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A Unitary or Binary Model of Emotions: A Discussion on a Fundamental Difference between Cognitive Therapy and Rational Emotive Behaviour Therapy

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Abstract: The primary purpose of this paper is to consider the differential cognitive conceptualization of emotions postulated by the two main schools of cognitive behavioural therapy (CBT), namely Rational Emotive Behaviour Therapy (REBT) and Cognitive Therapy (CT). While CT theory favours a unitary model of emotional distress, REBT theory posits a binary model of emotional distress. This paper will address how the two approaches differ in their conceptualizations of emotional disturbance and the implications such differences have on clinical, theoretical, and research practice in both psychotherapy and psychology. A review of the relevant empirical literature will be presented with a recommendation for how future research can better investigate the differing predictions made by REBT and CT theory, respectively.

Key words: Cognitive Therapy, Rational Emotive Behaviour Therapy, Emotions

Introduction

As a mode of psychotherapy Cognitive-Behavioural Therapy (CBT) has emerged from all others as the most empirically investigated and validated method of treating psychiatric and psychological disorders (Barlow, 2008; Butler, Forman, Chapman, & A. T. Beck, 2006; Chambless & Hollon, 1998; Chambless & Ollendick, 2001; Engels, Garnefsky, & Diekstra, 1993; Epp & Dobson, 2010; Lyons & Woods, 1991). The central theoretical precept of CBT, and from which its clinical practice emerges, is that all psychological disturbances occur as a consequence of at least some form of dysfunctional cognitive information processing (A. T. Beck, 1976; Ellis, 1962, 1994). Complex emotional reactions are hypothesised to occur as a result of conscious or unconscious cognitive processing (David & Szentagotai, 2006). Dysfunctional, irrational, or unrealistic processing of internal stimuli (e.g., a pain in the chest) or external stimuli (e.g., receiving a low grade on an exam) are hypothesised to produce unhealthy or maladaptive emotional reactions, while functional, rational, or realistic processing of such information will produce healthy and adaptive emotional reactions (J. S. Beck, 2011; David & Szentagotai, 2006). This relationship between cognitions and emotions is among the most central of topics within not just psychotherapy but also cognitive psychology and psychological science as a whole. Cognitive Therapy (CT) and Rational Emotive

Behaviour Therapy (REBT) are the primary “CBT” approaches and given their respective conceptualizations of the importance of cognition in the development of emotions, they are both to be considered very much a part of the cognitive approach to emotions (see David & Cramer, 2010). The distinctions between CT’s and REBT’s models of emotion can be best understood with reference to well established cognitive models of emotions.

One of the earliest and most influential cognitive theories of emotions is the “Two-factor theory of emotions” (Schachter & Singer, 1962). The two-factor theory posits that emotional experience involves an interaction between physiological arousal and cognitive representation. Specifically, information received by the sense organs which is sent to sub-cortical regions of the brain triggers an autonomic response which is cognitively interpreted in relation to the situational context in order to label the arousal as fear, love, anger, joy, or some other emotion (Schachter, 1966). The two-factor theory (Schachter & Singer, 1962) posits that the important determining factor in the development of an emotional response is the way in which the individual represents a given situation in their cognitive system.

The two-factor theory of emotions (Schachter & Singer, 1962) explores the effects of representational cognitions on emotional experience. These representational cognitions include schemas, attributions, inferences, and automatic thoughts. These cognitions are congruent with what Abelson and Rosenberg (1958) refer to as “cold cognitions”. More recent cognitive theories of emotions have improved upon the two-factor theory by focusing on the role of “hot cognitions” (appraisal cognitions) as the primary causal cognitive mechanisms in the development of emotion.

The most prominent cognitive theory of emotion is the ‘Appraisal theory of emotions’ (Folkman & Lazarus, 1988; Lazarus, 1991; Smith & Lazarus, 1993). Appraisal theory acknowledges the important role of cold cognitions in the development of emotions, as cold cognitions are viewed as the information that an individual subsequently evaluates in terms of the significance to one’s own personal interests. Appraisal theory states therefore that cold cognitions are a necessary, but not a sufficient condition for the emergence of emotions. As long as cold cognitions go unevaluated they are insufficient to produce emotional reactions (Lazarus, 1991; Smith & Lazarus, 1993).

According to Appraisal theory (Folkman & Lazarus, 1988; Lazarus, 1991; Smith & Lazarus, 1993), emotion formation initially involves information processing to assess whether or not the present environmental situation is harmful, beneficial, threatening, or challenging, and an appraisal of one’s abilities to face or deal with this environment. This process of appraisal takes into account both the individual’s goals and their representation of the situation. So while the cognitive representation of a particular event has an influence on emotion formation, only the process of appraisal itself directly results in the development of emotional experience. In other words, the way in which a person appraises their representation of reality will determine their emotional response.

The appraisal process and the emotions which subsequently result then influence the way in which the individual copes with a particular environmental stimulus, thus a change in the person-environment context occurs. This altered person-environment context is then reappraised and this process of secondary appraisal leads to alterations in the nature and intensity of the emotional reaction.

Investigations into emotional development from a cognitive perspective have highlighted the importance not only of cognitive processes in general, but the

differential effect various types of cognitive processes have on emotions; the distal causes of attributions, inferences, and schemas (Schachter & Singer, 1962) and the proximate causes of evaluations and appraisals (Folkman & Lazarus, 1988; Lazarus, 1991; Smith & Lazarus, 1993; Smith, et al, 1993).

The CT and REBT Theories of Emotions

CT's theory of psychopathology focuses on cognitive distortions expressed in automatic thoughts, inferences, attributions, rules, assumptions, and schemas (J. S. Beck, 2011; Leahy, 2003). These cognitive processes are consistent with Ableson and Rosenberg's (1958) description of cold cognitions. These cognitive processes are ways of representing and/or interpreting the world in one's cognitive system. CT theory posits that erroneous, negative, and/or maladaptive schemas give rise to distorted interpretations and representations of reality which in turn result in the development of emotional distress (A. T. Beck & Dozois, 2011; J. S. Beck, 2011; Leahy, 2003). Given its focus on dysfunctional cold cognitions in the development of emotional reactions, the theory and clinical practice of CT can therefore be said to be in line with the two-factor theory of emotions (Schachter & Singer, 1962).

Alternatively, REBT's theory of psychopathology focuses on the role of irrational beliefs (Ellis, 1994). Irrational beliefs, as described by REBT theory, are evaluative or appraisal cognitive mechanisms, and hence are consistent with Ableson and Rosenberg's (1958) description of hot cognitions. Rational and irrational beliefs are ways of appraising or evaluating particular representations of reality in terms of their personal significance to a particular individual. The theory of REBT posits that rigid, extreme, unrealistic, and illogical appraisals of our automatic interpretations give rise to emotional disturbances (Walen, DiGiuseppe, & Dryden, 1992; Ellis, 1994; Ellis & Dryden, 2007). Given REBT's focus on hot cognitions as the primary causal cognitive mechanisms in the development of emotional reactions, the theory and clinical practice of REBT can therefore be said to be strongly congruent with the appraisal theory of emotions (Folkman & Lazarus, 1988; Lazarus, 1991; Smith & Lazarus, 1993). Such a distinction is extremely important because it indicates that the theory of emotions as described by REBT theory, as opposed to CT theory, is consistent with the most contemporary and empirically validated model of emotions in cognitive psychology (David, 2003).

A Unitary Versus a Binary View of Emotions

Psychological science has predominately conceptualized emotions as a unitary entity (Russell & Carroll, 1999; Watson & Tellegen, 1999). However, the theory of REBT challenges this view and posits that emotional distress can be more accurately understood as a binary construct. The unitary model of emotional distress assumes that distress is experienced along a continuum which ranges from low levels of emotional distress to high levels of emotional distress, irrespective of the kind of emotion that is being measured, or whether one aggregates specific scores from various measures of discrete (negative) emotions into a score of general (negative) emotional distress (e.g. McNair, Lorr, & Droppleman, 1971). Currently within the psychological and CBT literature, the severity of emotional disturbance is considered to be a direct reflection of the intensity of the subjective level of negative emotional affect. If an individual experiences high levels of negative emotional affect such as high levels of sadness, anxiety, rage, irritation, shame, or regret, for example, that person is considered to

be emotionally disturbed, while a person who experiences low levels of such emotions is considered to be emotionally healthy. Psychological measures of mood, and of specific disorders, such as the Beck Depression Inventory II (A. T. Beck, Steer, & Brown, 1996) and the shortened version of the Profile of Mood States (Shacham, 1983) have been developed based on this view. Within this framework no distinction is made between various negative emotions which may be conceptualized as functional or dysfunctional; rather the functionality or dysfunctionality of the emotional experience is determined by the intensity with which any particular emotion is experienced.

David, Montgomery, Macavei, and Bovbjerg (2005a) point out that within a unitary framework of emotions different terms which are used to describe similar but apparently distinct emotional experiences, for example, concern as opposed to panic, or sadness as opposed to depression, could be considered from a number of perspectives. Firstly, labels such as concern or anxiety could be considered simply as synonyms: different labels describing an identical emotional experience. Secondly, such labels could describe differences in the intensity with which a person experiences the same underlying condition: concern represents low levels of anxiety whereas panic represents high levels of anxiety. Or thirdly, such labels could represent qualitatively different emotional responses: concern and panic are similar but distinct emotions, and their functionality depends upon the intensity with which each is experienced. According to this view, high levels of concern and/or high levels of panic would be considered unhealthy and dysfunctional while low levels of concern and/or low levels of panic would be considered functional and healthy.

Contrastingly, the binary model of emotional distress makes a qualitative rather than a quantitative distinction between functional and dysfunctional emotions. According to this view, an emotion such as panic is not merely "too much" concern, rather panic and concern are viewed as distinct emotions resulting from a radically different underlying cognitive architecture. In an important paper on the topic, Ellis and DiGiuseppe (1993) outlined in detail the REBT binary model of emotions, explaining that distinctions between functional and dysfunctional emotions (be they of a positive or a negative variety) cannot be made based upon arousal levels given that both functional and dysfunctional emotions can be experienced with low, medium, or high levels of intensity; that healthy and unhealthy emotions can be experienced simultaneously; that although emotions like rage or panic will usually produce maladaptive behavioural responses and are therefore usually considered "unhealthy", under certain circumstances such emotions may in fact lead to adaptive behavioural responses and thus in unique circumstances emotions such as depression or anxiety can be considered "healthy" (a view which is congruent with an evolutionary perspective of human emotions - Pelusi, 2003); and that functional and dysfunctional emotions are largely the product of rational and irrational beliefs, respectively. Furthermore, the binary model of emotions does not preclude the possibility that a person can experience both healthy and unhealthy emotions simultaneously. In other words, a person can experience both low, medium, or high levels of concern and low, medium, or high levels of anxiety about the same event.

An implication of the binary model within the clinical setting is that not all forms of negative affect would be targeted for intervention. A clinical intervention would target only unhealthy negative emotional experiences (feelings of worthlessness or panic) while recognising the beneficial nature of healthy negative

emotional experiences (feelings of concern or regret). The unitary model of emotions cannot make such a theoretical distinction between healthy and unhealthy emotions and thus any clinical intervention based upon the unitary framework would necessarily attempt to reduce all negative affect irrespective of its functionality; an approach which could well result in disadvantageous clinical outcomes.

Quantitative or Qualitative Differences in Emotion: A Review of the Empirical Literature

Cramer (1985) first attempted to test the REBT binary model of emotions with a series of correlational studies. These studies, which examined the relationship between irrational beliefs and functional and dysfunctional negative emotions, involved placing participants in either an imagined stressful situation or a non-stressful situation. The results of Cramer's (1985) study demonstrated a positive correlation between irrational beliefs and both functional and dysfunctional emotional reactions.

Cramer and Fong (1991) employed an experimental design in order to examine the relationship between irrational beliefs and functional and dysfunctional emotions. In this study, participants repeated either irrational or rational statements about a potentially unpleasant situation. Their hypothesis was that if functional and dysfunctional emotions differ quantitatively then those participants who repeated irrational statements should rate their functional and dysfunctional emotions as being more intense than those participants who repeated rational statements. If however functional and dysfunctional emotions differed qualitatively then it was hypothesised that participants repeating irrational statements should rate only their dysfunctional emotions as more intense than those participants repeating rational statements because irrational beliefs were hypothesised to influence only the dysfunctional emotions. The results of this study were congruent with Cramer's (1985) earlier finding, revealing that rehearsal of irrational beliefs was associated with an increase in both functional and dysfunctional emotions leading Cramer and Fong (1991) to the conclusion that, "*there was no support for the view that irrational beliefs evoke feelings which are qualitatively different from those produced by rational beliefs*" (p. 327). Furthermore, they concluded that their results "*indicate that 'inappropriate' (dysfunctional) feelings are more suitably viewed as simply differing in intensity from 'appropriate' (functional) ones*" (p. 327).

Cramer and Fong (1991) claimed that their research findings invalidated REBT's binary model of emotions and their findings provided empirical support for the unitary model of emotions. Further studies by Cramer and Kupshik (1993), Cramer and Buckland (1996), and Cramer (2004, 2005) replicated these findings and provided additional weight to Cramer's (1993) view that REBT's original unitary model of emotional distress (Ellis & Harper, 1961; Ellis, 1962), which was wholly consistent with the current CT unitary model of emotions, is the more accurate model based upon the empirical evidence attained.

The findings of Cramer's research group were not the only critique of REBT's binary model of emotions. A philosophical critique from within the REBT community was articulated by Wessler (1996) who argued that the binary model of emotions is logically inconsistent. Wessler's view rested on the arguments that it is impossible to feel both sad and depressed simultaneously; that mild feelings of depression or anxiety, for example, are considered dysfunctional by REBT theory;

that such conclusions are impossible to comprehend in clinical terms; and that no major theory of emotions endorses a binary view and therefore that the concept is pseudoscientific and REBT theory would do well to abandon it. Wessler also pointed to findings from Kassinove, Eckhardt, and Endes (1993) which showed that although people are easily able to identify quantitative differences in emotional experience, they find it extremely difficult to identify qualitative differences, suggesting to Wessler a major flaw in the binary model of emotions.

The evidence gathered by Cramer's research group however is not an invalidation of REBT's binary theory of emotions; in fact the evidence gathered by Cramer and his colleagues actually provides support for the predictions made by the binary model of emotions. The major flaw in the research program of Cramer and his colleagues is a fundamental misunderstanding of what the REBT theory of emotions actually predicts. This programme of research was based upon the hypothesis that if participants who rehearsed irrational statements showed increases in the intensity with which they rated both functional and dysfunctional emotions then the binary model would be invalidated and the unitary model would be supported. However, as detailed by Ellis and DiGiuseppe (1993) this is not at all what the REBT binary model of emotions proposes. Contrary to Cramer and Fong's (1991) hypothesis, the REBT binary theory in fact predicts that individuals who hold irrational beliefs will show increased levels of both functional and dysfunctional emotions. Ellis and DiGiuseppe (1993) state:

"...people who feel regretful and who also feel depressed and worthless start off with a preferential (or rational) Belief - such as "I don't *like* my acting foolishly" - and then add a rigid, absolutist demand: "Therefore I *have to* do what I prefer, and if I don't act sensibly, as I *must*, I cannot accept my *self* and must view myself as a really *rotten person*." (Ellis & DiGiuseppe, 1993, p. 473).

REBT theory states that at the core of neurotic disturbance is a process of escalating one's rational, flexible preferences into irrational, rigid demands. Humans construct their unhealthy irrational beliefs from their healthy rational beliefs, in other words. Therefore, according to REBT theory it is to be expected that when a person possesses an irrational belief they will exhibit both functional and dysfunctional emotional responses since irrational beliefs tend to develop from rational ones, and consequently functional emotions are a component of dysfunctional emotions.

With respect to the criticisms of Wessler (1996), David, Schnur, and Belloiu (2002) point out that according to the appraisal theory of emotions (Lazarus, 1991) the simultaneous coexistence between various types of negative emotions, whether they are functional or dysfunctional, as well as the simultaneous coexistence between positive and negative emotions, makes perfect sense. This can also be understood within the context of REBT theory. A person can have multiple goals when they encounter a specific activating event, about which they can have different beliefs and therefore experience multiple different emotional consequences. The variety of goals and the variety of beliefs an individual holds about the same event means the experience of different emotional reactions simultaneously is perfectly understandable.

Although Cramer's research findings can be interpreted as support for REBT's theory, when these findings are viewed in terms of what the binary model actually predicts, these findings should be interpreted cautiously given the

methodology employed. Firstly, rehearsals of rational and irrational beliefs were used in these studies so there is no way of knowing whether or not participants actually internalised and believed these statements. Secondly, the vast majority of these studies employed imagined stressful situations, rather than remembered or real-life stressful events. Ellis (1994) has argued vigorously that a true test of the REBT theory should involve real-life stressful situations because rational and irrational beliefs are very often held implicitly until activated by a particular event, and would therefore only become accessible in the context of a real-life stressful activating event. Indeed there is now considerable evidence that this is in fact the case (Solomon, Arnow, Gotlib, & Wind, 2003; Szentagotai, David, Lupu, & Cosman, 2008).

In order to more fully and accurately test the REBT binary model of emotions as outlined by Ellis and Harper (1975, 1997), Ellis and DiGiuseppe (1993), and Ellis (1994); David et al. (2002) tested the model within the framework of appraisal theory (Lazarus, 1991; Smith & Lazarus, 1993). This involved relating various concepts within the REBT model to the concepts of appraisal theory. Specifically, it was hypothesised that Demandingness/Preferences, which are the primary irrational and rational appraisal mechanisms in REBT theory, would be associated with the primary appraisal function in appraisal theory, while Awfulizing/Non-Awfulizing, Low Frustration Tolerance/High Frustration Tolerance, and Global Evaluations/Acceptance, which are the secondary irrational and rational appraisal mechanisms in REBT theory, would be significantly associated with the secondary appraisal mechanisms of appraisal theory. David et al.'s (2002) analysis did indeed support this hypothesis, validating a central component of Ellis' (1994) REBT theory.

David et al.'s (2002) study also sought to investigate the relative contribution of appraisals and irrational beliefs relative to attributions in the development of emotions, specifically with respect to four emotion groups (concern/anxiety, sadness/depression, remorse/guilt, and annoyance/anger) which represented the distinction between the functional and dysfunctional emotions. In line with the predictions of appraisal theory (Lazarus, 1991; Smith and Lazarus, 1993) and Ellis' (1994) theory, results of this study showed that emotions were more significantly and directly related to appraisals and irrational beliefs than they were to attributions.

The results from this study also supported the REBT binary theory of emotions. While appraisals were directly related to emotions of both a functional and dysfunctional nature, irrational beliefs were related to dysfunctional emotions while functional emotions were associated with rational beliefs (measured as low levels of irrational beliefs). Functional emotions (concern, sadness, regret, and annoyance) were found to involve primary appraisals associated with Preferences while dysfunctional emotions (anxiety, depression, guilt, and anger) were found to involve primary appraisals associated with Demandingness. David et al. (2002) using regression analyses were able to increase the percentage of variance explained by appraisal theory (Smith et al. 1993) for each of the emotions studied by adding irrational beliefs to the analysis. Empirical evidence was therefore found which demonstrated that through the introduction of REBT's theory of functional and dysfunctional emotions, the explanatory power of appraisal theory was significantly increased.

The binary model was further supported by the finding that levels of arousal did not differentiate between functional and dysfunctional emotions. This supports Ellis' (1994) hypothesis that the differentiating factor between functional and dysfunctional emotions is not a result of the intensity with which the emotion is experienced.

Due to criticisms that the results of the David et al. (2002) study were unreliable due to the use of a sample that consisted of psychology undergraduates who could have been aware of the theory under investigation, a replication of the study was conducted by David, David, Ghinea, Macavei, and Kallay (2005b) involving a sample of 120 physics undergraduate students and a sample of 60 patients undergoing psychotherapy. Findings from this study replicated the original study from David et al. (2002), although some correlations while remaining significant did decrease. However, these findings from David et al. (2002) and David et al. (2005b) support the REBT theory that Demandingness is the primary irrational appraisal mechanism involved in various forms of psychopathology; that irrational beliefs being appraisal in nature are the proximate cognitive antecedents of emotions, and that irrational beliefs give rise to qualitatively different emotions than rational beliefs. It can be argued based on the fact that David et al.'s (2002) initial findings in support of the REBT binary model of emotions were replicated in a clinical and non-clinical sample that these findings are both reliable and generalizable.

In order to further evaluate the robustness and generalizability of the binary theory of emotions, David, Schnur, and Birk (2004) tested Ellis' (1994) cognitive theory of emotions within the framework of Schachter and Singer's (1962) two-factor theory of emotions. As outlined previously in this chapter Schachter and Singer's (1962) theory posits that emotion formation involves an interaction between cognitive and physiological factors. Specifically the theory states that during levels of high arousal individuals will give meaning to that arousal through cognitive interpretations of the environmental situation. However, the theory also states that when an obvious explanation for the physiological arousal is presented, no further explanatory search is conducted by the individual.

David et al. (2004) employed a quasi-experimental method in which undergraduate participants were primed with either rational or irrational beliefs. Participants were then randomly assigned to an exercise or no-exercise group. Participants then exercised or sat still and then either after a delay (the experimental group) or immediately following the exercise regime (the control group) the participants completed a rating of their emotional state.

The results supported both Schachter and Singer's (1962) two-factor theory of emotions and Ellis' (1994) cognitive theory of emotions. The participants in the experimental condition who did not have an obvious explanation for their continued arousal levels interpreted their arousal in line with their primed beliefs. Furthermore, those participants who were primed with rational beliefs interpreted their arousal with functional positive emotions (indicating the activating event was considered a positive one) while those who were primed with irrational beliefs interpreted their arousal with both functional and dysfunctional negative emotions; the functional negative emotions were combined with the dysfunctional ones (participants reported feeling sad and depressed, for example). Given that the unitary model of emotions states that arousal levels will differentiate functional from dysfunctional emotions, the findings of this study stand in contradiction with the predictions of the unitary model and support the binary model of emotions.

David et al.'s (2004) findings further demonstrated that arousal levels were not the differentiating variable between functional and dysfunctional emotions, rather rational and irrational beliefs were the differentiating causal variable between functional and dysfunctional emotions, supporting the binary model of emotions as predicted by REBT theory (Ellis & DiGiuseppe, 1993; Ellis, 1994).

The binary model of emotions was tested by David and colleagues (2005a) with respect to a third paradigm; the factorial paradigm. This followed the recommendation of Ellis and DiGiuseppe (1993) that the most appropriate test of the REBT cognitive theory of emotions would involve a principal component analysis (PCA). Specifically, Ellis and DiGiuseppe's (1993) hypothesis was that if the REBT theory is correct then a PCA of the data should reveal two principal components. The first principal component should reveal that high levels of irrationality are positively correlated with both functional and dysfunctional negative emotions, while the second principal component should reveal that high levels of rationality are positively correlated with functional negative emotions and negatively correlated with dysfunctional negative emotions.

In order to maximise the ecological validity of the study David et al. (2005a) carried out two prospective studies involving 55 breast-cancer patients from the United States, and 45 breast-cancer patients from Romania, who were all about to undergo surgery related to their cancer. The results of both studies confirmed Ellis and DiGiuseppe's (1993) hypothesis. Two principal components were extracted from the data which showed that during a real-life stressful event, high levels of irrational beliefs were associated with high levels of functional and dysfunctional negative emotions, while low levels of irrational beliefs (conceptualized as high levels of rational beliefs) were associated with high levels of functional negative emotions and low levels of dysfunctional negative emotions. Support for the REBT binary model was therefore found in two culturally distinct clinical samples.

Evidence supporting REBT's cognitive theory of emotions (Ellis & DiGiuseppe, 1993; Ellis, 1994) has been established from other researchers too. Zisook, Shuchter, Irwin, Darko, Sledge, and Resovsky (1994) carried out a study investigating the immune functioning of recently widowed women compared to married women. Although no significant difference was found in immune functioning between the widowed sample and the non-widowed sample, within the widowed group itself significant differences were found between those women who met the diagnostic criteria for depression compared to those who did not. Widows who were experiencing depression, compared to widows who were experiencing grief (sadness), showed lower levels of NK cell activity and lower mitogen stimulation, revealing that depression, but not sadness, resulted in lower levels of immune functioning.

Harris, Davies, and Dryden (2006) experimentally tested a central hypothesis of REBT that irrational beliefs are at the core of psychological disturbance within the binary paradigm of emotions. The study involved a sample of 90 participants attending a General Practitioner's office who had no history of mental illness. The participants were divided into three groups; a rational belief group, an irrational belief group, and an indifference belief group that served as a control group. Participants were then connected to a machine to monitor their blood pressure levels and told to sit as still as possible in front of a camera for 1 minute and 10 "behavioural experts" would scrutinize their video, looking for tiny facial movements, and would then give each person a score out of 100 for stillness.

The results of the experiment showed that participants in the irrational belief group experienced increased levels of anxiety (with corresponding increases in systolic blood pressure), while those in the rational belief group experienced increases in their levels of concern, but not anxiety (and a corresponding decrease in systolic blood pressure). Harris et al.'s (2006) study provides experimental support for REBT's binary model of emotion.

Conclusion and Future Directions

This review of the empirical literature which has tested the predictions of the unitary and binary models of emotions has provided considerably strong and robust support in favour of a binary rather than a unitary view of emotional distress. The binary model advanced by REBT theory has been supported within the framework of three separate cognitive paradigms, in multiple clinical and non-clinical samples from distinct cultural backgrounds, and within the context of a true experimental design. However, there is a significant limitation with the majority of these studies which needs consideration. In most of these studies high levels of rational beliefs were measured as low scores on a measure of irrational beliefs. The assumption that low levels of irrational beliefs signify the presence of high levels of rational beliefs may well be an erroneous one. Research has suggested that rational and irrational beliefs are by no means polar opposites of each other (Bernard, 1998; DiGiuseppe, Robin, Leaf, & Gorman, 1989) therefore this research, strong and supportive as it is, should be interpreted with this limitation in mind.

Despite the evidence obtained in support of the binary model of emotions, it would be premature and inaccurate to argue that the binary model should be considered superior to the much more widely accepted unitary model. Far more empirical data is required before any conclusion regarding which model should be favoured can be drawn. Finding an answer to this question is however extremely important as the implications of such an answer would have far reaching consequences in both the theoretical and clinical domains. We propose that a significant contribution will be made by overcoming some of the methodological limitations of previous research endeavours. We suggest that researchers should employ an alternative and more stringent statistical-methodological approach to investigate Ellis and DiGiuseppe's (1993) recommendation for how to best test the competing predictions of the unitary and binary models. Rather than utilizing principal component analysis, the use of confirmatory factor analysis would provide a much more robust method of investigating the differential theoretical predictions. Additionally, rather than conceptualizing high levels of rational beliefs from a low score on a measure of irrational beliefs, a practice that previous studies have employed which appears to be founded on a false assumption (see Bernard, 1998), future investigators should use a measure of both rational and irrational beliefs in order to more accurately determine whether the predictions of REBT regarding a binary view of emotions is valid. Given the serious clinical implications that would arise from support for the binary model, it is essential that such research be carried out.

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