between the factor structure and affective and process measures. This revealed significant associations between the cultural factors and affective and process measures, although this association was weaker for emotion regulation skills. Overall, greater depressive symptomology was associated with lower independent self-construal and lower collective self-esteem.

While between-group differences in affective and process measures were in line with the literature, this study revealed intriguing findings within the cultural domain. Broadly, the scores on the SCS suggested a comparable endorsement of both independent and interdependent self-construal. This indicated that unlike previous conceptualisations (Hofstede, 1980), healthy Iranians did not exhibit a strong collectivist cultural tendency. Further, in previous investigations, independent self-construal was associated with greater well-being, self-enhancement and self-promotion, and thought to buffer against distress (Lee, Aaker, & Gardner, 2000; Mak, Law, & Teng, 2011). In contrast, interdependent self-construal was thought to leave individuals more vulnerable to distress, due to the heightened emphasis on and expectation of interpersonal cohesion (A. G. Lam & Zane, 2004; B. T. Lam, 2005). This was in line with our findings, suggesting that independent construal provides a buffer against psychological distress across

groups. In fact, distress in MDD participants may reflect their heightened sensitivity to the outcome of interpersonal relationships encompassed in their interdependent construal.

Similarly, controls endorsed more autonomous values on the widely used IND-COL measure, emphasising collective equality within a meaningful hierarchy relative to depressed Iranians. The juxtaposition of hierarchy and equality, as well as similar endorsement of both independent and interdependent self-construal, may appear contradictory but complements other findings suggesting that Iranians endorsement of collectivistic value is commensurate with individualistic values (Ghorbani, Bing, Watson, Davison, & LeBreton, 2003). This might reflect a societal change (Brumberg & Farhi, 2016; Chatty et al., 2005; Haghighatjoo, 2016), in which new cultural values are being endorsed, compared to previous conceptualisations (Gudykunst & Ting-Toomey, 1996; Hofstede, 1980, 2001). However, it also suggests that in healthy Iranians, individual needs can co-exist alongside communal commitments and values, while in depression, this co-existence is trumped by the need for autonomy and a heightened focus on inequality.

These findings mirror the depression literature more generally, in which a heightened self-focus in depression and negative response bias may divert attention away from socially engaging or positive interactions (Gotlib, Krasnoperova, Neubauer Yue, & Joormann, 2004; Mor & Winquist, 2002; Roiser & Sahakian, 2013). Similarly, *others'* needs and feelings in communal relationships relative to *individual* needs were valued less in the presence of depression, illustrated in lower membership self-esteem and lower public self-esteem in depressed relative to non-depressed individuals. In contrast, no

difference between groups was found on private self-esteem and importance to identity, suggesting that private and public self-esteem were differentially affected by depression. As such, discrepancies in fulfilling value priorities consistent with one's surrounding culture and 'public' identity may have a greater impact on self-esteem compared to any perceived discrepancies in personally fulfilled values held 'in private' (Becker et al., 2014). The findings reiterate the view that in Iran, the difference between the private and public sphere may be more pronounced relative to other cultures (Ghobari & Bolhari, 2001).

Theoretical frameworks outlined in the conceptual introduction suggested that adverse life events, such as traumatic experiences, but also social rejection experiences, can impact on value priorities embedded within self-construal and self-esteem. Trauma promoted more autonomous orientation focused on safety and survival (Jobson, 2009), while social 'risk' of exclusion was found to trigger a risk-averse motivational state with maladaptive behavioural adaptations aimed 'repairing' one's social standing (Allen & Badcock, 2003). Results from this empirical investigation suggest that the tendency for inward-directed goal hierarchies and/or perceived threats to social status associated with depression may be reflected in lower communal self-esteem and lower endorsement of independent individualism in depressed versus healthy controls. These constructs were also found to be associated with greater interpersonal rejection sensitivity and difficulties in emotion regulation. This is in line with findings suggesting that collective self-esteem mediated the relationship between individual self-construal and subjective well-being (Yu, Zhou, Fan, Yu, & Peng, 2016). As such, present findings provide a first tentative examination of the social risk hypothesis in Iran

and emphasise the importance of incorporating constructs of self-esteem or well-being in cultural conceptualisations.

Aside from independent individualism and interdependent collectivism, the inclusion of 'communal self-esteem' therefore clearly captures an important dimension previously disregarded, especially in this Iranian sample. This underscores the importance of multi-dimensional conceptualisations of culture that go beyond the traditional individualism-collectivism construct (Fiske, 2002). Not only did the incorporation of this dimension into the three-factor model best fit the available data, but it also exhibited measurement invariance across groups. Our findings, therefore, allow for further examinations of 'true' differences between depressed and non-depressed, which are not skewed by lack of equivalence or poor validity of measures, as outlined in the challenges in cross-cultural psychology. As such, the multi-dimensional characterisation of cultural orientation in Iran provides a novel way to capture individual and cultural differences in affective processing, interpersonal sensitivity and/or difficulties in emotion regulation. It could also provide a valuable pathway to understanding the development and maintenance of depression.

As such, this work is of both clinical and cross-cultural interest. In Iran, clinical populations continue to be faced with significant stigma with no available data on the national prevalence of mental disorders until 2004 (Ciftci et al., 2012; Hughes-Morley et al., 2015; Rüsch et al., 2005). Findings from this study, therefore, shed important light on the depressive profiles of Iranians, which can be incorporated into culturally-informed conceptualisations of mental health. This may contribute to the understanding of cognitive models of depression in future

and allow researchers and clinicians to develop and implement culturally-sensitive interventions targeting mental health in Iran and beyond.

For example, for current Western models of depression, this may mean incorporating a cultural formulation into the model, emphasising the importance of culturally-valued beliefs and assumptions that may have led to the development of dysfunctional attitudes and negative cognitions as opposed to viewing the individual in isolation or limited to their nuclear family experiences. This would allow clients to gain a greater understanding of both the origin and maintenance of their difficulties and could be of particular importance in communities that have faced a process of acculturation, placing them at greater risk of psychological distress. For example, when treating clients from Iran or a culture similar to Iran within Western medical contexts, in which having the importance of self-actualisation will have to be carefully weighed against the importance of communal needs. Finally, incorporating our understanding of the relationship between culture and mental health into current teaching methods will aid in training culturally-competent clinicians as part of the competency frameworks aimed at ensuring the delivery of effective psychological interventions.

However, there are a few limitations of the present study that need to be addressed and will also be elaborated on in the third part of the thesis. Firstly, given the limitations in sample size, findings need to be interpreted with caution and would benefit from replication in representative samples of depression and healthy control participants. *A-priori* power analyses are the preferable approach to determining the sample sizes required to detect an existing effect within the data. However, these were not feasible due to the practical constraints of undertaking cross-cultural research in countries with less well-established research

infrastructures and less rigorous testing procedure. In Iran, the stigma surrounding mental health (disclosure) significantly impeded the recruitment of clinical samples that are large enough for research purposes. The cross-sectional nature of this study limits the ability to draw causal inferences. Future investigations could consider incorporating longitudinal designs to examine whether differences in cultural orientation lead to depression symptoms or vice versa. In addition, as a range of measures required translation for the purpose of this project, there exists limited data on the translated measures' validity and reliability. Further validation would help to underscore the utility of these measures in other Iranian samples, especially community samples. Nonetheless, the novelty of the sample remains a key strength as it is essential to examine the impact of culture on depression in as many cultural contexts as possible.

In sum, this study explored cultural orientation and depression in Iran using complex statistical analysis. Findings validated existing cultural measures in line with calls in the literature to provide replicability, as well as a data-driven approach to derive meaningful latent structures across cultural measures. However, importantly, it provided a unique examination of the relationship between culture and depression. Finally, all these analyses were run in a novel sample, not typically the focus of empirical examinations (Butler et al., 2007; Cozma, 2011; Kitayama et al., 2000; Batja Mesquita et al., 2016). As such, findings here provide compelling evidence suggesting multi-dimensionality applies to the Iranian society, necessitating a reconsideration of previous cultural conceptualisations (Gudykunst & Ting-Toomey, 1996; Hofstede, 1980, 2001).

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Part Three: Critical Appraisal

Introduction

This critical appraisal will provide an opportunity to reflect on the research process as a whole and to provide background on the nature of this collaborative project; this will include a discussion of opportunities and challenges posed by carrying out research in Iran in general, and challenges and limitations unique to a secondary data project. The appraisal will also aim to expand on general concerns identified within the cross-cultural psychology literature, drawing on some of the issues highlighted in the conceptual introduction in part one and offer a discussion of possible future directions in this exciting, ever-evolving field. Finally, this appraisal will also provide a space to reflect personally on the research process as my training to become a scientist-practitioner concludes.

Background

Prior to my training as a clinical psychologist, I was undertaking a PhD in Cognitive Neuroscience, examining the neural signature of social processing in depression. In this context, I was struck by the limitation of viewing social processes in isolation and disregarding the cultural context from which they emerge. As such, I questioned whether research could do more to incorporate cultural frameworks, especially in cognitive neuroscience, which has largely remained a Western-led research field. This sparked my interest in cross-cultural psychology more generally and led me to pursue a research project outside of my PhD work to examine emotion processing cross-culturally. As such, I was fortunate enough to collaborate with Dr Laura Jobson (LJ) (Monash University, Australia), with the support of my PhD supervisor Dr Tim Dalgleish (MRC Cognition and Brain Sciences Unit, University of Cambridge, UK).

Together with LJ, we designed and developed a series of behavioural studies. However, while the data presented in the previous chapter, therefore, forms part of a larger dataset, the cross-cultural comparison centred on a series of empirical studies, which were carried out in Iran, Malaysia and Australia. LJ led the overall project, coordinating the studies in Australia and Malaysia, while I led on implementing the studies in Iran in collaboration with Dr Alireza Moradi. However, given the novelty of the Iranian population and its poor cultural characterisation to date, I also decided to incorporate a battery of self-report measures in Iran only; in particular, the cross-cultural measures presented previously. This required the careful selection, translation and validation of a range of measures.

In 2016, I then travelled to Iran to set up the studies and, on my return to the UK, was able to supervise the remaining data collection remotely. This included the administration of measures and simultaneous running of three behavioural studies, with the help of Farsi speaking research assistants, and with the great help of my research colleague, Vida Mirabolfathi. I then analysed the Iranian data separately and aimed at reporting these results for the D.Clin.Psy. thesis, while overall, results from the cross-cultural comparison were written up by LJ and presently under submission. However, while the description thus far may give the impression of a smooth and conflict-free research process, the actual execution of this project encountered many obstacles along the way, a few of which I will outline in more detail in the next sections.

Conducting Research in Iran

Firstly, while Iran has made significant steps to facilitate basic science research, Iranian scientists and scientists collaborating with Iranian academic institutions face significant challenges when attempting to carry out basic scientific research (Mehrdad, Heydari, Sarbolouki, & Etemad, 2004). My main challenges were accessing a well-established research infrastructure, which might include appropriate testing facilities, participant panels, and means for reimbursement.

This difference in infrastructure was also evident in the process of gaining ethical approval. As this project was part of a larger collaboration, ethical approval was first sought from Monash University with Dr Laura Jobson as the main lead of the project (See Appendix B). Simultaneously, in Iran, Dr Moradi presented the project to the department at Kharazmi University and received departmental approval. However, at the time, Kharazmi University did not have a dedicated ethics committee for research projects. It was only in 2018 that Kharazmi University formally established an ethics committee and as a result, project proposals were presented again, resulting in formal ethical approval in May 2019. See Appendix B for ethical approval certificates and supporting letter outlining this process of gaining ethical approval.

Obtaining ethical approval is at the heart of conducting any sound research, however, the process described above highlighted the 'ethical dilemma' described more generally with regards to conducting collaborative research in less-resourced countries, in which standards of care, informed consent or cultural expectations around research procedures may differ from countries with establish ethical review committees, such as the UK or US (Mertens, Ginsberg, Matsumoto, & Jones, 2014; Zumla & Costello, 2002). This includes differences in research budgets,

which meant we were faced with difficulty in recruiting trained research assistants familiar with testing procedures and clinical protocols, while also ensuring that participants were adequately compensated. This was important not just to ensure data collection would be carried out conscientiously and ethically, but also to realise this research project in terms of the wider collaboration.

Another significant challenge centred on the availability of technology necessary for data collection and analysis, e.g. statistical software packages, or other commonly available licenced computer software, as these are subject to international sanctions. Ironically, I consequently encountered the difficulty of having to update all my computer programs to run on newer, frequently incompatible, software, as my Iranian research colleagues had obtained more recent software licences (although perhaps through less conventional means). Conversely, the widespread internet censorship in Iran severely limited the ability to freely source information or resources available on the internet (Aryan, Aryan, & Halderman, 2013). This censorship limits scientific growth and progression of scientific knowledge in the same way that preventing open access to published research articles and other resources continue to widen the knowledge-gap between developing countries like Iran and better-resourced scientific communities (Evans & Reimer, 2009; Suber, 2008; Van Noorden, 2013). As such, in the course of this project, I became acutely aware of just how lucky I have been to have benefitted both from existing research infrastructures, as well as access to open science while being a student at various UK academic institutions, including UCL.

However, aside from the challenges, I was also faced with addressing some of the more common pitfalls experienced in cross-cultural psychology. The

conceptual introduction already outlined the main issues, including the difficulty of ensuring measurement equivalence, biases or lack of ecological validity. As such, the field of cross-cultural psychology has already made significant strides in developing culturally sensitive models of human behaviour. However, culture as a construct remains of the most challenging phenomena to capture. Future research will be increasingly tasked with examining differences in social, affective or cognitive processes both on a behavioural and neural basis. This might initially mean translating existing behavioural findings into the domain of cognitive neuroscience, currently a largely Western-led research field. I am curious as to whether contributions from the relatively new field of a 'cultural neuroscience' will be able to finally answer some of the fundamental questions around cultural universality versus biological determinism (Bjornsdottir & Rule, 2018).

Clinical Recruitment Issues

However, regardless of the methodological approach chosen, other challenges remain. Particularly relevant to this project was the recruitment of a clinical sample of depressed and non-depressed participants. Recruitment of diverse samples can be challenging in any context (Knight et al., 2009), but this challenge is heightened for clinical populations, let alone in environments where mental health continues to be faced with significant stigma (Ciftci et al., 2012; Hughes-Morley et al., 2015; Rüsch et al., 2005). For example, until 2004, there was no available national data on the prevalence of mental disorders in Iran until a large-scale survey estimated prevalence rates for mental health disorders to be around 21% in both urban and rural settings (Noorbala, Bagheri Yazdi, Yasamy, & Mohammad, 2004). This represents an important step in being able to successfully develop and implement

interventions targeting mental health, as there is a need. Similarly, clinical research relies on the availability of volunteers to further our understanding of the psychological processes involved in mental health disorders, including depression.

Besides, in recruiting clinical samples, it is vital to find representative samples to be able to reliably generalise any behavioural or neural differences in functioning. This recruitment process is frequently challenged by the heterogeneity of depressive symptoms found in clinical samples and sample selection issues more generally, including the issues raised above (Hughes-Morley, Young, Waheed, Small, & Bower, 2015). While every effort was made to recruit a representative sample, it is therefore important to raise the possibility of limited generalisability. It is also for this reason that studies in cross-cultural psychology would benefit from replication and further validation, as suggested previously (Matsumoto & Yoo, 2006; Sternberg, 2017).

From Primary to Secondary Data

I would now like to think more about the challenges unique to the secondary data project. As indicated earlier, this project initially aimed at mainly presenting results from the series of empirical studies examining the relationship between cultural variability and i) instantaneous emotional reactions to biological motion stimuli, ii) subjective experience of emotion, requiring some language and higher-order cognition and iii) emotion meaning, involving concepts, preferences and beliefs about emotions which require language and higher-order thinking. The latter study aimed at replicating a previous study by Mesquita et al. (2001) in a novel sample of depressed individuals in Iran. However, in the course of developing this research project for the D.Clin.Psy., it emerged that any data

collected before the beginning of the training would only be considered secondary data, even if it had originally been collected by the same researcher (or team of researchers). As such, I needed to rethink the approach I would take to these data to ensure that the analyses satisfied the D.Clin.Psy. criteria for a substantial and original piece of research.

I struggled with this distinction between primary and secondary data at first. However, this change, of course, provided me with an opportunity to re-evaluate the existing data and generate novel research questions based on the available data. In this case, I chose to focus on the array of cross-cultural measures, which had not previously been administered in this Iranian sample. While I had then still considered including the behavioural studies in the main empirical paper, it also emerged that the cultural factors derived from the CFA analysis did not reveal significant relationships with the respective outcomes on the empirical studies. This was primarily due to the fact that the sample sizes for the empirical studies were significantly smaller, as they were run in three different samples, compared to the battery of measures, which had been administered across all samples. For this reason, and for the sake of conciseness, it was decided finally not to include any of the behavioural studies in the final empirical paper.

On reflection, the distinction between primary and secondary data can be fluid, as the same data set collected by one researcher could be treated as a primary data set in one analysis and secondary data in another. In fact, the definition of secondary data analysis simply refers to using an existing data set to examine research hypotheses that differ from the original research questions and purpose (Boslaugh, 2009; Tripathy, 2013). While the advantage of secondary data is the ability to generate novel research hypotheses, the disadvantages frequently centre

on the lack of familiarity with the research team which has collected the data, and/or limited knowledge as to the origins and reliability of the data available. However, while the latter assumption did not apply in this case, as the data set was collected by myself and our researchers, the specific purpose and analysis under consideration did change throughout the project.

Sample Size Considerations

However, given my objective of carrying out more complex statistical analyses, such as Structural Equational Modelling of Confirmatory Factor Analysis (CFA) on my secondary data set, I was faced with a potentially limited sample size. While the sample had been sufficient for the original analysis under consideration, I was concerned it would not suffice for the new analysis in mind given my prior understanding of sample size requirements for CFA. However, on reading more on the literature, I was surprised to learn just how varied suggestions are on what constitutes sufficient sample size when using complex statistical analysis. Contrary to my prior assumptions about multivariate statistical modelling, I learnt that sample size calculations for CFA no longer strictly adhered to the assumption that observations per variable or per parameter determined sample size, instead favouring the consideration of model quality (Gagné & Hancock, 2006).

Through conducting this research, I came to see that statistical modelling and multivariate analyses require a nuanced approach and cannot be reduced to a 'rule of thumb' when demanding large sample sizes, as has frequently been the case (Maas & Hox, 2005; Wolf et al., 2015). In fact, with the increasing push towards 'big data' and large-scale studies (Bareinboim & Pearla, 2016; Liu, Li, Li, & Wu, 2016), we run the risk of collecting inconsistent, incomplete or unreliable

data, and, invariably, noise. It also disregards the important contributions of small n-samples, which are grounded in theory and demonstrate effective experimental controls. While smaller in sample size, these sorts of studies benefit from high inferential validity and power, or in other words, the ability to detect 'true' underlying differences (Smith & Little, 2018).

Scientist-Practitioner Revisited

In retrospect, I was glad to have to rethink my approach to this project and in the process acquiring useful skills in psychometric analysis and statistical modelling and learning about the most recent advances and limitations in multivariate behavioural research. I also set myself the personal challenge of running all analyses in R, which required learning a completely new programming language. These research skills built on my training before the D.Clin.Psy as a doctoral student and prior research assistantships. However, fundamentally, they also helped me edge closer to becoming a scientist-practitioner in more than just aspirational terms. In fact, in reflecting on this research process, I took a trip down memory lane and examined my answer to the question *What would you hope to gain from training?* from my D.Clin.Psy application:

> *My aim is to train as a scientist-practitioner to allow my empirical experience gained during my scientific training to positively influence my applied practice. I hope to achieve professional competence as a practitioner by gaining clinical experience and specific skills in case formulation, delivery of evidence-based psychological therapies, and outcome evaluation, while further developing my clinical skills in appraisal and critical reflection. I look forward to gaining a greater understanding of key theoretical issues in clinical psychology and treatment evaluation within the NHS in order to effectively apply theoretical frameworks to treatment delivery while continuing to contribute to the scientific evidence base as a scientist.*

Looking at this with the benefit of hindsight, I realise that while I had focused on the need for developing as a practitioner, my journey as a scientist and researcher was far from complete. As such, this doctorate provided me with useful skills in data analysis and the evaluation of theoretical frameworks, which I hope will aid me in narrowing the gap between science and practice in future as I begin my next professional chapter.

Conclusions

This critical appraisal presented the opportunity to reflect on the research process. I have discussed some of the challenges I encountered when running a cross-cultural research project in Iran, as well as working with secondary data. I hope some of the issues raised can be useful points for future researchers to consider and for doctoral students to reflect on as they enjoy the spoils of well-resourced and supportive research environments. On the whole, the running of this project required an entirely different mindset and perspective than I had been used to in the context of my previous doctoral work. It required a lot of 'thinking on your feet' and active and dynamic problem-solving approaches – skills I consider useful and transferrable to a variety of contexts. This process also made me reflect on the importance of ensuring or developing adequately resourced research infrastructures when working cross-culturally and the challenges faced by scientists from less-resourced scientific communities. Finally, I was particularly struck by the 'scientific' privilege I enjoyed during my doctoral training – both during my PhD and presently.

However, the field of cross-cultural psychology also still has a long way to go. While secondary data approaches can serve to examine novel research

hypotheses, cross-cultural research will benefit from a range of methodological approaches. This includes further validating the psychometric properties of existing measures and incorporating these into research designs aiming to examine underlying differences in cross-cultural comparisons. It also includes using multi-dimensional and/or broader conceptualisations of culture to avoid misleading interpretations of research findings based on existing narrow or at times out-of-date cultural constructs. Finally, conducting research into mental health, and validating these findings in different cultural contexts will help to develop a comprehensive knowledge base from which to develop or improve existing therapeutic interventions. This is where professional psychologists trained as scientist-practitioners can be most useful in bridging the gap between research and clinical practice.

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Appendices

Appendix A: Summary of Literature Review Studies

Table S 1

Summary of Literature Review Studies

Reference	Participants	N	Mean Age (years)	Assessment	Depression Measures	Cultural Measures?	Other Measures
Chentsova-Dutton et al., 2007	East Asian (EA) (n=15 depressed, n=15 non-depressed), Asian Americans (AA) (n=12 depressed, n=14 non-depressed)	56	EA: M=28.73 depressed, M=32.07 non-depressed; AA: M=26.83 depressed, M=26.31 non-depressed	Interview; Self-Report (SR)	Structured Clinical Interview for Diagnosis (SCID), Beck Depression Inventory (BDI; Beck, Rush, Shaw, & Emery, 1979).	Suinn–Lew Asian Self-Identity Acculturation Scale (SL–ASIA; Suinn, Ahuna, & Khoo, 1992)	
Potthoff et al., 2016	Netherlands, Hungary, Spain, Italy, Portugal, Germany (N=1553)	1553	Netherlands: M=21.69; Hungary: M=24.19; Spain: M=29.9; Italy: M=26.51; Portugal: M=22.24; Germany: M=28.38	SR	BDI, Patient Health Questionnaire (PHQ-9), Symptom Checklist- 90-Revised (SCL-90), Brief Symptom Inventory (BSI)	None	Cognitive Emotion Regulation Questionnaire (Garnefski et al., 2001); Anxiety Sensitivity Index-3 (Kemper, Ziegler, & Taylor, 2009); State-Trait Anxiety Inventory

Reference	Participants	N	Mean Age (years)	Assessment	Depression Measures	Cultural Measures?	Other Measures
							(STAI; Spielberger, 1993)
Lam & Zane, 2004	AA (n=79), European American (EurA) (n=79)	158	M=19.97	SR	None	Self-Construal Scale (SCS) (Singelis, 1994)	-
Dejonckheere et al. 2017	Amazon Mturk (n=112)	112	MTurk: M=34.27	SR	PHQ-9	None	Social Expectancies about Depression and Anxiety Scale (SEDAS; Bastian, Dejonckheere, & Kuppens, in preparation)
Shacham et al. 2010	U.S.A (n=234), Kenya (n=284)	518	Kenya: M=36.5; American: M=42.3	SR	BSI	None	-
Chentsova-Dutton et al. 2015	EurA (n=32), Hisapnic American (HA) (n=26), AA (n=33), Russian Americans (RA) (n=20)	111	EurA: M=21.38; HA: M=20.76; AA: M=22.18; RA: M=27.35	Interview; SR	Diagnostic Inventory for Depression (Zimmerman, Sheeran, & Young, 2004); BDI	General Ethnicity Questionnaire (GEQ);	Satisfaction with Life Scale (SWLS) (Diener, Emmons, Larsen, & Griffin, 1985)
Agüera et al., 2017	China (n=72), UK (n=117), Spain (n=355)	544	China: M=21.76; UK: M=25.49; Spain: M=25.43	Interview; SR	SCL-90	None	Eating Disorders Inventory (EDI)
Saint Arnault et al., 2006	U.S.A. (n=44) and Japanese (n=50)	94	Japanese: M=19.2 yrs., American: M=22.5 yrs.	SR	Positive and Negative Affect Schedule (Watson,	None	Self-report Affect Circumplex (Larson & Diener, 1992);

Reference	Participants	N	Mean Age (years)	Assessment	Depression Measures	Cultural Measures?	Other Measures
					Clark, & Tellegen, 1988))		
Beshai, et al. 2016a	Egypt (n=29 depressed, n=29 non-depressed), Canadian (n=35 depressed, 38 non-depressed)	131	Egypt: M=29.41 depressed, M=30.90 non-depressed; Canadian: M=41.26 depressed, M=32.97 non-depressed	Interview; SR	BDI, SCID, Psychiatric Diagnostic Screening Questionnaire	None	-
Ford et al., 2015	U.S.A (n=307), German (n=91), Russia (n=184), EA (n=204)	786	U.S.A.: M=19.37; German: M=22.29; Russia: M=21.24; East Asia: M=26.15	SR	BDI, PANAS	None	Ryff Scales of Psychological Well-being (PWB; Ryff & Keyes, 1995); SWLS
Abe, 2004	Japanese (n=161) and U.S.A (n=165)	326	Japanese: M=19.70 years; American: M=20.30	SR	BDI	None	STAI; Rosenberg Self-Esteem Scale (RSE) (Rosenberg, 1965); Perception of Social Support from Friends (PSS-FR; Procidiano & Heller, 1983)
Hsieh, 2015	China (n=7,069); Russia (n=3,827)	10896	Russia: >50; China: >60	SR	Depression module from DSM-IV (APA)	None	WHO Study on Global AGEing and Adult Health (SAGE)

Reference	Participants	N	Mean Age (years)	Assessment	Depression Measures	Cultural Measures?	Other Measures
Zhu et al. 2016	China (n=363), U.S.A (n=363)	726	N/A	SR	Depression Anxiety and Stress Scale (Page, Hooke, & Morrison, 2007)	Interdependent Self-Construal Subscale (ISC; Singelis, 1994).	Experiences in Close Relationship Scale (Brennan, Clark, & Shaver, 1998); Multidimensional Scale of Perceived Social Support (Dahlem, Zimet, & Walker, 1991)
Campos et al., 2014	HA (n=218), EurA (n=294), AA (n=733)	1245	EurA: M=32; HA: M=28	SR	Center for Epidemiologic Studies Depression Scale (Radloff, 1977; Santor & Coyne, 1997); Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983); Rand Mental Health Inventory (Berwick et al., 1991)	None	Inclusion of Self in Other Scale (Aron, Aron, & Smollan, 1992); Social Support Survey (Sherbourne & Stewart, 1991); Familism Scale (Sabogal et al., 1987); Attitudinal Familism Scale (Steidel & Contreras, 2003)
Heu et al., 2019	Study 1: Austria (n=239); Study 2: Italy, Portugal, Sweden, The Netherlands (N=860)	1253	Austria: M=44.03; Italy: M=41.58, Portugal: M=37.32, Sweden: M=34.33, The Netherlands: M=35.42	SR	None	Individualism-collectivism (IC) (Fischer et al., 2009)	UCLA Loneliness Scale (Neto, 2014)

Reference	Participants	N	Mean Age (years)	Assessment	Depression Measures	Cultural Measures?	Other Measures
Chan & Mendoza-Denton, 2008	Study 1: AA (n=144); Study 2: AA (n=184)	164	Asian Americans: M=20.41	SR	BDI	Multigroup Ethnic Identity Measure (MEIM; Phinney, 1992; Roberts et al., 1999) is	RS-personal (Downey & Feldman, 1996); RS-race Questionnaire (Mendoza-Denton et al., 2002); RSE; Social Avoidance and Distress Scale (Watson & Friend, 1969)
Parker et al. 2005	Chinese (n=385), Non-Chinese (n=143)	528	None-Chinese M=38.5; Chinese: M=41.5	SR	DMI-10 measure (Parker et al. 2002).	SL–ASIA	None
Nezlek et al., 2008	UK (n=23), Northern Greece (n=19)	42	N/A	SR	None	SCS	None-

Appendix B: Overview of Behavioural Studies

Emotion Recognition (Study 1)

Study 1 investigated the impact of culture on instantaneous reactions to emotional stimuli. Participants completed an emotion recognition task adapted from a paradigm investigating biological motion and emotion recognition in autism (Nackaerts et al., 2012; Alaerts et al., 2011). Participants were presented with 144 moving point-light displays (PLDs) (of 3s duration), consisting of fifteen moving white spheres against a black background representing an actor acting out a given action type. These were drawn from a library of raw motion capture data (Ma et al., 2006). The initial presentation always depicted the PLD in a 'neutral emotional state', followed by a second "target" emotional state. Participants were asked to indicate as fast as possible whether the emotional state of the "target" PLD was (i) happier, (ii) sadder, (iii) angrier, or (iv) not different, from the initial presentation. The paired presentations remained constant with respect to the actor's gender and type of action displayed, but differed in viewing perspective (i.e., if the initial presentation was viewed from the front, the target was presented at a 90° (side) or 45° view). Viewing perspectives were included to control for lower-order visual comparisons. The above design resulted in 144 possible paired sequences, i.e., 18 initial presentation movies (2 actors (male, female) × 3 actions (walking, jumping, kicking) × 3 perspectives (0, 45, 90), each followed by 8 possible target movies (4 emotions (neutral, happy, sad, angry) × 2 perspectives (45, 90)). Reaction times (RT) (from the start of the movie, until a response button was pressed), and accuracy (% correct answers) were assessed as DVs. RTs were trimmed to correct trials only. RTs <100 and >10000ms were excluded.

Emotional Experience (study 2)

Study 2 investigated subjective emotional experience. The paradigm implemented a 'frequency of emotion' (Kitayama et al., 2000) and 'emotion in the situation' measure (Kitayama, & Park, 2007). First, participants were asked to indicate how frequently they generally experienced each of the emotions on a 6-point rating scale, ranging from "never" (=0) to "always" (=5). Next, in the 'emotion in the situation' measure, participants were given 10 common social situations (5 positive, 5 negative) involving either social relations (e.g., 'having a positive interaction with friends'), study and work-related themes (e.g., 'being overloaded with work'), or situations involving daily hassles (e.g., 'being caught in a traffic jam'). Participants were asked to remember the most recent time they had experienced each of the 10 situations and to rate the emotions they experienced in each situation on a 6-point rating scale ranging from "Not Experienced At All" (=0) to "Experienced Very Strongly" (=5). Emotion terms were adapted from Kitayama et al., (2000) and differed with respect to their social orientation (disengaging, engaging) and valence (positive, negative). Internal consistency for the subscales ranged from α = .75-.78.

Emotion Meaning (Study 3)

Study 3 investigated emotion meaning (i.e. concepts, preferences and beliefs about emotions). Participants were asked to recall a significant positive and negative personal event, followed by a questionnaire assessing emotional appraisal (Q1-32), source of appraisal (Q33-35), concerns (Q36-39), beliefs (Q40-43) and shared emotions (Q44-52). Participants responded on a 10-point scale ranging from "Not At All" to "Extremely" (e.g. 'How certain were you that you would get what you wanted?'). Concepts, preferences and beliefs were argued to be present when endorsed with 5 or above. This paradigm was adapted from Mesquita et al (2001) and emphasized the use of common emotion-eliciting situations as opposed to pure emotion words, which may not be comparable in meaning across cultural contexts (De Leersnyder, Boiger, & Mesquita, 2013; Batja Mesquita, 2001). *Appraisal* items encompassed independent-focused appraisals (agency, attentional activity, anticipated effort, goal-need conduciveness and norm-self compatibility); *Sources of Appraisals* referred to the common understanding of meaning, appraisals and implications (i.e., asking whether another person would find the situation as pleasant or unpleasant as the respondent did, would think or feel similarly, and would react similarly); *Social Worth* included questions about changes in perceived respect, prestige, family respect and in-group belonging; *Belief changes* measured changes in self-confidence, behaviour, self-respect, and motivation; finally, *Social sharing of emotions* related to the experience and implications of sharing the emotional experience with another person. Here, participants responded dichotomously (1 = *no* and 2 = *yes*). 'Yes' responses were tallied providing an index of social sharing of emotion, with higher scores indicating greater sharing of emotion.

Research Ethics Certificate

MONASH University

Monash University Human Research Ethics Committee (MUHREC)
Research Office

Human Ethics Certificate of Approval

This is to certify that the project below was considered by the Monash University Human Research Ethics Committee. The Committee was satisfied that the proposal meets the requirements of the *National Statement on Ethical Conduct in Human Research* and has granted approval.

Project Number:	CF15/1740 - 2015000884
Project Title:	Cultural Differences in the Processing of Emotion in those with Depression
Chief Investigator:	Dr Laura Jobson
Approved:	**From:** 29 June 2015 **To:** 29 June 2020

Terms of approval - *Failure to comply with the terms below is in breach of your approval and the Australian Code for the Responsible Conduct of Research.*

1. The Chief investigator is responsible for ensuring that permission letters are obtained, if relevant, before any data collection can occur at the specified organisation.
2. Approval is only valid whilst you hold a position at Monash University.
3. It is the responsibility of the Chief Investigator to ensure that all investigators are aware of the terms of approval and to ensure the project is conducted as approved by MUHREC.
4. You should notify MUHREC immediately of any serious or unexpected adverse effects on participants or unforeseen events affecting the ethical acceptability of the project.
5. The Explanatory Statement must be on Monash University letterhead and the Monash University complaints clause must include your project number.
6. **Amendments to the approved project (including changes in personnel):** Require the submission of a Request for Amendment form to MUHREC and must not begin without written approval from MUHREC. Substantial variations may require a new application.
7. **Future correspondence:** Please quote the project number and project title above in any further correspondence.
8. **Annual reports:** Continued approval of this project is dependent on the submission of an Annual Report. This is determined by the date of your letter of approval.
9. **Final report:** A Final Report should be provided at the conclusion of the project. MUHREC should be notified if the project is discontinued before the expected date of completion.
10. **Monitoring:** Projects may be subject to an audit or any other form of monitoring by MUHREC at any time.
11. **Retention and storage of data:** The Chief Investigator is responsible for the storage and retention of original data pertaining to a project for a minimum period of five years.

[redacted]

Professor Nip Thomson
Chair, MUHREC

cc: Ms Sindhu Mohan, Dr Firdaus Mukhtar

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ABN 12 377 614 012 CRICOS Provider #00008C

kharazmi university

Research Ethics Certificate

Approval ID:	IR.KHU.REC.1398.001	Approval Date:	2019-05-14
Evaluated by:	kharazmi university		
Status:	Approved		
Approval Statement:	The project was found to be in accordance to the ethical principles and the national norms and standards for conducting Medical Research in Iran. Notice: 1. Although the proposal has been approved by the research ethics committee, meeting the professional and legal requirements is the sole responsibility of the PI and other project collaborators. 2. This certificate is reliant on the proposal/documents received by this committee on 2019-05-14. The committee must be notified by the PI as soon as the proposal/documents are modified.		
Proposal Title:	Priming Reaction in Major Depression Disorder		
Principal Investigator:	Name: alireza moradi Email: moradi@khu.ac.ir		

[redacted]
Director of University/Regional Research Ethics Committee
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Postal code: 15719-14911

9.18.2019

To whom it may concern,

This letter is to confirm that the project entitled "Priming Reaction in Major Depression Disorder" was presented and approved by the Clinical Psychology department at Kharazmi University in June 2015. This project included the administration of three behavioural tasks (Study 1: priming reactions in MDD; Study 2: emotional experience in MDD; Study 3: emotion meaning in MDD), alongside the collection of a range of cultural and affective measures.

However, as Kharazmi University only formally established a research ethics committee in 2018, the project proposal was re-submitted to the committee for formal ethical approval and to obtaib an ethics id. This approval was granted in line with the ethical principles and national norms and standards for conducting Medical Research in Iran on 14th May 2019 (approval id: IR.KHU.REC.13980.001).

Please do not hesitate to contact me for further information,

Sincerely,
Prof Alireza Moradi [redacted]
Professor of Clinical Psychology
Email: Moradi@khu.ac.ir
Moradi90@yahoo.com

Appendix C: Copies of Affective, Process and Cultural Measures

Beck Depression Inventory	***[removed due to copyright]***
Beck Anxiety Inventory	***[removed due to copyright]***
Interpersonal Sensitivity Measure	***[removed due to copyright]***
Difficulty in Emotion Regulation Scale (DERS)	***[removed due to copyright]***
Self-Construal Scale (SCS)	***[removed due to copyright]***
Individualism-Collectivism Scale	***[removed due to copyright]***
Collective Self Esteem	***[removed due to copyright]***
Communal Orientation Scale	***[removed due to copyright]***

Appendix D: Correlation Matrix of Cultural Measures

Table S 2 **Correlation of cultural measures and subscales for all participants.**

		SCS Ind.		SCS Inter.		VI	VC		HI	HC		Memb. SE		Private Coll. SE		Public Coll. SE		Importance to Identity	
SCS Interdependent	Pearson's r	.43	***	—															
	p-value	< .001		—															
INDCOL VI	Pearson's r	.24	*	.21	*	—													
	p-value	.02		.04		—													
INDCOL VC	Pearson's r	.24	*	.41	***	.10	—												
	p-value	.02		< .001		.33	—												
INDCOL HI	Pearson's r	.31	**	.17		.22	* .001		—										
	p-value	.002		.11		.04	.99		—										
INDCOL HC	Pearson's r	.36	***	.54	***	.10	.59	***	.19	—									
	p-value	< .001		< .001		.34	< .001		.07	—									
CSE Membership SE	Pearson's r	.43	***	.15		-.07	.23	*	.17	.20		—							
	p-value	< .001		.15		.50	.03		.11	.06		—							
CSE Private Collective SE	Pearson's r	.41	***	.22	*	-.12	.26	*	.09	.31	**	.81	***	—					
	p-value	< .001		.04		.26	.01		.40	.003		< .001		—					
CSE Public Collective SE	Pearson's r	.31	**	.09		.09	.19		.19	.16		.73	***	.65	***	—			
	p-value	.002		.39		.38	.08		.07	.12		< .001		< .001		—			
CSE Importance to Identity	Pearson's r	.16		.22	*	.10	.06		.07	.21	*	.27	*	.31	**	.32	**	—	
	p-value	.14		.03		.34	.56		.50	.05		.01		.002		.002		—	
COS	Pearson's r	.15		.25	*	-.04	.12		.04	.13		.36	***	.41	***	.48	***	.28	**
	p-value	.17		.02		.71	.25		.71	.21		< .001		< .001		< .001		.01	

Note: SCS, Self-Construal Scale; Inter., Interdependent; Ind., Interdependent; INDCOL, Individualism and Collectivism Scale; HI, Horizontal Individualism; VI, Vertical Individualism; HC, Horizontal Collectivism; VC, Vertical Collectivism; CSE, Collective Self Esteem; Memb. SE, Membership Self Esteem; Priv. Coll. Self Esteem, Private Collective SE; Pub. Coll. SE, Public Collective SE; COS, Communal Orientation Scale

Across participants, the SCS independence subscale was significantly positively correlated with the interdependent subscale ($r = .43$, $p < .001$), the vertical and horizontal subscales: VI ($r = .24$, $p = .02$), VC ($r = .24$, $p = .02$), HI ($r = .31$, $p < .001$), HC ($r = .36$, $p < .001$); and the following CSE subscales: Membership Self-Esteem ($r = .43$, $p < .001$), Private Collective Self-Esteem ($r = .41$, $p < .001$) and Public Collective Self-Esteem ($r = .31$, $p < .001$). It was not significantly correlated with the Importance to Identity CSE subscale, nor with the COS. The interdependent subscale of the SCS was also significantly positively correlated with VI ($r = .21$, $p = .04$), VC ($r = .41$, $p < .001$) and HC ($r = .54$, $p < .001$) subscales, but not with HI. HI was significantly correlated with Private Collective Self-Esteem ($r = .22$, $p = .04$), Importance to Identity ($r = .22$, $p = .03$), and COS ($r = .25$, $p = .02$), but not with Membership Self-Esteem or Public Collective Self-Esteem.

Both VI and HI showed a strong intercorrelation ($r = .59$, $p < .001$), as did HC and VC ($r = .59$, $p < .001$). HC was also positively correlated with Private Collective Self-Esteem ($r = .31$, $p < .001$) and Importance to Identity ($r = .21$, $p = .05$). Similarly, VC was significantly correlated with Private Collective Self-Esteem ($r = .26$, $p = .01$), and Membership Self-Esteem ($r = .23$, $p = .03$). Finally, the COS was significantly positively correlated with the following subscales of the CSE: Private Collective Self-Esteem ($r = .41$, $p = .01$); Membership Self Esteem ($r = .36$, $p < .001$); and Public Collective Self Esteem ($r = .48$, $p < .001$).

Appendix E: Correlation Matrix of Culture Factors, Affective and Process Measures

Table S 3

Correlation of factor scores and affective and process measures for all participants

		BDI	BAI	IPSM	DERS	IntrdC	IndpnI
BAI	Pearson's r	.80	—				
	p-value	<.001	—				
IPSM	Pearson's r	.42	.44	—			
	p-value	<.001	<.001	—			
DERS	Pearson's r	.47	.42	.60	—		
	p-value	<.001	<.001	<.001	—		
IntrdC	Pearson's r	-.31	-.06	.02	.13	—	
	p-value	.002	.57	.84	.24	—	
IndpnI	Pearson's r	-.40	-.29	-.22	-.05	.54	—
	p-value	<.001	.01	.03	.65	<.001	—
CmmnSE	Pearson's r	-.44	-.34	-.37	-.27	.38	.51
	p-value	<.001	.001	<.001	.01	<.001	<.001

Note: BAI, Beck Anxiety Inventory; BDI-II, Beck Depression Inventory; IPSM, Interpersonal Sensitivity Measure; DERS, Difficulties in Emotion Regulation Scale; IntrdC, Interdependent Collectivism; IndpnI, Independent Individualism; CmmnSE, Communal Self-Esteem.