Prayer Types and Their Associations with Mental and Psychophysiological Health

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Abstract

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Researchers have found that prayer can better explain the relationships that exist between religion and mental health in Christian samples. The main purpose of this project is to further understand the two psychological facets of prayer that have previously been less investigated – the field of well-being and the field of personality – among Muslim groups. Based on this, four studies are reported upon in order to produce knowledge as to how prayer types relate to well-being and personality as components of mental health. Firstly, attention has been given towards the well-being component explored in Study One, Study Two and Study Three in terms of whether certain prayer types link to emotional and physical well-being and, in building upon this, how such a link manifests. Study One reports upon the relationships that occur between prayer types and emotional well-being through two proposed cognitive and behavioural frameworks. The results gained suggest that the demonstrated links between specific prayer types and well-being can be explained through the described theoretical mechanisms which may affect mental health. Study Two and Study Three assess to what extent engaging in prayer affects the emotional responses of individuals as measured by skin conductance, blood pressure and heart rate. The results produced here suggest that engaging in prayer induces an increased arousal level of skin conductance and decreased level of blood pressure and heart rate values, the latter two areas being considered to be a marker of the person encountering a state of relaxation. Secondly, attention has been given towards the five-factor model of personality – as explored in Study Four. This study has revealed several associations that exist between prayer types and personality traits alongside resilience trait measures. In consideration of the respective findings, it is concluded that the personality traits of Extraversion and Conscientiousness are common predictors of obligatory and supplication prayer types while, in contrast, Openness is uniquely found to be better predictor of obligatory prayer. Ecological trait resilience has also been found to be the greatest predictor of all of the prayer types measured. Those ties between the explored prayer models and psychophysiological states might arise as an indicator of better mental health outcomes for health practitioners in their respective services and, furthermore, could warrant further research so that such areas are explored in more depth.

Declaration

I hereby declare that this thesis has been composed solely by myself, that the work contains no material that has been submitted previously, in whole or in part, for any other degree. I confirm that this thesis and the works presented in it have been generated as my own original research.

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Under submission

Chapter 3

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Chapter 4

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Chapter One

This section gives the key arguments within a brief literature review that remained problematic when conducted investigations regarding religious practice and behaviours and its relationships with mental health components.

1. Thesis Overview

In its very nature, religion involves a pathway consisting of feelings, thoughts and acts. Through the general findings of religion, as drawn by scientists, it is noted that religious behaviours have a significant impact upon people's life expectancy in terms of their mental health. The purpose of this chapter is to provide a brief introduction as to the links between religion and mental health that have received less interest within the available literature – namely in regard to well-being and personality, and to highlight the basic elements of the theoretical understanding of the thesis.

In this regard, this chapter is structured in three sections; Section 1.1 gives a brief literature review that states to what extent religion-related investigations have received a great deal of attention in various areas of psychology. Since there are multiple psychological facets of religiosity existed in the literature, we paid attention two areas that remained less investigated in terms of its association with Muslim religion; the field of well-being (detailed in Part A) and the field of personality models (detailed in Part B). The main purpose in those areas are that given focus towards those psychological facets of religiousness can be explored in more depth. After then, Section 1.2 addresses the three key elements those that lay within the theoretical understanding of the PhD project; cognitive-behavioural model, Muslim religion, and prayer types (as a key component of religious behaviours). Finally, Section 1.3 summarises the chapter and outlines the further details in the subsequent chapters.

1.1. Introduction to Religion and its Relationships with Mental Health

1.1.1. Religion and Well-being (Part A)

Personal well-being depends upon how an individual feels about his or her own life events. Given that, the influences of religion have appeared as an increasingly popular topic of inquiry within the field of psychology of religion, particularly in relation to the sphere of mental health. In recent scholarship, especially within the last two decades, a

growing interest as to the relationship between religion and well-being has developed (Hill & Pargament, 2003). Several studies concentrated on how religion is of great significance in individuals finding answers as to the meaning of life and their perception towards human events (Emmons & Paloutzian, 2003). However, from the various investigations as to religion (particularly prayer) and well-being, a number of conclusions have been reached. Throughout the previous two decades, a number of scholars have found that prayer is associated with increased positive psychological outcomes whilst also being negatively associated with negative psychological outcomes such as anxiety and depression (Poloma & Pendleton, 1989, 1991). Moreover, McCaffrey, Eisenberg, Phillips, Legedza, and Davis (2004) have also highlighted the potential links between religion and well-being, and it was found that prayer was used by one-in-three people dealing with health-related issues.

1.1.2. Religion and Personality (Part B)

Emmons (1999), as a scientist, put forward the idea that religion and personality might play naturally similar roles in the life of an individual, namely via them sharing common goals and directions as to surviving or responding to circumstances in the best possible way (Emmons, 1999). It is noted that religion and personality function similarly in terms of people's life expectancy. Hence, previous research on this subject has suggested that personality models may be a useful resource in understanding how personal qualities fit in with the goals of religious behaviours.

Within the literature on religion, interest has grown in terms of the relationship that exists between the differential aspects of religiosity within the characteristic models – for example, via the Five-factor personality model. The five-factor model of personality, in this sense, includes extraversion, agreeableness, openness, conscientiousness and neuroticism. In considering the characteristics of individuals and the goals of religion and, furthermore, how they are intertwined in various religious experiences, previous research has claimed that there is a high degree of association between religiosity and agreeableness and conscientiousness, a low degree of association between religiosity and psychoticism and no association being evident with the other domains of the personality model (Saroglou, 2002). As such, the purpose of this study is to examine the unstudied relationships that exist between different types of prayer and the five-factor personality model.

1.2. Three Basic Elements Underpinning the Theoretical Context

1.2.1. Cognitive-Behavioural Model

Individually, whilst a person may not be able to take under control all of the events that happen externally to them, they nonetheless may be able to sense it, unintentionally, within their cognitive schema. Scientists have concentrated on how religion is of great significance in individuals possessing an understanding in relation to the meaning of life and their perception towards human events (Emmons & Paloutzian, 2003). Therefore, for scientists over the last few decades, the possible application of the cognitive behavioural framework within psychology of religion has become a key element of both subjective and psychological well-being. For example, James and Wells (2003) used a cognitive-behavioural model in their investigations as to the relationship between dimensions of religiosity and well-being from mental health perspective. The hypothesis of James and Wells (2003) highlights two mechanisms that underlie how the links between religiosity and mental health invoke better guidance when considering life events – achieved by helping individuals to understand their existence in the world, the meaning of life and the purpose of life (Maltby, Lewis, & Day, 2008).

The first cognitive behavioural mechanism points to a generic mental model that postulated by Peterson and Roy (1985). According to their hypothesis, religiosity has a significant impact upon an individual's understanding of life and their purpose in the life (James & Wells, 2003). Similarly, McGuire (1981) shed light on how this cognitive mechanism may reinforce an understanding of the world that the one lives in. This way thinking contributes to the person to understand the reason of his existence in the world, his importance, purpose of life, etc. (James & Wells, 2003).

The second cognitive behavioural framework addresses the idea that religious behaviours can contribute to the psychology of individuals. This hypothesis is based on the finding that religious behaviours enable to contribute to self-control by decreasing self-focus, concerns, or stresses. In this way, religious behaviours or practices lead the individuals to better subjective well-being (Maltby *et al.,* 2008). According to this hypothesis, some religious faiths can impact significantly upon one's emotions, obsessiveness, remorse and anxiety (Salkoovskis, 1985; Wells & Hackman, 1993; Steketee, Quay, & White, 1991; Wells, 1997).

Through the theories of the abovementioned scientists, the distinctions between intrinsic and extrinsic religious orientation and the relationship between these religious dimensions and well-being are widely examined (Maltby, Lewis, Freeman, Day, Cruise, & Breslin, 2010). Yet, the application of cognitive behavioural approach has remained less in the inquiry of religious practice and behaviours in relation to well-being development.

1.2.2. Studying Muslim Religion

In this field, researchers have tended to investigate the influence of religious beliefs and practices on the well-being and mental health of individuals. This has been undertaken from many different perspectives amongst Islamic communities (Paloutzian & Park, 2005; Pargament & Abu-Raiya, 2007). A great number of theoretical and empirical approach was intended for to understand what people do and what practices they consider important in their lives. In the research produced in the past few decades in relation to the psychology of religion, theological and clinical approaches have exclusively been utilised to study religious beliefs and practices rather than empirical methodologies. Islam-related studies have been neglected regarding the relationship between Muslim religiosity and well-being and mental health. This is because the majority of measures have been validated in exclusively Christian samples (Gorsuch, Hunsberger, Hood, & Spilka, 1996; Laird, Snyder, Rapoff, & Green, 2004). Accordingly, the previous research as to the relationship between religiosity and mental health revealed that various prayer measures are predominantly derived from Christian religious norms and beliefs. However, non-Christian religions have been mostly disregarded in these inquiries. More specifically, the links between religiosity and mental health among Muslim individuals have been neglected even though Islam is known as one of the largest religions in the world (Abdel-Khalek, 2011).

Therefore, researchers have tended to investigate the influence of religious behaviours and practices on the mental health of individuals within Muslim context (Paloutzian & Park, 2005; Pargament & Abu-Raiya, 2007). Some studies have focused upon whether or not it is possible to extend existence religiosity measures to different religious groups or, alternatively, whether new measures need to be developed. As such, in order to test the applicability and usefulness of general religiosity measurements with Muslims samples, several scholars have conducted such methodologies within Muslim contexts. For example, Ghorbani and Watson (2006) tested 191 Iranian college students

to measure their religious orientations, choosing to use the Religious Orientation Scales developed by Allport and Ross (1967) to test its applicability. In the same vein, another study aimed to explore how religious judgement amongst Muslims living in America is related to subclinical paranoia (Rippy & Newman, 2006). Here, in a sample of 152 American Muslims, the Race Related Stressor Scale (RRSS; Loo, Fairbank, Raymond, Ruch, King, Adams *et al.,* 2001) was used. With reference to the religiosity measures from the Islamic-based perspectives, the researchers sampled Muslim populations based upon the concept of Muslim religious doctrines. This was achieved by assessing the dimensions of religiousness, religious coping, religious beliefs, religious practices, religious attitudes and spirituality with well-being, mental and physical health, psychopathology and psychotherapy aspects with Muslim clients.

From this point of view, the objective of this project is to explore the relationship between Muslim religious behaviours, especially different prayer forms, and well-being in terms of mental health via a correlational research method.

1.2.3. Prayer Types (from an Islamic Perspective)

Religions all over the world, including Islam, have their own path, practice and rituals. In Islam, worshippers practice multiple aspects of religious behaviour – such as the profession of faith (shahadah), giving of alms, charity, ablution, prayer, pilgrimage to Mecca, fasting during Ramadan and at other times.

These aforementioned religious practices play a positive role as part of a coping mechanism against depression, anxiety or other kinds of psychological distresses (Abdel-Khalek, 2011). A very recent study undertaken on the effects of prayer has reported that prayer is positively related to happiness, well-being and optimism whilst, on the other hand, is negatively linked to anxiety and depression (Poloma & Pendleton, 1989, 1991; Koenig, 2006; Pössel, Winkeljohn Black, Bjerg, Jeppsen, & Wooldridge, 2014). With regards to the physiological effects of prayers, Al-Dhahabi has reported that when a person concentrates on their prayers, their mind will be relieved and will experience relaxation and a distancing away from those aspects that give them pain (Al-Dhahabi, 1996). This reflects what is stated in the Quran, Surah al-Baqara 2:153: O you who believe! Seek assistance (from Allah) through patience and the prayer. Surely Allah is with the patient (Abdel-Khalek, 2011). A similar sentiment can also be found in Surah at-Tauba 9:103: Invoke blessings (*salli*) upon them. Your prayer (salat) will surely bring

them peace. Moreover, the Quran states: Those who believed and their hearts have been satisfied with the remembrance of Allah. Verily, with the remembrance of Allah hearts do find rest, do they not? (Surah ar-Ra'd, 13:28) (Abdel-Khalek, 2011).

Amongst the diverse religious belief and practices, prayer is one of the most important fundamental themes of Muslim religion, primarily as it is a form of worshipping God; supplication (du'a), ritual prayer (salat), and invocation or chanting (dhikr). All these prayer forms are involved in emotional, psychological and physical processes in response to mental health. For example, du'a (supplication) is a way of communicating with God when one intends to (or needs to) rely upon Him in times of grief, stress, anxiety or worry, etc. Likewise, ritual prayer (salat) and the Remembrance of God (dhikr) provide psychological benefits for individuals in their coping with the stresses and hardships of life.

Salat Prayer (Ritual)

Salat, one of the most important tenets of Islam, pertains to ritual practice. It is categorised into different types; Fard Salat, Wajib Salat, Sunnah Salat and Nafl (pl. Nawafil) Salat, with each Salat being performed at a particular fixed time. For instance, it is obligatory for Muslims to perform Fard prayers five times a day and to also attend weekly Friday prayer. Islamic sources emphasise that it is sinful if an adherent abandons any of these prayers intentionally. Wajib prayers are as necessary as Fard prayers and need to be performed. Sunnah prayers are performed additionally and voluntarily, undertaken in following the Prophet Muhammad's acts. As stated in Islamic resources, the Prophet Muhammad performed Sunnah prayers regularly before and after Fard prayers. Nawafil prayers are optional prayers that were encouraged by the Prophet Muhammad (pbuh) and those that perform them are rewarded with extra benefits.

First Rak'ah   Second Rak'ah
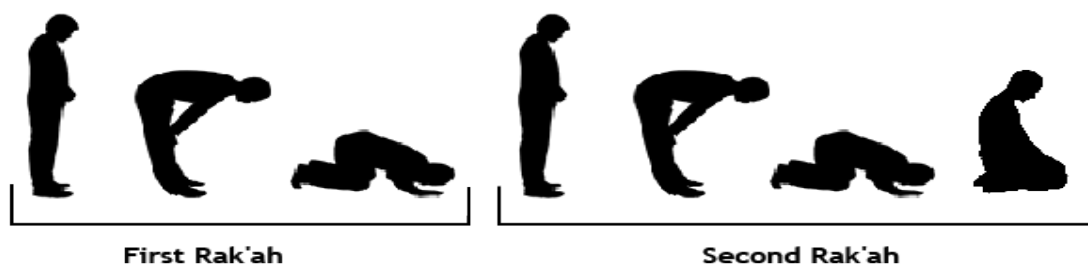
Figure 1. Movements of salat prayer for two units (rak'ah).

Ritual prayer (salat) consists of four acts; standing, bowing, prostrating and sitting (Figure 1). During the performing of these prayers, worshippers are supposed to focus on being in the presence of God, both in mind and soul.

Du'a Prayer (Supplication)

Another form of worshipping is verbal prayer, this being named du'a in the Islamic sense. Du'a is known as a phrase of one's wishes, requests or demands from the transcendent one, named as Allah amongst Muslims. The meaning of du'a is the act of referring somebody or something to Allah and leads the individual to have an open-ended conversation with Allah. This is stated in a verse in the Quran; "Take (O Muhammad), from their wealth a charity by which you purify them and cause them increase, and invoke [Allah's blessings] upon them. Indeed, your prayers are reassurance for them. And Allah is Hearing and Knowing" (Q 9:103).

Du'a can be described as a place of safety from daily problems and can be used to gain strength by heading towards God. People undertake du'a to feel better whenever they want to overcome feelings of hopelessness, helplessness, anxiety, depression or worry. Alternatively, worshipers may also wish to express their thanksgivings and gratitude to God. In his study, Aydin (2013) states that du'a has great power in helping to reduce not only the difficulties of individuals but also any pain they may feel in their soul, regardless of when or where they perform the practice. In this understanding, prayers thus have a strong potential to lead individuals towards possessing better psychological and subjective well-being.

The Remembrance of Allah (Dhikr / Invocation)

Remembering God is known as a rosary payer, invocation or mantra in other traditions. In Islam, it is known as dhikr or Remembrance of Allah. According to Islamic tradition, dhikr is one of the most common verbal prayers for Muslims. This practice is considered to be a tool through which an individual feeds their soul. Indeed, the Quran stresses the importance of Dhikr whereupon it states: "Who have believed and whose hearts have rest in the remembrance of Allah. Verily in the remembrance of Allah do hearts find rest! Those who believe and do right: Joy is for them, and bliss the journey's end" (Ar-Ra'd, 13:28-29).

Overall, for those who practice the Islamic faith, belief is given to the notion that individuals can become closer to God/Allah through prayer, be it salat, du'a or dhikr, and thus find peace of mind as a result of these rituals.

1.3. Summary of the Chapter and Thesis Outline

Chapter 1 has considered well-being and the personality aspects of mental health as the main variables of discussion. In doing so, this chapter has provided information pertinent to the associations between religion and different aspects of mental health (i.e., well-being and personality), as has been found to be problematic with contradictory results being gained (Section 1.1), and the key elements of the thesis that draw attention to the filling of gaps in the literature (Section 1.2). Thus, the main purpose of this project is to give focus towards the psychological facets of religious behaviour, undertaken so that they can be explored in more depth. Given that, the present thesis has conducted four studies that have aimed at exploring the effect of religious behaviour (particularly prayer) on the mental and physiological health of individuals through both subjective and objective measures.

The general structure of the PhD project has been mapped in Figure 2, as illustrates the interactions of the conducted studies within their respective chapters. Chapter 2 explains the links between different prayer types and well-being within the two given theoretical mechanisms that may prove to be beneficial when coping with negative life events. Chapter 3 tests this potential association via emotion-related measures (i.e., notable subjective well-being and psychological well-being), while Chapter 4 and Chapter 5 examine the potential effects of prayer in enhancing emotional outcome via physiological parameters (such as skin conductance response, blood pressure and heart rate). Chapter 6 provides general knowledge as to whether religious behaviours might be fruitful areas of exploration and utilisation within the fields of personality and resilience via their given theoretical mechanisms. Chapter 7 details a study designed to explore the interactions between prayer types, personality traits and resilience traits as measured by the five-factor model of personality and engineering, ecological and adaptive (EEA) resilience model. Finally, Chapter 8 summarises the findings of each conducted study and discusses their implications in terms of whether religious behaviours can be incorporated within therapeutic services and what future directions can be undertaken in this regard.

CHAPTER ONE

Psychological Facets of Religiosity

CHAPTER TWO

Links between Prayer and Well-being

CHAPTER SIX

Links between Prayer and Personality

CHAPTER THREE

Study 1

Associations between prayer types and well-being variables

(Survey, N = 214)

CHAPTER FOUR

Study 2

Reading prayer texts via Skin Conductance Response (SCR)

(Experiment, N = 55)

CHAPTER FIVE

Study 3

Reading and listening to prayer statements via the SCR

(Experiment, N = 78)

CHAPTER SEVEN

Study 4

Associations between prayer types and the FFM of personality alongside trait resilience (EEA)

(Survey, N = 173)

CHAPTER EIGHT

General Discussion

Figure 2. Flowchart of the structure of the thesis project.

PART A

Chapter Two

This section refers to the first focus of the PhD project, as includes three studies that examine the relationships that exist between religiosity and well-being through the employment of a questionnaire and a lab setting.

2.1. Relationship between Religiosity and Well-being: A General View

2.1.1. Introduction

When a comprehensive literature search has been made to examine the relationship between religion and/or spirituality and mental health, it is observed that religion and/or spirituality were considered as a coping mechanism in people's life to cope with adversity and negative events. With regards to psychologists and other health care givers, the growing interest in examining the role of religiosity/spirituality in the interpretation of life events and how it is related to psychological adjustments appeared varied. Some have revealed that religion is positively correlated with mental health (Koenig & Larson, 2001; Gartner, Larson, & Allen, 1991) while some have found that religion is negatively associated with psychological adjustment and mental health (Lewis, Lanigan, Joseph, & de Fockert, 1997). Since the previous findings have demonstrated that religion has a multifaceted nature, to what extent different dimensions of religiosity/spirituality are associated with psychological adjustment were examined.

Over the past two decades, studies regarding the relationship between religion and psychological and physical functioning have been increasingly conducted in psychiatry, counseling, and health care areas (Emmons & Paloutzian, 2003). The attention to this topic became more visible after Gordon Allport has revealed the importance of religiousness on real life issues (Allport, 1954, Allport & Ross, 1967) (Emmons & Paloutzian, 2003). Since then, the previous studies conducted on the influences of religiosity and spirituality on the individuals' well-being have been performed an increased frequency in the field of psychology of religion.

A comprehensive literature search was obtained by using Web of Science database for the past two decades, in which the field of psychology of religion has taken a great deal of attention when compared to the past. Because it is considered that religion and psychology has remained less investigated during the past few decades, this chapter

aims to present how religion play roles on the individuals' well-being, and to what extent religiosity has been performed by the individual in dealing with daily life stressors.

2.1.2. The relevance of religiosity to mental health

During past two decades, several review and meta-analysis have been made regarding the relationship between religiosity/spirituality and mental health. A large body of previous studies focused on the psychological outcomes (i.e. well-being, anxiety, depression, etc.) have suggested that religiosity and spirituality have a significant impact on the daily life of the individuals, thus may play important roles in the treatment of health-related issues (Lake, 2012). From the earliest studies to the past recent studies (around last two decades), research studies conducted on the relationship between religion and mental health have focused on different aspects of religion, such as religious orientations, religious coping, religious beliefs and practices, spirituality, and so on.

In an early meta analysis, when Seybold and Hill (2001) assessed the impact of religion on physical and mental health to explore whether religion was beneficial or harmful to psychological functioning, and they found that religion has a positive effect on mental health, coping mechanism, emotional states, and daily life events. In addition, Koenig, McCuollough and Larson (2001) have made a systematic review over 850 studies conducted on the relationship between religion and mental health, and they revealed that several studies was found to have a positive correlations between religious behaviours and life satisfaction. Plus, some showed that religiosity was associated with lower anxiety and depression among more religious people.

Further, Hackney and Sanders, (2003) analysed 34 studies conducted on the associations between religion and psychological adjustment from 1990 to 2002 in terms of the different religiosity and mental health definitions, and the evidence in their meta analysis was found supportive of the existing results, which being that religiosity has a positive relationship with mental health.

A few years later, Park (2007) has contributed another review among studies regarding how different pathways of religiosity and spirituality may affect physical health and psychological functioning by using 'a meaning system' framework. The researcher has aimed to organize the findings regarding this theoretical framework and concluded suggestions for future research. Having highlighting those findings that explored the effects of religiosity/spirituality on the individual's physical and mental health, possible

suggestions such as the role of theological differences in traditions on the individuals' beliefs, aims, health; to what extent the individuals deal with stressors were proposed for the unexplored areas to be examined.

2.1.3. Definition of Religion

Religion and spirituality are an important element in people's everyday lifespan. In a recent worldwide investigation poll, 59% of people reported that religion is of a great importance in their life (Jim, Pustejovsky, Park, Danhauer, Sherman, Fitchett *et al.,* 2015). Although the major religions have many beliefs and practices in common, there is not a unique definition for the terms religiosity and spirituality in the literature. It is reported that the word 'religion' derives from the Latin term *religio* and it is considered as 'obligation' or 'bond' (Fontana, 2003). According to the researchers, religion combines beliefs, practices, and rituals towards the superhuman power (e.g. the Divine, the Transcendent, the Ultimate Truth or Reality) or God, and contains cognitive, emotional, and behavioural mechanism (Ladd & Spilka, 2002; Hackney & Sanders, 2003; James & Wells, 2003). Religion represents a guide life for the individuals to understand the meaning or purpose of life, the importance of the existence and so on. Each religion is practiced within a specific community, but it can differently be performed as in private or communal within a social group.

On the other hand, it is stated that spirituality is more complicated to define. The term 'spirituality' derives also from the Latin term *spiritualis* that frequently refers to the clergy in Paul's letters (Koenig, 2008). In contrast to religion, spirituality is considered more personal lifestyle, in which its conception has to do with not only the transcendent or divine but also non-religious traditions (Emmons & Paloutzian, 2003; Koenig, 2008). With regards to its ambiguous concept and lack of definitions, the researchers have found spirituality more difficult to assess in empirical research (Koenig *et al.,* 2001; Hill & Pargament, 2003; Yonker, Schnabelrauch, & Dehaan, 2012). Although there has not been consensus among the researchers on the meaning and conceptualizing of religiosity and spirituality, the simplest definition made by Zinnbauer *et al.* (1999) and Hill, Pargament, Hood, McCullough, Swyers, Larson, and Zinnbauer (2000) as "a search for the sacred" has rooted in both religion and spirituality. By taken that religion has multifaceted nature, it is noted that both religiosity and spirituality relate to human experience which helps to understand the creation of purpose and meaning in life (Unterrainer, Lewis, & Fink,

2014). Therefore, in this context, the current study has used the term religiosity and spirituality in common.

2.1.4. Definitions of Psychological Adjustments

There are number of constructs of mental health in the literature that tended to assess the negative psychological adjustments such as anxiety, depression, etc. (Abu-Raiya, Ayten, Agbaria, & Tekke, 2018) and the positive psychological adjustments such as well-being, life satisfaction, happiness, etc. (Maltby & Day, 2000; Bergan & McConatha, 2000; Hackney & Sanders, 2003; Whittington & Scher, 2010; Lazar, 2015). As it is emphasized above in this chapter that different factors of religiosity may have various impacts on mental health, likewise different components of mental health may differently be related to religiosity.

2.1.4.1. Psychological and Subjective Well-being

Psychological well-being (PWB) primarily refers to healthy human functioning that involves in the assessments of life satisfaction, happiness, self-esteem, positive affect, hope, optimism, etc. (Keyes, Shmotkin, & Ryff, 2002; Fontana, 2003; Yonker *et al.*, 2012). Ryff and Keyes (1995) developed a multiple facets of psychological well-being based on the concept of *eudaimonic* which focuses on pleasure and fulfilment. These facets consist of six dimensions of psychological functioning: autonomy (i.e. able to resist social pressure in a certain way with being self-determined and independent), environmental mastery (ie. ability to manage and create a proper environment for personal needs), personal growth (i.e. sense of continued development and self-knowledge), positive relatedness (i.e. ability to build a trusting relationship with others), purpose in life (i.e. aims discovering meaning in life), and self-acceptance (i.e. has satisfactory in self despite possible diverse aspects of self) (Ryff, 1989a; Ryff, 1989b; Ryff & Keyes, 1995).

Subjective well-being (SWB) is described as "a person's cognitive and affective evaluations of his or her life" (Diener, Oishi, & Lucas, 2002; Abdel-Khalek, 2011, p.129). Therefore, this cognitive and affective judgment conceptualizes three components such as life satisfaction, positive affect, and negative affect as an emotional reaction to events (Albuquerque, 2010). It is stated that the cognitive judgment comprises "the satisfaction with self, family, peer group, health, finances, work, and leisure", and the affective judgment involves in the positive affect (i.e. happiness, pride, affection, joy, etc.) and the

negative affect (i.e. depression, anxiety, sadness, guilt, anger, stress, etc.) (Abdel-Khalek, 2011).

Studies conducted during last two decades are consistent with the findings of a positive relationship between religiosity and well-being (Francis & Wilcox, 2000; Hackney & Sanders, 2003; Koenig *et al.,* 2001). For instance, Koenig *et al.* (2001) reviewed 100 studies regarding the relationship between religious involvement and well-being, and of the 79 have been reported that there is a positive correlation between the two while only one study revealed a negative correlation between two variables (Fontana, 2003, p.214).

2.1.4.2. Depression and Anxiety

Depression and anxiety are investigated as the most common mental problems in psychiatry and health care areas. The effects of religion have also taken a great deal of attention to deal with these psychological disorders among health care providers. For example, an increasing body of research studies has investigated the diverse aspects of religiosity and their relations to anxiety (such as obsessive compulsive disorder, stress, panic attack, etc.), and obtained mixed results (Khalaf, Hebborn, Dal, & Naja, 2015). The vast majority of studies have reported that religion has positive and protective impacts on anxiety (Koenig, 2009), while some studies have found either negative association (Park & Park, 2012; Pearce, Singer, & Prigerson, 2006) or no association at all between the two *(*Koenig, King, & Carson, 2012). Although, a large body of existence literature on the relationship between religion and anxiety has increasingly been investigated, the current findings have remained uncertain and limited, and so require further research.

Moreover, reviews of the literature have demonstrated possible role of religion in reducing depression. For instance, a recent meta-analysis has examined the results of 147 studies with around 100.000 subjects on the interplay between religion and depressive symptoms (Smith, McCullough, & Poll, 2003). The researchers have found that religiosity is associated with lower level of depression with an effect size of -0.096 (Moreira-Almeida, Neto, & Koenig, 2006). Supporting these findings, Koenig (2008) has found that religion is associated with lower levels of depression. While the associations between religiosity and depression are usually similar in studies, it is important to draw attention that different types of religious measures alongside with depression levels have been assessed (Moreira-Almeida *et al.,* 2006).

2.1.5. Religious Behaviours and Their Roles in Psychology

According to 2011 UK Census, 59% of people stated that they were Christian, 25% of people stated that they had no religion and 5% of people stated that they were Muslim (Office for National Statistics, 2013). It is evident that religious beliefs and practices provide significant support and contribution to the mental health and well-being of individuals (Dixon & Wilcox, 2016). Multiple practices play a major role as coping mechanisms in different matters of daily life. Amongst the various ritual practices, prayer is one of the most important central themes of religiosity, primarily as it is representative of worshipping God. Whilst it can be argued that religion is one of the most dominant factors in people's lives, particularly in its cultural context, living in a secular state is also of great importance in shaping the beliefs and practices of Muslim individuals. As such, Muslims residing in the UK would be an interesting empirical study in generalising the above-mentioned findings from the research conducted on religiosity and well-being associations into practice.

According to the previous research, various prayer measures are predominantly derived from Christian religious norms and beliefs. However, non-Christian groups have been mostly disregarded in these inquiries.

2.2. Relationship between Religiosity and Well-being: An Islamic Perspective

2.2.1. Introduction

As humanity consists of psychological, social, spiritual or even biological incidents, all of which are based on the individual lives people lead, religion can be held to be one of the most important factors in motivating people to feel safe. The field of the psychology of religion has placed increasing importance on this subject, seen in it highlighting the effect of religion upon the life, attitude, behaviour and personality of individuals. In particular, the relationship between the dimensions of religiosity, spirituality, mental health and well-being has been focused upon (Emmons & Paloutzian, 2003). In terms of the most common investigation as to aspects of religiosity, in them considering religious behaviours, has been to compare any differences among diverse populations (Abdel-Khalek, 2011). For that reason, some studies have tried to develop measurements that assess Islamic religiosity whilst other studies have taken a clinical perspective in attempting to assess the significance of religious faiths and behaviours on psychotherapy, coping process and so forth.

Although studies as to Muslim populations in states other than Islamic countries have remained limited (especially in regard to Muslims living in the UK), some research has been conducted based on samples of either Muslims living in Muslim countries or Muslims living in Western countries (Abdel-Khalek, 2011; Tiliouine, 2009). Several studies have given focus to the associations between the well-being of Muslims and religiosity – research primarily undertaken by Abdel-Khalek and his colleagues (Abdel-Khalek, 2002; Abdel-Khalek, 2006; Abdel- Khalek, 2007a; Abdel- Khalek, 2007b; Abdel- Khalek, 2008; Abdel- Khalek, 2009; Abdel- Khalek & Lester, 2007; Abdel-Khalek & Naceur, 2007). As cultural diversity and religiosity may differ in thoughts of people (especially when taking into consideration whether they live in Western or Arabic countries), the objective of the present research is to fill part of this gap by exploring the association between religiosity and well-being in a sample of Muslims in behavioural-cognitive contexts.

2.2.2. Previous Findings on the Relationship between Muslim Religion and Psychological Outcomes

From the literature with reference to Islamic studies and the associations between religiosity, mental health and well-being, overall the studies conclude that there is a positive relationship between religiosity, health attitudes and well-being. For instance, Al-Sabwah and Abdel-Khalek (2006), in testing 570 Egyptian Muslim female nursing undergraduates, found that high scores of religiosity were associated with fewer levels of death fear and death sadness. Furthermore, Abdel-Khalek and Naceur found that, amongst 244 Algerian college students, in relation to religiosity and its relationship with positive and negative emotions, religiousness and life satisfaction amongst Algerian women was significantly higher than amongst Algerian men. Here, it was found that religiosity is associated with better mental health but only amongst men. Despite this, religiosity was found to be positively associated with optimism, happiness and life satisfaction and negatively associated with anxiety and pessimism amongst women (Abdel-Khalek & Naceur, 2007).

Later, Abdel-Khalek used five one-item self-rating scales of religiosity, happiness, life satisfaction and mental and physical health with the Multidimensional Child and Adolescent Depression Scale. From a sample of 7211 Saudi school students, Abdel-Khalek found that religiosity is positively correlated with happiness, satisfaction

in life and better mental and physical health. In contrast, religiosity is negatively correlated with depression (Abdel-Khalek, 2009).

In the same vein, Abdel-Khalek (2010) worked with a sample of 499 Muslim Kuwaiti adolescents to explore religiosity, self-esteem, subjective well-being, and anxiety associations. From this study, he found that religiosity is positively and significantly associated with high levels of self-rating of subjective well-being and self-esteem whereas low levels of anxiety. Using a sample of 1251 undergraduates from Egypt and Kuwait, Abdel-Khalek (2011) found that Kuwaiti men and women have a significantly higher mean score on all scales, particularly on the mental health and happiness scales, than their Egyptian counterparts. On the basis of the results of this study, it is possible to say that the participants with high religiosity scores were more likely to have good mental and physical health, be happier and more satisfied with their lives and have high self-esteem (Abdel-Khalek, 2011, p.752). On the other hand, the researcher reported that SWB and mental health are positively associated with a higher national income, such as found in Kuwait, and negatively associated with unemployment, such as found in Egypt (Abdel-Khalek, 2011, p.753). Khan and Watson (2004) tested 121 Pakistani Muslims to examine the experience of Eid al-Adha alongside three religious orientations: intrinsic, extrinsic-social and extrinsic-personal. They found positive correlations between religious interest, interest in Eid, self-esteem and both intrinsic and extrinsic personal orientations. They also found however that extrinsic-social orientation was not significantly correlated with any variables in the study.

Briefly, the findings of the above-mentioned studies show that Islamic religiosity is positively associated with happiness, satisfaction in life and optimism. Furthermore, religiosity was also found to be negatively associated with anxiety, depression and pessimism. The findings and outcomes of the abovementioned research highlight that investigation as to the impact of religiosity amongst Muslim communities is needed if, in respect of the unique instruments that are practiced and performed within Islam, appropriate religiousness scales are to be developed.

Chapter Three

Prayer Types and Their Associations with Well-being within an Application of a Cognitive-Behavioural Framework

Abstract

Objectives: Several theoretical and empirical approaches have been attempted to address what people do in the face of life events and what practices are of great importance in their lives. There is a common idea that prayer is a key factor that has a beneficial impact in people's lives when they encounter life stressors. The aim of the current study has been to explore the relationship between different prayer types and well-being variables within a theoretical context of the cognitive-behavioural mechanism among Muslim individuals.

Methods: In order to examine the association between different prayer forms and mental well-being, 214 participants (female= 145, male= 69) completed a number of self-completed questions pertinent to prayer types (as performed daily, weekly or yearly) in addition to a measure of psychological well-being within six domains (autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance) and a measure of subjective well-being within two domains (life satisfaction and positive and negative affect schedule).

Results: The results highlight that two forms of prayer (supplication and invocation), over other forms of prayer, account for the unique variance in predicting better psychological and subjective well-being respectively. In contrast, the supererogatory form of prayer was found to be a predictor of lower psychological well-being.

Conclusion: The current findings highlight that the application of a cognitive-behavioural framework can be applied to examine the relationship between different forms of prayer and the well-being of individuals. As a result, this mechanism enables researchers to help understand the association between prayer and well-being in terms of mental health.

3.1. Introduction

Over the past two decades, in light of it representing a dimension of religious faith, prayer has mostly been studied by scientists due to its potential to be a supporting component of well-being and mental health in the field of the psychology of religion. According to the literature as to this area, a number of studies have reported that prayer is associated with increased happiness, well-being and optimism while also being negatively associated with anxiety and negative affect (Francis & Kaldor, 2002; Koenig, 2002). However, it is important to state that many of the previous studies have solely focused on the empirical relationship between the single-item measure of prayer and various aspects of mental health (Krause, 2003), while little attention has been given towards investigating the theoretical areas that underpin the relationship observed between different aspects of prayer and dimensions of mental health (Breslin & Lewis, 2008; Maltby *et al.,* 2008; James & Wells, 2003; Poloma & Pendleton, 1991; McCullough, 1995). Thus, the use of theoretical considerations as to how prayer forms may be effective in promoting mental health remains limited. The current paper seeks to examine the usefulness of such theoretical approaches in explaining the relationships that arise between different types of prayer and mental health.

Although evidence has revealed that prayer is related to the promotion of mental health, it is important to draw attention to the specific forms of prayer in relation to mental health variables though a theoretical conceptualisation. While some theoretical frameworks – such as the religious defence framework and the religious coping mechanism framework as proposed by Houts and Graham (1986) and Pargament (1990, 1996) respectively – have been proposed, they have focused on the helpful roles of religious behaviour in appraising individual life events, in dealing with difficult situations and in addressing the feeling of powerless held towards those things which a person cannot control (James & Wells, 2003). Yet, psychological models of coping in their use within religious belief systems have not been directly tested by researchers when attempting to explain the differential relationships of prayer models with psychological outcomes in terms of mental health.

Notably, a potential cognitive behavioural conceptualisation of religion has been proposed by James and Wells (2003), provided in order to determine the reasons for the differential relationships of religion that arise with mental health. The hypothesis of

James and Wells highlights two mechanisms that underlie how the links between religiosity and mental health invoke better guidance when considering life events – achieved by helping individuals to understand their existence in the world, the meaning of life and the purpose of life (Maltby *et al.,* 2008). The first cognitive behavioural mechanism as to this area is grounded in the theory postulated by McGuire (1981) and Peterson and Roy (1985). According to this theory, religiosity has a significant impact upon an individual's understanding of life and their purpose in the world. This way of thinking contributes to a person's understandings as to the reasons for their existence, importance and purpose in this world (James & Wells, 2003). The second cognitive behavioural framework addresses the idea that religious behaviours can contribute to the psychology of individuals. This hypothesis is based upon the findings that religious behaviour contributes to self-control by decreasing self-focus, concerns or stresses. In this way, religious behaviour or practice leads individuals to better subjective well-being (Maltby *et al.,* 2008). This hypothesis initially refers to the studies of different types of prayer, research as conducted by Poloma and Pendleton (1991) and Poloma and Gallup (1991). According to this hypothesis, some religious behaviour can impact significantly upon one's emotions, obsessiveness, remorse, anxiety and depressive symptoms (Steketee *et al.,* 1991; Wells & Hackman, 1993; Wells, 1997; Pérez, Smith, Norris, Canenguez, Tracey, & DeCristofaro, 2011). Here, James and Wells (2003) have found that meditative prayer helps individuals to take control of their self-focus and stress. From this, an individual may encounter less worry. As such, meditative prayer is held to be an activity that can help individuals deal with daily life events and problems. After this, Maltby *et al*. (2008) applied the cognitive-behavioural framework context in examining the relationships that arise between different prayer dimensions and subjective well-being, whereupon they reported that ritual prayer, meditative prayer, prayer experience and praying for others all accounted for the unique variance in predicting better mental health scores. These findings suggest that the frequency of personal prayer among other prayer types stand as a central factor between the cognitive and behavioural aspects of the model proposed by James and Wells (2003).

Despite the theories of the abovementioned scientists, there is still little research that has extended the application of the cognitive-behavioural model in identifying how types of prayer (as formed based on non-Christian norms) relate to both psychological and subjective well-being measures. Indeed, the majority of previous research has been

hindered by a lack of diverse praying populations where prayer plays a central element in their religious practices. While the literature of this area has revealed varying links between prayer and mental health, this may be due to the limitations in the populations used as these have comprised of predominantly Christian samples (Hood, Hill, & Spilka, 2009). Furthermore, many of the self-report measures used in the literature are based on Christian populations (Poloma & Gallup, 1991; Ai, Tice, Huang, Rodgers, & Bolling, 2008; Hood *et al*., 2009; Winkeljohn Black, Pössel, Jeppsen, Tariq, & Rosmarin, 2015).

3.2. Present Study

The present study investigates whether an application of a cognitive-behavioural model can be applied to explore the relationship between different types of prayer and psychological and subjective well-being variables. In this study, the self-report prayer type measures contain six dimensions of prayer and were categorised as obligatory (reciting prayers as a daily reminder of God), necessary (reciting prayers with the awareness of God's presence), voluntary (earning of God's love), supererogatory (performed prayers beyond the required duties), supplication (feeling a sense of God's presence) and invocation (attaining inner peace and reflection as to the universe and creation). Here, the supplication type of prayer reflects James and Wells' first mechanism of the model that is associated with the self-perception of individuals, their significance in the world and how their purpose of life provides an awareness of God's presence. The second mechanism of James and Wells' (2003) model is consistent with the invocation aspect of prayer, as is associated with quiet reflection as to the universe and creation and as generates self-regulation in one's attention and thinking processes that help free one from any kind of stress or worry. James and Wells (2003) thus suggest the model's ability to provide researchers and mental health practitioners with a deeper understanding of how religiosity contribute to mental health well-being. At this point, the proposed cognitive behavioural framework has sought for application upon prayer types and their well-being associations, undertaken in order to identify whether or not the use of prayer models can enable individuals to find meaning in stressful life events and, furthermore, to encounter better mental health.

3.3. Research Objectives and Hypotheses

Based on the previous findings, a number of significant relationships between multi-dimensional religiosity (such as religious orientation and personal prayer models) and indices of mental well-being have been identified and explained within this proposed cognitive-behavioural model (James & Wells, 2003; Maltby *et al.,* 2008; Maltby *et al.,* 2010). Despite the growing literature on prayer, no previous research has specifically addressed multidimensional inventory of Muslim prayer and their associations with both psychological and subjective well-being within the above-mentioned theoretical model among Muslim populations. Therefore, the aim of this study is to replicate and extend Maltby *et al.*'s (2008) findings by testing different Muslim prayer types (obligatory, necessary, voluntarily and supererogatory prayers as a ritualistic-based prayer; supplication and invocation prayers as a verbal-based prayer) and their relations with well-being variables within the proposed framework. In light of providing empirical support for the previous findings, this investigation was guided by the following research questions and hypotheses:

Research Question 1. Are there any differential associations of prayer types with psychological well-being variables among a Muslim sample?

Research Question 2. Are there any differential associations of prayer types with subjective well-being among a Muslim sample?

Research Question 3. Do certain prayer types predict well-being variables?

Research Question 4. Are the results of this study explained by the proposed cognitive-behavioural framework?

Hypothesis 1: Ritualistic prayers in which the focus is on the worshipping of God do not always yield consistent correlations with indicators of well-being across religious groups, as stated in previous studies, with this being especially true for a Muslim sample (Poloma & Gallup, 1991; Whittington & Scher, 2010). It was thus here hypothesised that ritualistic prayer models (namely obligatory, necessary, voluntarily and supererogatory) would not be found to be a predictor of well-being variables.

Hypothesis 2: Despite the fact that the supplication prayer type has a problem-focussed nature (Laird *et al.,* 2004; Whittington & Scher, 2010), this form of prayer with its potential links to mental health offers promoted contributions (Lazar, 2015).

Therefore, it was here predicted that the supplication prayer type would be found to predict better psychological well-being.

Hypothesis 3: According to the literature, meditative prayer appears to be a form containing the strongest connectedness to God (Ai *et al*., 2008). Earlier findings have suggested that meditative prayer would predict better subjective well-being (James & Wells, 2003; Maltby *et al*., 2008). As a concept related to meditative prayer, the invocation prayer type (in the Islamic sense of meditative prayer) is here hypothesised as being the best predictor of subjective well-being.

Hypothesis 4: Prior studies have revealed that the cognitive-behavioural mechanism links intrinsic religiosity and meditative prayer to mental health components (Maltby *et al*., 2008; Maltby *et al*., 2010). Given that, it is hypothesised that the proposed cognitive-behavioural framework would link supplication and invocation types of prayer to the indicators of well-being (psychological and subjective well-being).

3.4. Method

3.4.1. Sample Characteristics

A total of 214 responses were gained (145 females, 69 males), with the respondents being aged from 18 to over 66 years old ($M = 27.01$, $SD = 8.80$). All of the respondents were Muslim and resided within the UK. The frequently reported marital statuses were single (139: 65%), married (70: 32.7%), divorced (4: 1.9%) and widowed (1: 0.5%). In terms of educational attainment, 65 (30.4%) respondents reported that they were high school graduates, 44 (20.6%) reported possessing a bachelor's degree, 78 (36.4%) reported being Master's students, 19 (8.9%) reported being PhD students and 8 (3.7%) reported as 'Other'. In terms of nationality, 13 (6.1%) were Caucasian, 10 (4.7%) were of a mixed background, 89 (41.6%) were Asian/Asian British, 14 (6.5%) were Black/Black British, 75 (35%) were of other ethnic groups while 13 (6.1%) declined to report their ethnicity.

3.4.2. Measures and Questionnaires

Besides demographic questions (age, gender, marital status, education, and ethnicity), a number of self-report questions assessing different types of prayer (as performed by the respondents daily, weekly or yearly), and a number of well-being

indices were administered (Appendix A). Participants were asked to complete four self-report inventories as follows:

Self-rating Prayer Types. Islam, as is now the second largest religion in the world (Abdel-Khalek, 2013), should evidently been incorporated into such research if progress is to be made in this field of study. Thus, six self-report prayer types are employed to assess active and passive forms of prayer; ritual prayers and the verbal prayers respectively. The ritual prayers consisted of four prayer forms; Fard prayers, Wajib prayers, Sunnah prayers and Nawafil prayers that involve reciting a memorised sctript contained in the Holy Quran. The verbal prayers consisted of two prayer forms; Du'a and Dhikr that refer to the informal conversation with God.

1. Obligatory (fard) prayer (six items) refers to a type of prayer in which one focuses on devotion to God. This prayer consists of bodily movements that believers are bound to by the consequence of violating God's commandments. These must be performed at fixed worship times via the repeating of Quranic texts and allow the uniting of mind, soul and body in directly communicating and connecting with God with full attention.

2. Necessary (wajib) prayer (three items) refers to bodily movements that are nearly performed as commanded as Fard prayers at worship times. These are undertaken in connection with the divine via the recitation of Quranic texts and ensure awareness of the divine presence.

3. Voluntary (sunnah) prayer (twelve items) refers to bodily movements encouraged by the Prophet and that demonstrate the earning of God's love.

4. Supererogatory (nawafil) prayer (twenty-one items) refers to bodily movements that involve resorting to God for guidance, with this being led by God in seeking answers and protection.

5. Supplication (du'a) prayer (six items) refers to have an open-ended conversation with God, whereby one expresses desires to God for oneself or for others. This can be performed at any time and in any place.

6. Invocation (Remembrance of God or dhikr) prayer (three items) refers to the act of remembering God, thus feeling a sense of closeness to God and attaining inner peace.

Each item had three basic questions that assessed the frequency, intensity and importance of the given prayer behaviour. For example, the frequency of which prayer was assessed with the question: "How often do you engage in this (type of) prayer in a week/a year?" The response scale ranged from 1 *(Never)* to 6 *(More Than Once a Week)*. The intensity of which prayer was evaluated with the question: "When you engage in this (type of) prayer, how intense is this experience for you?" Here, the response scale ranged from 1 *(Not at All)* to 5 *(Extremely)*. The importance of which prayer was measured with the question: "How important to you is engaging in this (type of) prayer?" The given responses ranged from 1 *(Not at All)* to 5 (*Very Important)*. Upon being calculated above 0.7, the Cronbach's Alpha for all variables suggest that all multi-item prayer inventories are acceptable among the present sample (Kline, 2011) - with obligatory prayer (α= .73), necessary prayer (α= .84), voluntary prayer (α= .86), supererogatory prayer (α= .90), supplication prayer (α= .88) and remembrance of God prayer α= .70).

Psychological Well-Being (PWB; Ryff & Keyes, 1995, 18 Item). This scale consists of six components and measures multiple aspects of psychological well-being which focus on pleasure and fulfilment. These facets consist of six dimensions of psychological functioning; autonomy (i.e., the ability to resist social pressure in a certain way through being self-determined and independent), environmental mastery (i.e., the ability to manage and create a proper environment for personal needs), personal growth (i.e., the sense of continued development and self-knowledge), positive relatedness (i.e., the ability to build a trusting relationship with others), purpose in life (i.e., the aims held as to discovering meaning in life) and self-acceptance (i.e., the satisfaction in one's self despite possible diverse aspects of self). The short version of this scale, as used in this present study, consists of 18 items with a 6-point response scale. The scale consists of responses ranging from 1 (Strongly Disagree) to 6 (Strongly Agree). Respondents were asked to indicate whether they agreed or disagreed with a number of statements. (e.g., "Some people wander aimlessly through life, but I am not one of them" [Item 14]). The Cronbach's alpha of this scale in the current study is .73.

The Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin 1985, 5 Item). The scale includes 5 items rated on a 7-point response scale (1= Strongly Disagree, 7= Strongly Agree) (e.g., "If I could live my life over, I would change almost nothing" [Item 5]). The Cronbach's alpha coefficients for the Satisfaction with Life measure is .79.

The **Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988, 20 Item).** The scale consists of a 5-point response scale (1= Not at All, 5= Extremely), with this being used as part of the subjective well-being measurement, noting in particular how participants felt over the past week (e.g., "I have felt interested over the past week" [Item 1]). The affective judgment here is involved in the positive affect (i.e., happiness, pride, affection, joy), while the negative affect corresponds to depression, anxiety, sadness, guilt, anger and stress among others. The Cronbach's alpha coefficients for this scale is .84.

Subjective well-being scale "is defined as a person's cognitive and affective evaluations of his or her life" (Diener *et al.,* 2002, p. 63). This cognitive and affective judgment conceptualises two components; satisfaction with life overall, and positive affect and negative affect as an emotional reaction to events.

3.4.3. Research Procedure

An online survey was used in this study, whereby the details of the research (such as the aim of the study, the measure used and the eligibility of being a participant) were provided to the target participants. A link to a web-based survey was sent to several Islamic student societies – at; the University of Leicester, Oxford University, SOAS, Durham University, Stirling University and Sheffield University. In addition, it was also sent to several worship places (such as the London Central Mosque and London Muslim Center).

3.4.4. Ethical Consideration

All of the participants were above 18 years old and gave their consent to participate in the research. To ensure informed consent, all of the individual respondents were asked to select an "*I agree*" button in the web-based survey to demonstrate their affirmative consent with reference to participating in the research. And also, the researchers guaranteed the confidentiality of the respondents. None of the answers given by the respondents have been shared with any other researcher or revealed in any other studies. The data collection procedure of this research gained ethical approval from the University of Leicester, Department of Neuroscience, Psychology, and Behaviour Ethics Board *(Reference number: 3633-fzg1-neuroscience,psychologyandbehaviour)* (Appendix B).

3.4.5. Statistical Analysis

All of the obtained data was statistically evaluated through the Statistical Package for the Social Sciences programme (SPSS Statistics Version 24), with each measure being examined respectively for differences via the use of bivariate correlational analysis and multiple regression after examining the normality of the data. First, Pearson product moment coefficients correlation analysis was conducted to examine the relationship between the multi-dimensional prayer forms and indices of well-being. The effect size for the zero order correlations was measured as $r= .10$ representing a small effect, $r= .24$ representing a medium effect and $r= .37$ representing a large effect (McGrath & Meyer, 2006). Then, two multiple regression analyses were used to determine whether a type of prayer predicts psychological well-being and/or subjective well-being. In order to determine the effect size of the regression association, Cohen's convention considered an f^2 of .02 (accounts for 2% of the variance) to be a small effect, while .15 (accounts for 13% of the variance) is held to be a medium effect and .35 (accounts for 26% of the variance) is held to be a large effect (Cohen, 1988). As previous findings have revealed contradictory results towards mental health components, the statistical analysis undertaken was performed separately for each well-being measure. Furthermore, in order to be able to achieve a high level of power and to reduce the risk of making a Type II error, the estimation of the sample size was performed using the statistical software package G*Power 3.1 (Buchner, Erdfelder & Faul, 1997), with a power value of .80, an alpha level of .05 and a medium effect size based on the recommendations of Cohen (1988, 1992). Through this analysis, the minimum sample size was found as 206 for this study, as seems adequate in terms of the statistical procedures undergone in an effort to answer the research questions held.

3.5. Results

Means and standard deviations (*SD*) for all variables are presented for each sex in Table 1 below. Notably, females scored significantly higher than males in relation to the supplication prayer and the invocation prayer as well as to self-acceptance, life satisfaction and negative affect as domains of psychological and subjective well-being. The only exception to this arises in relation to the obligatory prayer, where males scored significantly higher than females. This finding is consistent with previous research, as has

found women to be more religious than men (Beit-Hallami & Argyle, 1997; Maltby & Day, 2003).

Table 1

Mean (*SD*) score comparisons for six prayer types and well-being variables by gender.

Scales	Female (*n*= 145) M (*SD*)	Male (*n*= 69) M (*SD*)	*t*	*p*
Obligatory prayer	16.00 (4.24)	19.45 (4.67)	-5.38	**.00**
Necessary prayer	8.72 (3.87)	8.83 (4.00)	.18	.86
Volunary prayer	30.60 (9.24)	31.10 (10.15)	-.36	.72
Supererogatory prayer	40.62 (19.25)	37.99 (18.50)	.95	.34
Supplication prayer	18.37 (4.76)	15.32 (7.11)	3.71	**.00**
Invocation prayer	10.40 (1.61)	9.10 (2.92)	4.16	**.00**
Autonomy	10.27 (2.40)	9.57 (2.91)	1.87	.06
Env. Mastery	9.54 (2.43)	10.23 (2.66)	-1.87	.06
Personal Growth	12.81 (2.14)	12.17 (2.70)	1.88	.06
Positive Relations	10.68 (2.87)	10.29 (2.68)	.94	.35
Purpose in Life	10.96 (2.62)	11.12 (2.69)	-.41	.68
Self-acceptance	10.50 (2.68)	9.41 (3.28)	2.58	**.01**
Life Satisfaction	20.03 (5.11)	18.14 (5.82)	2.41	**.02**
Positive Affect	20.70 (8.33)	19.10 (7.46)	1.36	.18
Negative Affect	13.34 (8.28)	9.68 (7.35)	3.14	**.00**

Notes. N= 214; Env. Mastery= Environmental Mastery

p< .05

Table 2

Pearson-moment correlations coefficients between six prayer types and well-being variables.

	M (SD)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Obligatory	17.11 (4.66)	1	.52**	.62**	.42**	.28**	.22**	-.04	.21**	-.03	.01	.04	.05	.07	.14*	-.16*
2. Necessary	8.76 (3.90)		1	.64**	.49**	.33**	.24**	-.05	.05	-.02	.01	-.03	-.08	.04	.03	-.06
3. Voluntarily	30.77 (9.52)			1	.63**	.40**	.34**	-.05	.18**	.05	.05	.05	-.03	.08	.10	-.06
4. Supererogatory	39.77 (19.01)				1	.47**	.40**	-.08	.09	.00	-.05	-.09	-.08	.07	.08	-.01
5. Supplication	17.38 (5.79)					1	.51**	.04	.02	.20**	.19**	.15*	.06	.07	.11	-.05
6. Invocation	9.98 (2.21)						1	.05	.07	.11	.09	-.08	.21**	.23**	.15*	-.02
7. Autonomy	10.04 (2.59)							1	.17*	.24**	.08	.09	.13*	-.01	.10	-.15*
8. Env. Mastery	9.77 (2.52)								1	.32**	.35**	.26**	.34**	.31**	.23**	-.34**
9. Personal Gr.	12.61 (2.34)									1	.31**	.37**	.26**	.10	.23**	-.24**
10. Positive Rel.	10.55 (2.81)										1	.34**	.39**	.14*	.27**	-.17*
11. Purpose Life	11.01 (2.64)											1	.16*	-.02	.12	-.09
12. Self-Accept	10.14 (2.93)												1	.56**	.27**	-.22**
13. Life Satis	19.42 (5.41)													1	.39**	-.07
14. PA	20.19 (8.08)														1	.08
15. NA	12.16 (8.16)															1

Notes. *N*= 214. M= Mean; *SD*= Standard Deviation; PA= Positive Affect; NA= Negative Affect; ** *p*< .01; * *p*< .05

Table 2 presents, for all of the variables, any correlations that were found to be significant. With respect to the six prayer types, all prayers were significantly positively correlated with one another. The results presented in Table 2 also demonstrated that obligatory (fard) prayer was significantly correlated with environmental mastery ($r= .21$, $p< .01$) as a domain of psychological well-being and the Positive Affect Schedule ($r= .14$, $p< .05$), despite being negatively correlated with the Negative Affect Schedule ($r= -.16$, $p< .05$) as a domain of subjective well-being. Likewise, voluntarily (sunnah) prayer was positively associated with environmental mastery only ($r= .18$, $p< .01$). Supplication (du'a) prayer was found to have a strong correlation with three domains of psychological well-being; personal growth ($r= .20$; $p< .01$), positive relations with others ($r= .19$; $p< .01$) and purpose in life ($r= .15$; $p< .05$). Invocation (dhikr) prayer was also found to significantly correlate with self-acceptance ($r= .21$; $p< .01$) as a domain of psychological well-being as well as two domains of subjective well-being; satisfaction of life ($r= .23$; $p< .01$) and the Positive Affect Schedule ($r= .15$; $p< .05$). On the other hand, necessary (wajib) and supererogatory (nawafil) prayers failed to demonstrate any correlation with either the psychological or subjective well-being components. The effect sizes of the all correlations were small.

Table 3

Six prayer types regressed on psychological well-being.

Variables	B	SE B	β	t	Sig.
Obligatory prayer	.13	.18	.06	.70	.48
Necessary prayer	-.32	.22	-.13	-1.41	.16
Voluntary prayer	.16	.11	.15	1.44	.15
Supererogatory prayer	-.13	.05	-.25	-2.76	**.01**
Supplication prayer	.37	.14	.22	2.65	**.01**
Invocation prayer	.34	.35	.08	.97	.33

Notes. N= 213; $r= .29$, $r^2= .08$, Adj. $r^2= .06$

**$p< .01$; * $p< .05$

Table 4

Six prayer types regressed on subjective well-being life satisfaction (SWLS: Life Satisfaction).

Variables	B	SE B	β	t	Sig.
Obligatory prayer	-.06	.27	-.02	-.22	.82
Necessary prayer	-.23	.33	-.06	-.68	.50
Voluntary prayer	.06	.16	.04	.35	.73
Supererogatory prayer	.03	.07	.03	.36	.72
Supplication prayer	-.08	.21	-.03	-.37	.71
Invocation prayer	1.09	.52	.17	2.08	**.04**

Notes. $N= 213$; $r= .17$, $r^2= .03$, Adj. $r^2= .00$

$**p< .01$; $* p< .05$

Despite the fact that the correlational analysis in Table 2 revealed a number of positive relationships between types of prayer and well-being indices among the overall sample, the mechanisms of these associations have not been clearly explained in terms of their unique contribution to the shared variance. Therefore, two multiple regressions (R) were performed to investigate whether a prayer type has a unique prediction of the psychological and subjective well-being scales. In Table 3, six prayer types (obligatory, necessary, voluntary, supererogatory, supplication and invocation) are regressed in relation to the psychological well-being measure. In Table 4, the six prayer types are also regressed on the subjective well-being measure. The result of the regression statistics as to psychological well-being was significantly different from zero; $F(6, 206)= 3.06$, $r= .29$, $r^2= .08$, Adj. $r^2= .06$, $p= .01$. The result of the regression analysis as to subjective well-being has been found as follows; $F(6, 206)= 1.07$, $r= .17$, $r^2= .03$, Adj. $r^2= .00$, $p= .38$. As hypothesised, Table 3 indicates that the total variance of the linear combination of ratings for six independent variables showed a small amount of variance ($f^2= .02$), namely in explaining 6% of the total variance in the psychological well-being variable. In this regression model, the supplication prayer type accounted for the unique variance in the psychological well-being scores in total ($\beta= .22$, $p= .01$), while the supererogatory prayer type also accounted for the unique variance in the psychological well-being scores in total ($\beta= -.25$, $p= .01$). Furthermore, the total variance of the linear combination of the ratings for six independent variables showed a small amount of variance ($f^2= .02$), namely

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in explaining 0% of the total variance in the subjective well-being variable in which invocation prayer accounted for the unique variance in predicting the subjective well-being scores among the total sample (β= .17, p= .04). This is despite the regression statistics not being significantly different from zero. Through these findings, Hypothesis 2 and 3 have been confirmed. In contrast to Hypothesis 1, supererogatory prayer (as one of the described ritual prayers) alone demonstrated a unique relation with the total score of psychological well-being. However, when looking at the Standardised Beta (β) of the supererogatory prayer type, it can be seen that its association with psychological well-being is in a negative direction. A possible explanation for this is that people who more strongly engage in supererogatory prayers with respect to enacting purposive self-attachment to life desires may be more likely to focus on their own problems (as recall negative sides of life). This act might potentially decrease one's sense of well-being.

3.6. Discussion

There are several forms of religious behaviour within Islam that are of great significance to the everyday lives of adherent individuals (such as ablution, reciting the Quran, prayer, charity, etc). From the evidence of previous studies, prayer was found to be one of the most common religious behaviours that better explains the relationship between religiosity and mental health.

Numerous studies conducted on this subject have also indicated that people who regularly pray achieve more satisfaction in life and possess better health outcomes (Koenig *et al.,* 2001). As such, the aim of the present study has been to examine a series of different Islamic prayer types against the measures of subjective well-being and psychological well-being.

As far as the present study is concerned, the gained results from the correlational analysis indicate that obligatory (fard) prayer, voluntary (sunnah) prayer, supplication (du'a) prayer and invocation (dhikr/remembrance of God) prayer are positively associated with the well-being variables, while necessary (wajib) prayer and supererogatory (nawafil) prayer demonstrate no correlation with any of the well-being variables. As expected, the results of the multiple regression analysis confirmed Hypothesis 1, with this thus suggesting that ritualistic prayers (obligatory, voluntarily and necessary prayers) do not impact upon either the psychological or subjective well-being variables, with the exception of the supererogatory prayer type. In contrast to ritualistic prayers, as stated in

Hypotheses 2 and 3, the supplication prayer scores accounted for the unique variance in predicting the psychological well-being scores, while the invocation prayer scores accounted for the unique variance in predicting subjective well-being.

Hence, the presented data suggest that individuals whose prayers take the form of a supplication prayer and invocation prayer in which they rely on God for guidance and support and refresh their thinking through feeling God's presence are likely to report better psychological and subjective well-being.

On the other hand, it is interesting to note that when multiple regression analysis was performed, supererogatory prayer was also found to predict the unique variance in psychological well-being in addition to supplication prayer, even though this prayer type was not found to have a significant correlation with any well-being variables when the Pearson product moment correlation coefficient analysis was employed. Notably, the literature in this area has highlighted that the relationships that arise with dependent variables can be altered substantially following multiple predictors when high inter-correlations are used (Lancaster, 1999; Maltby *et al*., 2008). However, supererogatory prayer performed with a sense of self-attachment to life desires seems to have a negative association with psychological well-being. This finding is consistent with the previous study of Poloma and Pendleton (1991) in which a positive relation of ritual prayer with negative affect was identified. Thus, the finding in this prior study suggests that those who engage in ritual prayer are more likely to be sad, depressed and lonely. In the present findings as to supererogatory prayer, it is found that this type of prayer (as one of the ritual prayer forms) may also be less likely to contribute to an individual's well-being as its items may refer to the consequences of any suffering situations encountered when facing daily life stresses in terms of its content and purpose-focused nature.

As hypothesised (Hypothesis 2 & 3), two prayer measures were found to be consistent with James and Wells' (2003) cognitive-behavioural framework, where the prayer models contain both mechanisms that influence the appraisals given to life events (supplication) and thus affect well-being and contribute self-regulation to the thinking process (invocation), as ultimately helps individuals to reduce any stress, worry or depression faced. In light of the cognitive and behavioural models of James and Wells' (2003) hypothesis, the present study has identified only supplication and invocation prayer types as important factors that have a positive effect for individuals in their

providing of psychological support for them. This is achieved by shifting their own mind and unpleasant and/or painful thoughts into a positive direction. Therefore, the abovementioned analysis confirms our final research hypothesis, Hypothesis 4, by suggesting that the association between different types of Muslim prayer and mental well-being dimensions can be explained by the proposed cognitive-behavioural framework. Here, it is held that a guiding framework of religiosity may provide an interpretative tool for an individual's perceptions as given towards life events. As a consequence, this may lead to better well-being outcomes.

Given the thought of the notion that prayer has beneficial influences upon people's psychological outcomes in terms of appraising life events, the different forms of prayer explored in the present study provide strong evidence for James and Wells' cognitive behavioural framework and, furthermore, provide an important direction for the multidimensional investigation which underpins the robust associations between religion and mental health. In considering that prayer models guide individuals in dealing with the negative feelings, conflicts and stressors they face, such prayer models may be implicated in therapeutic practice. It is apparent that both the cognitive and behavioural mechanisms of religion are beneficial in respect of finding meaning in stressful factors – as may be important to understand. These religious behaviours may thereby contribute to a person's understandings as to the reasons for their existence in the world, their importance and the purpose of certain life events. As previous findings pertinent to the cognitive-behavioural model have been applied across religiosity dimensions – such as religious orientations and different prayer types (James & Wells, 2003; Maltby *et al.,* 2008, 2010) – it is important to address the importance of the present study if psychologists and health practitioners are to sensitively address and interpret people's problems in view of their religious norms and faith.

Therefore, the present findings are notable, especially given that both the theoretical framework and practical direction can contribute to an understanding being held as to the relationship between Muslim prayer types and mental well-being, and provides guidance for health practitioners in regards to how different prayer models can lead individuals to have better well-being.

In summary, this research represents an attempt to outline the potential applicability of the cognitive-behavioural framework model to the differential validity of

prayer types and their associations with mental health. The gained results suggest that prayer models (especially supplication prayer and invocation prayer) might be usefully applied by health practitioners or therapists in their respective services as a response to daily life stress events and, from this, an individual may encounter less worry. Further empirical studies should therefore be supported, especially those pertaining to diverse religious groups and other aspects of well-being – such as in relation to the forms of supplication and invocation prayer types within the cognitive-behavioural model. From this, the ability to incorporate the use of prayer types into clinical practice shall be strengthened. On the other hand, the present study has aimed to explore the psychological and subjective influence of prayer, rather than its psychophysiological effects. Consequently, subsequent chapters (Chapter 4 & 5) will seek to investigate the effects of prayer on emotional reactivity, undertaken in order to explore whether certain religious behaviours (particularly the supplication and invocation forms of prayer) can induce physiological arousal on the emotional level.

Chapter Four

The Potential Effects of Prayer on Psychophysiological Response (Skin Conductance Response, Blood Pressure, and Heart Rate)

Abstract

Objectives: Since previous studies as to emotion have demonstrated that a person's sympathetic nervous system is activated upon an emotion-related task being administered, it is believed that prayer as the most popular religious activity helps to induce the individual's emotional states. However, emotional reactivity as corresponding to prayer has hardly been investigated in a controlled experimental setting.

Methods: In this chapter, Skin Conductance Responses (SCRs) as an emotional reactivity was collected during the performance of prayer. 55 participants were randomly assigned into the experimental $(n= 30)$ and control $(n= 25)$ groups. In the experimental group, the participants were asked to recite a number of supplications for 10 minutes along with a 10-minute resting condition while, in contrast, the participants in the control group recited non-religious statements with the same resting condition duration.Furthermore, blood pressure and heart rate both before and after task sessions were also collected from the participants to measure physiological changes due to the potential effects of prayer.

Results: Results revealed that prayers caused increased arousal in comparison to the resting (baseline) condition. However, an increased arousal was not observed when non-religious statements were performed in control group.

Conclusion: Findings were similar to previous studies reported that increased arousal was obtained during the prayer performance. Therefore regular reading prayers may help promote psychological and physiological relaxation and leads to decreased stress level of the individuals. The current study reveals a method that may possibly be applied to the role of both reading and listening to prayer on physiological arousal (anxiety and stress).

4.1. Introduction

In recent years, researchers have long been interested in examining the relationship between religion and mental health in terms of how the influence of religion appears in psychological functioning (for reviews, see Seybold & Hill, 2001; Hackney & Sanders, 2003; Park, 2007). Yet, research on religion and its relation to everyday psychological outcomes have been varied. Some studies reported that religion is positively correlated with well-being and mental health (Gartner *et al.,* 1991; Maltby, Lewis, & Day, 1999; Koenig & Larson, 2001; Hill & Pargament, 2003; Sion & Francis, 2009) while some have found that religion is negatively associated with psychological adjustment and mental health (Schaefer, 1997; Francis, Robbins, Lewis, & Barnes, 2008). Besides of reported conflict findings, some studies have revealed no significant relations between religion and well-being (Lewis *et al.,* 1997). Since the previous findings have demonstrated mixed results, to what extent different dimensions of religiosity are associated with emotional functioning has remained less known.

Thus, religion-related inquiry and its relation to emotional functioning have also been taken a growth interest among researchers. There is no doubt that religious beliefs and behaviours have a remarkable impact upon the emotions of individuals, this being unsurprising considering its physiological and psychological context. Yet, the role of religious behaviours, especially prayers as one of the most common practices, on emotional reactivity is still little known through objective measures. The assessing of prayer via a physiological response approach, considering prayer being a cognitive act, may provide an empirical understanding as to how religion is linked with emotional reactivity (Ladd & Spilka, 2002; Al-Kandari, 2003). However, there is a lack of empirical investigation as to how certain prayers map onto emotional reactivity, as refer to physiological arousal.

4.2. Physiological Arousal

Arousal is here defined as an overall activation of emotional responses (Braithwaite, Watson, Jones, & Rowe, 2015). To clarify this inquiry, it is important to note how the debated phenomena as to the influence of prayer on emotional states is twofold; whereby the meditative hypothesis focuses on reducing arousal by invoking internal states (such as self-awareness and attention) and therefore potentially decreasing

levels of arousal and relaxation while the engagement hypothesis relates to religious behaviours whereby one communicates with God and this act potentially increases levels of arousal. Therefore, recently, the influence of religion-related statements on emotional states has taken a keen interest, whereby exploration has been given to the role played by the autonomic nervous system (ANS) in physiological responses (e.g. skin conductance, blood pressure, and heart rate).

Skin Conductance Response (SCR) represents the emotional stimuli of physiological reactivity, this being known as electrodermal response. SCR defines the emotional process as "the phasic change in electrical conductivity of skin" (Braithwaite *et al.,* 2015, 4). Given that, the changes in the skin conductance in micro Siemens (µS) unit linked to the sweat secretion means to be elicited by any emotional stimuli (Braithwaite *et al.,* 2015). SCR, or in other name Galvanic Skin Response (GSR), is considered as an indicator of emotional arousal. Emotional arousal occurs when the subject shows a reaction to a stimuli and this creates changes in the skin conductance and changes in vital sings as the self-reflection of feelings such as happiness, sadness, fear, angry, surprise, and so forth (Burleson, 2003; Boucsein, 2012; Salam, Abdul Wahab, & Ibrahim, 2013). Thus, decreasing stress levels increases emotional arousal (Das & Anand, 2012; Salam *et al.,* 2013).

4.3. The Effects of Religious Behaviours on Physiological Responses

Previous studies have used objective technique to expose physiological responses, as arise due to anxiety and stress, in religion-related inquiries (Mardiyono & Sulistyowati, 2007; Mardiyono & Songwathana, 2009; Salam *et al.,* 2013). Given that, for example, the concentration employed in prayer enables individuals to clear their minds and to be awoken as to their surroundings. This motivates such people to move away from pains and turmoil (such as stress, sickness and depression). The majority of previous findings have revealed that religious behaviour leads to reduced levels of stress and anxiety and higher degrees of psychological comfort and increased emotional reactivity whereupon it has been found that such behaviour modulates physiological responses as well as heart rate and blood pressure (Telles, Nagarathna, & Negandra, 1998; Yucel, 2007; Danucalov, Simoes, Kozasa, & Leite, 2008; Stanley, 2009; Doufesh, Faisal, Lim, & Ibrahim, 2012; Das & Anand, 2012; Duofesh, Ibrahim, Ismail, & Ahmad, 2014; Abu Bakar, 2014).

One recent experimental study, for example, explored the different emotional arousals that arose between atheists and religious individuals whereupon they dared God to do terrible things to them (Lindeman, Heywood, Riekki & Makkonen, 2014). The findings here demonstrated a significant difference between the reading of God statements and neutral statements by these demographics. Here, skin conductance level witnessed increased signals whereupon both God statements and offensive statements were read by atheists and religious individuals, whereas skin conductance level failed to increase upon the participants reading neutral statements. In this case, verbally asking God to do terrible things caused equal stress as it did to religious people (Lindeman *et al*., 2014). This above-mentioned study examined to what extent people exhibit physiological arousal via verbally God statements. However, those statements were not derived from the scriptural texts or a Holy Book. It would be useful to measure God-related prayers to analyse whether the results can be replicated. Therefore, the present study aimed to rule out the possibility of prayer statements also would show physiological arousal rather than just God-related daring statements.

4.4. Research Aims and Hypothesis

Given the support for the influence of verbal prayers as to generic mental control (supplication) and the self-regulating of one's thinking process (invocation), as explored in Study 1, the purpose of the present study is to investigate the relationships that arise between the physiological responses that derive from supplication and invocation prayer activities and well-being assessments. Thus, the present study has produced the following objectives; **1)** to assess the potential influences of engaging in supplication and invocation prayers on emotional reactivity (Skin Conductance Response: SCR) and cardiovascular reactivity (Blood Pressure: BP, Heart Rate: HR), **2)** to determine the associations between the physiological responses with outcome psychological variables and **3)** to evaluate the efficacy of the physiological responses on the outcome variables. Based on the study objectives held, a number of research questions have been produced.

Question 1. Does prayer activity (due to reading) increase emotional arousal (assessed by the emotional reactivity of SCR) over a neutral activity acting as a control?

Question 2. Does prayer activity (due to reading) cause a reduction in cardiovascular responses (assessed by blood pressure and heart rate) over a neutral activity?

Question 3. Do people who pray more frequently relate to better well-being indicators (namely psychological well-being, life satisfaction and positive affect schedule)?

Question 4. Do people who pray more intensely relate to better well-being indicators (namely psychological well-being, life satisfaction and positive affect schedule)?

Question 5. Do people who consider praying as more important relate to better well-being (namely psychological well-being, life satisfaction and positive affect schedule)?

Question 6. Are there any significant predictors as to the associations between emotional reactivity (SCR), well-being indicators and the prayer background inventory?

Question 7. Are there any significant predictors as to the associations between cardiovascular responses (BP and HR), well-being indicators and the prayer background inventory?

Question 8. Do any aspects of the prayer background inventory (i.e., prayer frequency, prayer intensity and prayer importance) have a meditative role between physiological responses and well-being variables?

From the above-mentioned discussions and the held research questions, eight research hypotheses have been proposed to investigate the potential effects of prayer on the psychophysiological responses of individuals;

Hypothesis 1. Increased emotional arousal (SCR) shall be witnessed during prayer activities versus during non-prayer activities as a consequence of reading stimuli.

Hypothesis 2. A significant reduction in cardiovascular responses shall be witnessed as a consequence of reading religious statements versus the reading of non-religious texts.

Hypothesis 3. Significant positive correlations shall be witnessed between prayer frequency and well-being assessments.

Hypothesis 4. Significant positive correlations shall be witnessed between prayer intensity and psychological well-being assessments.

Hypothesis 5. Significant positive correlations shall be witnessed between prayer importance and psychological well-being assessments.

Hypothesis 6. Differential positive effects of self-reported prayer assessments on physiological responses due to prayer activity shall be witnessed.

Hypothesis 7. Differential positive effects of the physiological responses due to prayer activity on well-being assessments shall be witnessed.

Hypothesis 8. Background assessments of prayer shall be witnessed to have a meditative role between physiological responses and well-being variables if the mediational conditions are not concerned with.

4.5. Method

4.5.1. Study Sample

55 Muslim individuals from various cities in the UK were participated in this experiment. In order to recruit participants, the researcher posted an invitation on the Experimental Participation Requirement (EPR) system of the University of Leicester, Psychology Department, whereby the research subjects were offered 3 credits for their participation. The experiment was also advertised across the main campus of the University of Leicester, particularly in the respective male and female prayer rooms. Such participants were offered a payment as gratitude and to compensate them for their time (Appendix C).

Experiment and Control Groups

Of 55 participants who agreed to take part in the study, 9 of them were excluded in data analysis due to the distorted data recording. 23 Muslim individuals (4 males, 19 females), aged between 18 and 40 years old ($M=$ 25.09, $SD=$ 6.42) were recruited for the experiment group, and were asked to complete several self-reportage assessments as to psychological characteristics measurements in the first session. And then, they were asked to read/recite a number of prayer texts while emotional reactivity was recorded on a computer. Skin Conductance Response (SCR) were measured via a NeuLog galvanic skin response logger sensor (NUL-217) while two logger sensors were attached to the fingers of their non-dominant hand. Additionally, the blood pressure and heart rate of each participant was recorded with a Labquest sensor in 3-minute sequences before and

after the reading sessions in both groups. In a similar vein, 23 Muslim individuals (5 males, 18 females), aged 19 to 43 (*M*= 30.39*, SD*= 7.18*)*, again primarily from the city of Leicester, were taken for the control group. This group was also paid as with the experimental group. The same procedure as administered with the experimental group was undertaken with the control group as well.

Inclusion criteria of each group included above 18 years old, being able to know prayer activities as the experiment was set up, having normal health conditions (systolic blood pressure= 120 mmHg or less, diastolic blood pressure= 80 mmHg or less, heart rate= between 60 – 100 beats per minutes) (Nasiri, Fayazi, & Karimvand, 2015).

4.5.2. Psychological Assessments and Questionnaires

The following self-assessments were administered to collect data (Appendix A);

Psychological Well-Being (PWB; Ryff & Keyes, 1995, 18 Item). This measure was developed to assess six areas of psychological well-being; autonomy (e.g. "I have confidence in my opinions, even if they are contrary to the general consensus"), environmental mastery (e.g. "In general, I feel I am in charge of the situation in which I live"), personal growth (e.g. "I think it is important to have new experiences that challenge how you think about yourself and the world"), positive relations with others (e.g. "People would describe me as a giving person, willing to share my time with others"), purpose in life (e.g. "Some people wander aimlessly through life, but I am not one of them"), and self-acceptance (e.g. "I like most aspects of my personality"). High or low scores for those above-mentioned components indicated that whether or not respondent was comfortable with that category. Participants are asked to rate 18 items version of the scale using a –six-point Likert-type, ranged from 1 (strongly disagree) to 6 (strongly agree).

The Satisfaction with Life Scale (SWLS; Diener *et al.,* 1985, 5 Item). This scale was designed to assess to what extent the respondents were satisfied with their lives. For instance, "If I could live my life over, I would change almost nothing" [Item 5]). The responses were rated on a 7-point response scale (1= strongly disagree, 7= strongly agree).

The Positive and Negative Affect Schedule (PANAS; Watson *et al.,* 1988, 20 items). This scale includes two independent dimensions of 10 positive affect labels (e.g. excited, strong) and 10 negative affect labels (e.g. hostile, upset) with a 5-point response

scale (1= Not at All, 5= Extremely) to assess to what extent the feelings and emotions of the respondents have been affected over the past seven days. High and low levels of positive label show engagement vs unhappiness mood states while high and low levels of negative label show offensive vs calm states.

Background Inventory of Prayer. The frequency, the intensity and the importance aspects of particular prayer (such as supplication *(du'a)* prayer that leads an adherent to communicate with God either with own words or through the Quranic texts, gratitude to God, blessings, asking for forgiveness, becoming closer to God; and invocation (*dhikr*) prayer in which a person could feed his soul, praising God) were assessed (Appendix A). Responses for each items were made on a 5-point Likert scales. For example; 'how often do you engage in (a particular type of prayer) a week?', and the response scale was (1) never (2) once a week (3) twice/three times a week (4) every day (5) more than once every day, 'When engaging in (a particular type of prayer), how intense the experience to you?' , and the response scale was (1) not at all (2) a little (3) somewhat (4) a lot (5) extremely, and 'how important to you is engaging in (a particular type of prayer)?' , and the response scale was (1) not at all (2) moderately important (3) slightly important (4) quite important (5) very important. The cronbach's alpha of the frequency, the intensity, and the importance of prayer were .70, .73, and .79 respectively.

4.5.3. Objective Instruments

Skin Conductance Response (SCR). The SCR is defined as a form of electrodermal response. This objective measurement aims to assess emotional reactivity. Here, electrical changes in the skin are associated with the sweat glands and can thus be detected. A Neulog logger sensor (version of Sensors3, 7.46.31) was used to record SCR whilst continuously monitoring the responses of individuals via a computer. From previous studies (Sigmon, Rohan, Boulard, Dorhofer, & Whitcomb, 2000b; Lindeman *et al*., 2014), it has been suggested that the most active sweat glands can be found in the hands or the feet. Hence, two electrodes were placed on the phalange of two fingers of the non-dominant hand of the respective participants.

Blood Pressure (BP) and Heart Rate (HR). Additionally, the blood pressure and heart rate of the participants were measured before and after the sessions via Labquest equipment (Logger Pro software). The additional objective measures of the present study

have been to test the hypothesis that prayer-related activities are associated with lower blood pressure and heart rate.

Prayers as Research Stimuli. Through a review of the pertinent literature as to prayer, there is a lack of research as to Muslim prayers even though Islam is being the second largest religion in the world (Abdel-Khalek, 2013). With regards to the stimuli design, we generated religious texts in groups of supplications (du'a) and chanting (dhikr). Ritual prayers (such as Salat) were eliminated from the present study due to bodily movements being an integral part of such prayer and this movement needing to be minimised or eradicated when taking measurements of emotion via skin conductance response.

Thus, the present research was designed to test emotional arousal derived from du'a and dhikr prayers through SCR. Here, it is important to define the prayers with respect to their category content:

Du'as from the Quranic texts:

- Ayat al-Kursi (verses of Throne),

- Al-Fatiha (the Opening),

- Al-Falaq (the Daybreak),

- An-Nass (the Mankind),

- Al-Asr (the Time) (Yucel, 2007).

Du'as from the *Hadith*:

- Supplication to ask for forgiveness for parents (e.g., O Lord, forgive me, my parents and Muslims in the Hereafter),

- Supplication for anxiety and grief (e.g., be sufficient for me in what worries me in the state I am),

- Supplication for thanksgiving (e.g., praise be to Allah who created us from His light and His hand),

- Supplication for material needs (e.g., O Allah, if in Your knowledge, this matter is good for me, then ordain it for me), and

- Supplication of expressing being obedient (Qunoot) (Mohammed, 2016).

The Remembrance of God/ Dhikr: refers to 'invocation', 'mantra', or 'rosary' in the contexts of various religions. In Islamic sense, it can be performed through

- Suphanallah (Glorious is Allah),

- Alhamdulillah (praise and thanks to Allah),

- Allah Akbar (Allah is the greatest),

- Astaghfirullah (seeking forgiveness form Allah) (Soliman & Mohamed, 2013).

4.5.4. Procedure and Data Acquisition

The participants were randomly assigned to either an experimental or control group, and the data-collection period spanned almost three months. The researchers asked the participants to adjust themselves to be as comfortable as possible prior to the session beginning. The participants were asked to make no unnecessary noise to avoid recording incorrect or misleading the SCR and they were asked not to move until their session had ended. At the start of the experiment session, each subject chose their preferred seating position and read and signed an informed consent form (Appendix D). Subsequently, each participant was then asked to fill out an online survey that included demographic questions (i.e., gender, age, marital status, and ethnicity) and several self-reported assessments.

The experiment comprised of two sessions; the baseline SCL session and the reading session. For the experimental group, 14 single prayer texts as Quranic texts (n= 5), self-structured supplications for others (n= 5), and chanting God (n= 4) were used. Contrary to the experimental group, the participants in the control group were asked to read 14 non-religious texts, as were devoid of any religious reference. Baseline skin conductance level (SCL) recordings were obtained across a 10-minute duration, from which the average SCL was calculated and the SCR was then recorded during the 10-minute reading session for both groups. The sequence of each condition for each reading texts was presented via PowerPoint slides for each participant. Each text was illustrated for 30 seconds with a 10-second inter-stimulus interval (e.g. the experimental group illustrated in Figure 3). As emotional responses can be affected by time, a short inter-stimulus interval was employed to delineate each single prayer (Stewart, Silton, Sass, Fisher, Edgar, Heller et al., 2010). The presentation sequence of reading and the control

condition were counter-balanced across the participants in both groups to counter any potential influence of the sequence. In addition, vital signs (blood pressure and heart rate) were measured before and after the SCR sessions to identify the state of health of the participants.
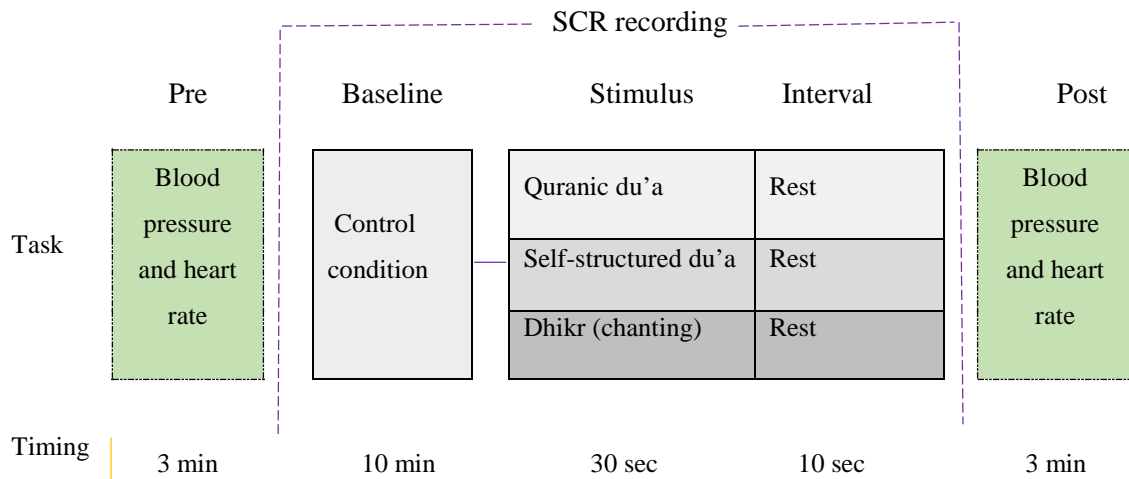
Figure 3. Research design diagram. Participants recited each prayer block with the repetitions of five sequences after the rest baseline SCL period. Vital signs were obtained before and after the experiment sessions.

Baseline SCL and verbal stimuli (prayer activities) were computed in terms of the average score of the skin conductance responses. The baseline data was also compared against the changes witnessed whereupon the participants undertook prayer tasks by subtracting the mean baseline (pre-prayer levels) scores from the mean prayer scores. The change scores of the cardiovascular responses were calculated by subtracting the pre-scores from the post-scores (as in post-pre). After then, the changes for the SCRs and the cardiovascular measures were calculated via Microsoft Excel for each condition.

4.5.5. Ethical Considerations

Before the experiment study was conducted, an informed consent form was obtained from all participants, and the researcher provided a sufficient explanation about the study details, confidentiality and anonymity of the subjects. This study was approved by the Ethics Board of Psychology Department, the University of Leicester *(Reference number: 9045-jm148-neuroscience,psychologyandbehaviour)* (Appendix E).

4.5.6. Statistical Analysis

Since the purpose of this study was to investigate the effects of engaging in the reciting of prayer texts on physiological responses, a number of analysis approaches have

been utilised for all of the variables. Descriptive statistics (such as mean, *SD, SE,* and numbers) were obtained from the collected data of the experiment and control groups. The obtained data was then analysed through the independent *t*-test, the paired sample *t*-test, the two-way analysis of variance (ANOVA), bivariate correlation analysis, and linear regression models using Statistical Package for Social Science, (SPSS-PC software, version of 24). The independent sample t-test was conducted to determine the characteristic differences on the well-being measures and prayer questionnaires between the experimental and control groups. Furthermore, a paired sample t-test was employed to determine the differences between the baseline SCL over the SCR as derived from the reciting of prayer and non-prayer texts, alongside the differences of cardiovascular response before and after the undertaking of prayer activities. In addition, an analysis of variance (two-way ANOVA) was utilised to explore the interactions of emotional arousal (SCR) between the experimental group and the control group at the baseline Skin Conductance Level (SCL) and during the reading task sessions. Moreover, a two-way ANOVA was conducted to investigate the differences of the two groups and their cardiovascular responses (systolic blood pressure, diastolic blood pressure and heart rate) before and after the emotional reactivity. Then, the relationship between physiological responses (SCR, BP, and HR) and the preliminary questions (well-being measures and prayer questionnaires) were investigated using bivariate correlation analysis. Finally, a linear regression model was employed to explore the association between physiological responses and well-being variables after controlling for demographics and the background inventory (in regards to prayer frequency, intensity and importance). Furthermore, through using the statistical software package G*Power 3.1 analysis (Buchner, Erdfelder & Faul, 1997), the minimum sample size was found as 39 for this study, as seems adequate in terms of the statistical procedures undergone in an effort to answer the research questions held. *P-value* < .05 was considered to be the significance level.

4.6. Results

4.6.1. Demographic Characteristics

The mean of the total participants' age was provided as *M*= 27.74, *SD*= 7.25. After conducting independent sample *t*-test, the experimental and control groups did not significantly differ by demographics (gender and ethnicity), background inventory as to

prayer, and well-being indices (Table 5). On the other hand, group differences were determined in age and marital status (p= .01 and p= .00 respectively).

Table 5

Descriptive statistics for all variables by the groups.

	Experiment Group (n= 23)	Control Group (n= 23)			
	Mean (*SD*)	Mean (*SD*)	t	*df*	p
Gender - Female	19 (83%)	18 (78%)	.36	44	.72
Ethnic - Middle East	4 (17.4%)	15 (65.2%)	-.95	44	.35
Prayer Frequency	8.39 (2.86)	9.43 (2.09)	-1.42	44	.16
Prayer Intensity	8.91 (2.02	10.00 (1.51)	-2.07	44	.05
Prayer Importance	10.04 (2.14)	10.48 (1.65)	-.77	44	.45
Psychological Well-being	65.22 (9.20)	64.61 (7.80)	.24	44	.81
Life Satisfaction	19.35 (4.43)	18.30 (4.67)	.78	44	.44
Positive Affect	18.17 (6.55)	20.09 (6.25)	-1.01	44	.32
Negative Affect	12.09 (6.92)	12.26 (8.13)	-.08	44	.94

Note. Values are shown as Mean (*SD*) or Number (%)

p< .05

4.6.2. Baseline SCL Condition versus Prayer Activities

The descriptive values of the prayer group are presented in Table 6, and Figure 4 depicts the physiological changes across baseline skin conductance level (SCL) session and reading activities for both groups including standard error bars. The mean and standard deviation (*SD*) for the SCR changes showed that mean of each prayer scores of SCRs were higher than the mean of baseline condition scores of SCL.

Table 6

Descriptive statistics of the SCRs in response to religious texts and baseline SCL condition within prayer group.

	Experiment Group					
	Mean	*SD*	SE	t	*df*	p
Baseline	1.40	1.22	.25	-	-	-
Ayat-al-Kursi	1.74	1.42	.30	-2.10	22	.05

A-Fatiha	1.57	1.21	.25	-1.06	22	.30
Al-Falaq	1.46	1.10	.23	-.39	22	.70
An-Naas	1.40	1.07	.22	-.02	22	.98
Al-Asr	1.29	.99	.21	.60	22	.56
Dua for Parents	1.37	1.16	.24	.12	22	.90
Dua for Anxiety	1.36	1.26	.26	.23	22	.82
Dua for Thanksgiving	1.32	1.20	.25	.56	22	.58
Dua for Needy	1.30	1.22	.26	.67	22	.51
Qunoot Dua	1.26	1.26	.26	.94	22	.36
SuphanAllah	1.56	1.53	.32	-1.36	22	.19
Alhamdulillah	1.56	1.64	.34	-.97	22	.34
AllahuAkbar	1.46	1.51	.32	-.41	22	.69
Astaghfirullah	1.41	1.37	.29	-.08	22	.94

Notes. p< .05

A two-way ANOVA was conducted to investigate the impact of the two groups and the trials (baseline SCL condition and reading session) on emotional reactivity. However, there was not a significant main effect of the reading trials within the subjects, $F(1, 44)= .58$, $p= .45$. Furthermore, there was not a significant main effect between the groups, $F(1, 44)= .43$, $p= .51$. In addition, since most of the variables had a normal skewness or kurtosis, the paired sample *t*-test was conducted to determine how each prayer and baseline SCL were specifically related. Although increased arousal derived from the reading of religious statements was observed in relation to some single prayers, no increases statistically significantly differed from the baseline SCL ($p\geq .05$).
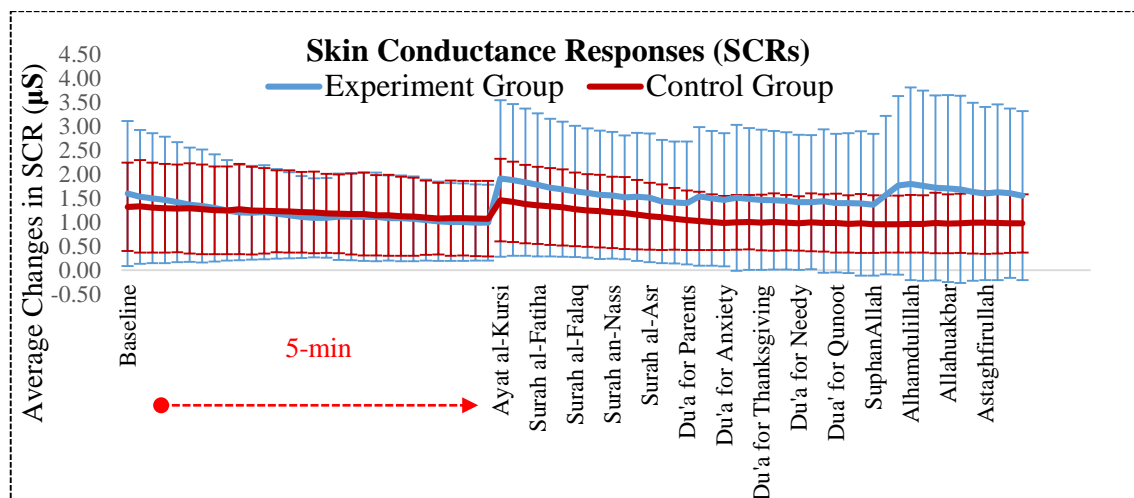
Figure 4. Means and standard errors for each group are shown in the graph.

4.6.3. Prayer Group versus Control Group

The effect of religious statements of a 10-minute duration and a 10-minute baseline period in order to calculate the skin conductance level for each individual's emotional reactions were recorded. For each group, the first 5-minute period of the baseline rest condition has been graphed to minimise outlier-related recording errors and to show the normalised distribution of the average scores (Sigmon, Dorhofer, Rohan, & Boulard, 2000). The same procedure was carried out for the respondents of control group with non-religious statements. (The 10-minute baseline period has been graphed and reported in Appendix F. The same procedure has been applied to the next study in Chapter 5 and also illustrated in Appendix F).

From the results, it can be concluded that emotional reactivity (SCR changes) showed an increased arousal as the consequences of reading some of the religious texts. Conversely, no increased patterns in SCR changes were noticed in control group as the consequences of reading non-religious texts.
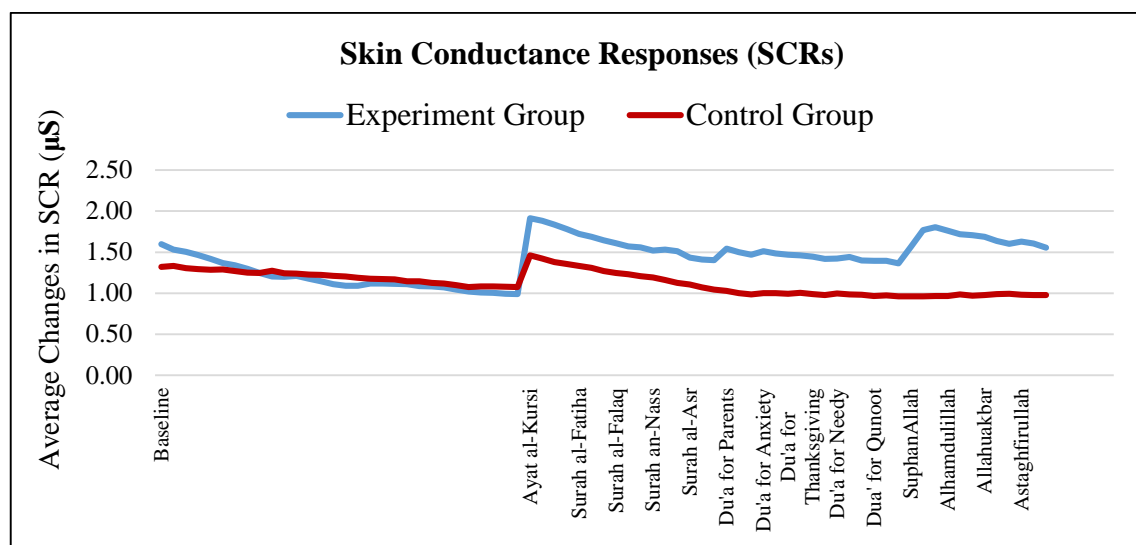
Figure 5. Graph depicts the average responses for both experimental and control groups

The average scores comparison of the skin conductance responses across the praying session and non-praying session are illustrated in Figure 5, above. Although prayer-related reading texts demonstrated increased arousal, after conducting the independent *t*-test no significant differences in relation to any reading text were witnessed between the experimental group and control group.

4.6.4. Cardiovascular Responses Before and After SCR Activities

The average scores comparison of the vital signs across the praying session and non-praying session are illustrated in Figure 6, below. A two-way ANOVA was conducted to investigate the impact of the two groups and vital signs (systolic blood pressure, diastolic blood pressure and heart rate) before and after the emotional reactivity. Here, no significant main effect of the pre-post measure of systolic blood pressure, $F(1, 44)= 2.19$, $p= .15$, pre-post measure of diastolic blood pressure $F(1, 44)= .00$, $p= .94$, and pre-post measure of heart rate, $F(1, 44)= .32$, $p= .58$ was found within the subjects. However, a significant main effect of the pre-post measure of heart rate between the groups, $F(1, 44)= 13.65$, $p= .00$ was found, with the mean of the experimental group ($M= 83.91$) being compared with the mean of the control group ($M= 82.65$).

After conducting paired sample t-test, no statistically significant difference in systolic blood pressure, diastolic blood pressure, and heart rate before and after SCR prayer activities in the experiment group ($p> .05$) was occurred. The test also showed that mean of pre-measures score of systolic blood pressure and heart rate were scored higher than the mean of post-measure. However, based on the independent sample t-test (Table 7), there was statistically significant difference in the heart rate between the experiment and control groups before and after SCR activities ($p< .05$).
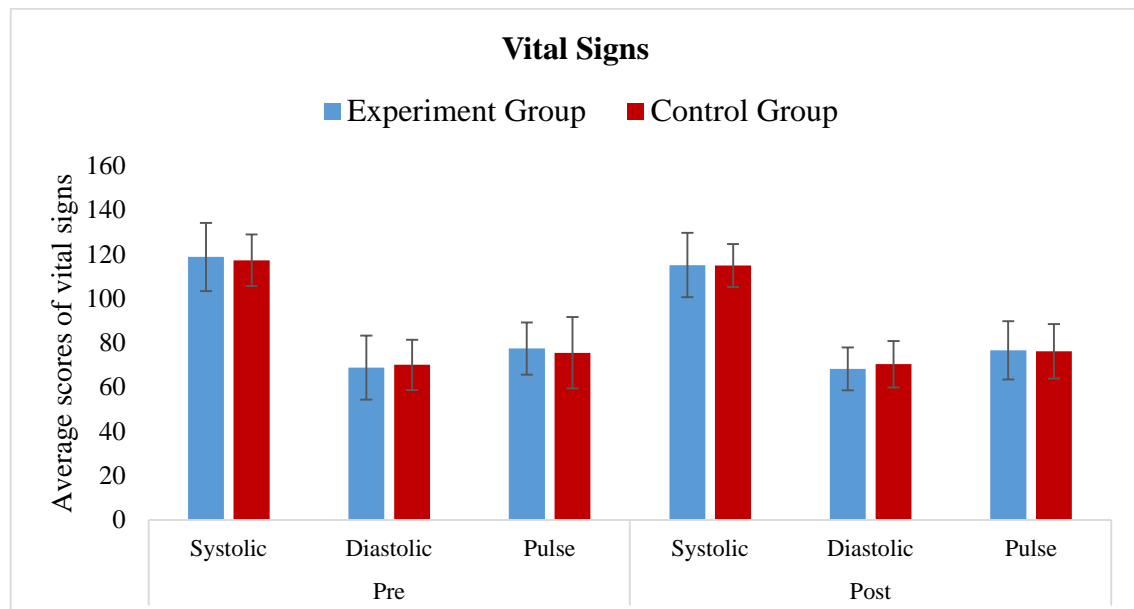
Figure 6. Mean and standard deviations of the cardiovascular responses at all subjects by the two groups.

Table 7

Descriptive statistics of blood pressure and heart rate in the experiment and control groups before and after SCR activities

	Variables	Experiment Group (n= 23) Mean (SD)	Control Group (n= 23) Mean (SD)	p
Pre	Systolic BP (mmHg)	118.91 (15.42)	117.39 (11.68)	.71
	Diastolic BP (mmHg)	68.87 (14.49)	70.09 (11.35)	.75
	Pulse (beats/min)	77.48 (11.74)	90.35 (16.10)	**.00**
Post	Systolic BP (mmHg)	115.22 (14.58)	115.04 (09.73)	.96
	Diastolic BP (mmHg)	68.30 (9.67)	70.39 (10.49)	.49
	Pulse Rate (beats/min)	76.70 (13.15)	88.61 (13.27)	**.00**

Notes: Values are shown as Mean (SD); BP= Blood Pressure; $p < .05$

4.6.5. Bivariate Correlational Analysis

In this step of analysis, the Pearson product-moment correlation coefficients were employed in order to investigate the relationship between physiological responses (measured by SCR, blood pressure and heart rate), well-being variables and the background inventory of prayer assessments among the overall sample and within the treatment groups.

Correlational Analysis among the Overall Sample

In the first bivariate correlation analysis, as presented by the overall sample scores illustrated in Table 8, the results revealed that frequency of prayer was positively significantly correlated with positive affect schedule as a component of subjective well-being, while it has further been found to be positively significantly correlated with diastolic blood pressure as an objective measure ($r= .31$, $p< .05$; $r= .35$, $p< .05$ respectively). Importance of prayer was also positively significantly correlated with diastolic blood pressure as an objective measure ($r= .31$, $p< .05$). However, other objective measures and well-being variables failed to show any correlations with each other. In addition, the obtained correlation coefficients between the prayer inventory

assessments and objective measures were moderate in terms of the size of the effect of the components among the overall sample.

Correlational Analysis among the Group Sample

In the second bivariate correlation analysis, the two groups were separately presented in Table 9 in terms of the associations between emotional reactivity (SCR), cardiovascular responses (blood pressure and heart rate), psychological assessments (well-being) and background assessments of prayer. Given that, a number of significant correlations were found between all of the variables in each group. In regards to the self-reported measures among the experimental group, only frequency of prayer was positively significantly correlated with diastolic blood pressure ($r= .43$, $p< .05$), while this was significantly negatively correlated with heart rate ($r= -.48$, $p< .05$). With respect to the correlations of the objective measures with the psychological assessments, only heart rate was found to have significant negative associations with life satisfaction and a positive affect as components of subjective well-being ($r= -.48$, $p< .05$; $r = -.63$, $p< .01$ respectively). Among the control group, frequency of prayer was positively correlated with positive affect, negative affect and was found to be negatively related to systolic blood pressure ($r= .43$, $p< .05$; $r= .49$, $p< .05$; $r= -.51$, $p< .05$ respectively). Furthermore, intensity of prayer was positively correlated with positive affect ($r= .52$, $p< .05$), while importance of prayer was negatively related to life satisfaction ($r= -.48$, $p< .05$). Over other objective measures, only systolic blood pressure was negatively correlated with positive affect ($r= -.54$, $p< .01$) among the control group. However, the SCR measurements failed to show any correlations with any of the variables in either group. The resulting correlations between all of the variables presented as $r= .43$, -.48, -.48, -.63, .43, .49, -.51, .52, -.48, and -.54 respectively, with this suggesting a large effect size.

4.6.6. Mediational Analysis

Despite the fact that the correlational analysis in Table 8 and 9 revealed positive relationships between the background assessments of prayer and cardiovascular values among the overall sample and the two separate treatment groups, the mechanisms of these associations have not been clearly explained in terms of their unique contribution to the shared variance. The third step of analysis aimed to conduct meditation analysis between the cardiovascular responses, psychological assessments and prayer background

Table 8

Correlations between subjective assessments and objective measures by the overall sample.

	Mean	*SD*	1	2	3	4	5	6	7	8	9	10	11
1. Frequency of prayer	8.91	2.53	_	.61**	.62**	-.13	-.01	.31*	.18	-.03	.35*	-.16	.15
2. Intensity of prayer	9.46	1.85		_	.60**	-.05	.05	.20	-.05	.00	.20	.02	.22
3. Importance of prayer	10.26	1.90			_	.01	-.20	.28	-.01	-.11	.31*	-.11	-.03
4. Psychological Well-being	64.91	8.44				_	.26	.43**	-.46**	.15	-.20	-.20	-.13
5. Life Satisfaction	18.83	4.53					_	.14	-.27	-.06	.13	-.21	-.05
6. PANAS Positive Affect	19.13	6.40						_	-.01	-.18	.22	-.27	.09
7. PANAS Negative Affect	12.17	7.46							_	-.21	.19	-.03	.21
8. Systolic Blood Pressure	-2.85	13.66								1	.06	-.23	-.09
9. Diastolic Blood Pressure	-1.07	12.02									1	-.28	.05
10. Heart Rate	-1.17	16.40										1	.07
11. SCRs due to reading texts	-0.04	0.50											_

Note. *N*= 46

**p< .01; *p< .05*

Table 9

Correlations between subjective assessments and objective measures by the two treatment groups.

	1	2	3	4	5	6	7	8	9	10	11
1. Frequency of prayer	_	.65**	.63**	-.04	.24	.19	-.08	.21	.43*	-.48*	.05
2. Intensity of prayer	.48*	_	.63**	-.20	.17	-.08	-.13	.14	.29	-.22	.17
3. Importance of prayer	.57**	.53**	_	-.03	.04	.30	-.07	.05	.40	-.40	-.01
4. Psychological Well-being	-.27	.21	.09	_	.40	.54**	-.60**	.25	-.18	-.30	-.07
5. Life Satisfaction	-.28	-.01	-.48*	.10	_	.21	-.18	-.13	.11	-.48*	-.20
6. PANAS Positive Affect	.43*	.52*	.24	.31	.10	_	-.11	.05	.30	-.63**	-.20
7. PANAS Negative Affect	.49*	.02	.07	-.34	-.34	.07	_	-.38	.27	.01	.22
8. Systolic Blood Pressure	-.51*	-.29	-.41	-.01	.05	-.54**	-.02	1	.01	-.15	-.04
9. Diastolic Blood Pressure	.19	.01	.13	-.23	.17	.09	.09	.15	1	-.55**	-.01
10. Heart Rate	.22	.30	.23	-.10	.05	.07	-.06	-.34	.11	1	-.04
11. SCRs due to reading texts	.20	.19	-.09	-.19	.11	.28	.21	-.17	.12	.14	_

Note. Experimental group above the diagonal ($N= 23$); Control group below the diagonal ($N= 23$)

**p< .01; *p< .05

inventory. Based upon Baron and Kenny's (1986) steps, the mediational regression analysis undertaken required four important conditions; (1) the predictor must be related to the outcome variable; (2) the predictor must be related to the mediator, (3) both the predictor and the mediator must predict the outcome variables and (4) when the mediator is controlled, the relationship between the predictor and the outcome must be no longer significant or significantly reduced, as means partially mediated (Baron & Kenny, 1986). In considering the significant associations between the objective and subjective variables found in the correlational analyses, as presented in Table 8 and 9 in the present study, those conditions with the current variables did not exist when testing the mediational analysis as to both the overall sample and the two separate groups.

Since the two reported correlational analyses produced (Table 8 & 9) showed no associations between the SCR measurements with the well-being variables and the prayer background assessments for a mediational analysis, this step of analysis witnessed standard multiple regression analysis being performed to determine in what way cardiovascular responses depend on the outcome variables. Therefore, in this section, the existing relationships between cardiovascular responses and the other assessments will solely be investigated at a multivariate level through two separate analyses.

1) Assessing the predictive power of cardiovascular responses on the psychological variables (i.e. well-being assessments) among the overall sample

The first step aimed at determining the predictive power of the cardiovascular responses on the psychological assessments (namely psychological well-being, satisfaction of life, positive affect schedule and negative affect schedule) among the overall sample. In the regression model, each psychological assessment was used as a dependent variable, while the prayer background inventory and physiological responses (assessed by blood pressure and heart rate) were used as predictive variables. In order to determine the effect size of the association, Cohen's convention considered an f^2 of .02 (accounts for 2% of the variance) to be a small effect, .15 (accounts for 13% of the variance) to be a medium effect and .35 (accounts for 26% of the variance) to be a large effect (Cohen, 1988).

In Table 10, the unstandardized regression coefficient (B), the standardized regression coefficients (β), t-value, and p-value were included. The results of each regression statistic (R) was found to not be significantly different from zero for

psychological well-being ($F_{(6, 39)}$= 1.16, r= .39, r^2= .15, *adj. r^2* = .02, p> .05), for positive affect ($F_{(6, 39)}$= 1.72, r= .46, r^2= .21, *adj. r^2* = .09, p> .05) or for negative affect ($F_{(6, 39)}$= 1.33, r= .39, r^2= .15, *adj. r^2* = .02, p> .05). In considering the completed model, prayer importance (β = -.48, p< .02) was found to be a predictor of life satisfaction in which the regression model was not statistically different from zero ($F_{(6, 39)}$= 1.60, r= .44, r^2= .20, *adj. r^2* = .07, p> .05). When the regression statistics (R) were not significantly different from zero, it is indicated that the linear combination of these six independent variables failed to explain or predict the outcome variable beyond chance levels.

Table 10

Multiple regression analysis for Psychological well-being, Life Satisfaction, Positive Affect, and Negative Affect using the background inventory of prayer and the physiological responses as predictor variables by the overall sample (*N*= 46).

Model	Psychological Well-being				Life Satisfaction			
	B	*β*	*t*	*Sig.*	B	*β*	*t*	*Sig.*
Prayer Frequency	-.70	-.21	-1.00	.32	-.03	-.01	-.07	.95
Prayer Intensity	.09	.02	.09	.93	.78	.32	1.61	.12
Prayer Importance	.87	.20	.95	.35	-1.14	-.48	-2.40	**.02**
Systolic BP	.07	.12	.78	.44	-.06	-.18	-1.22	.23
Diastolic BP	-.19	-.27	-1.63	.11	.06	.15	.95	.35
Pulse Rate	-.13	-.26	-1.63	.11	-.07	-.27	-1.73	.09
Model	PANAS Positive Affect				PANAS Negative Affect			
	B	*β*	*t*	*Sig.*	B	*β*	*t*	*Sig.*
Prayer Frequency	.39	.15	.76	.45	.98	.33	1.58	.12
Prayer Intensity	.17	.05	.25	.80	-.73	-.18	-.89	.38
Prayer Importance	.28	.08	.42	.67	-.71	-.18	-.88	.38
Systolic BP	-.11	-.23	-1.55	.13	-.12	-.23	-1.46	.15
Diastolic BP	.03	.06	.41	.69	.11	.18	1.09	.28
Pulse Rate	-.11	-.27	-1.75	.09	.00	.01	.04	.97

Note. BP= Blood Pressure; *p*< .05

2) Assessing the predictive power of cardiovascular responses on the psychological variables among the two separate groups

As a second step, multiple regression analysis was employed for each outcome variable among the two separate treatment groups. For the experimental group, the results of the regression statistic (R) were not significantly different from zero for psychological well-being; $F_{(6, 16)}= 1.36$, $r= .58$, $r^2= .34$, *adj. $r^2= .09$*, $p> .05$; for life satisfaction $F_{(6, 16)}= 1.87$, $r= .64$, $r^2= .41$, *adj. $r^2= .19$*, $p> .05$; for positive affect schedule $F_{(6, 16)}= 2.69$, $r= .71$, $r^2= .50$, *adj. $r^2= .32$*, $p> .05$; or for negative affect schedule $F_{(6, 16)}=.95$, $r= .51$, $r^2= .26$, *adj. $r^2= -.01$*, $p> .05$. Likewise, for the control group, the regression models were not found to be significantly different from zero for psychological well-being; $F_{(6, 16)}= 1.13$, $r= .55$, $r^2= .30$, *adj. $r^2= .03$*, $p> .05$; for life satisfaction $F_{(6, 16)}= 2.24$, $r= .68$, $r^2= .46$, *adj. $r^2= .25$*, $p> .05$; or for negative affect schedule $F_{(6, 16)}= 1.74$, $r= .63$, $r^2= .40$, *adj. $r^2= .17$*, $p> .05$. The exception to this is positive affect schedule $F_{(6, 16)}= 3.47$, $r= .75$, $r^2= .57$, *adj. $r^2= .40$*, $p< .05$. Table 11 demonstrated that heart rate uniquely contributed to life satisfaction ($p= .01$) and positive affect ($p= .02$) among the experimental group, however these contributions were negative. On the other hand, among the control group, life satisfaction was found to be negatively predicted by prayer importance ($p= .01$), while positive affect was positively predicted by prayer intensity ($p= .02$) and negatively predicted by systolic blood pressure ($p= .01$). Finally, the negative affect schedule was positively predicted by prayer frequency ($p= .01$).

Table 11

Multiple regression analysis for psychological assessments using the background inventory of prayer and the physiological responses as predictor variables by the two groups (for each group, $n= 23$).

| | **Experiment Group** | | | | | | | | **Control Group** | | | | | | | |
| | Psychological Well-being | | | | Life Satisfaction | | | | Psychological Well-being | | | | Life Satisfaction | | | |
Model	B	β	t	Sig.	B	β	t	Sig.	B	β	t	Sig.	B	β	t	Sig.
Prayer Frequency	-.25	-.08	-.24	.81	.19	.12	.40	.70	-2.22	-.59	-2.02	.06	-.69	-.31	-1.19	.25
Prayer Intensity	-1.12	-.25	-.83	.42	.64	.29	1.05	.31	1.98	.38	1.45	.17	1.25	.40	1.74	.10
Prayer Importance	.51	.12	.40	.69	-.78	-.38	-1.37	.19	1.00	.21	.76	.46	-1.97	-.70	-2.84	**.01**
Systolic BP	.12	.21	1.01	.33	-.08	-.29	-1.43	.17	-.11	-.16	-.58	.57	-.13	-.33	-1.37	.19
Diastolic BP	-.27	-.42	-1.66	.12	-.08	-.26	-1.09	.29	-.09	-.11	-.46	.65	.18	.36	1.80	.09
Pulse Rate	-.30	-.54	-2.03	.06	-.19	-.70	-2.79	**.01**	-.08	-.17	-.71	.49	.00	.01	.04	.97

| | PANAS Positive Affect | | | | PANAS Negative Affect | | | | PANAS Positive Affect | | | | PANAS Negative Affect | | | |
Model	B	β	t	Sig.	B	β	t	Sig.	B	β	t	Sig.	B	β	t	Sig.
Prayer Frequency	-.10	-.05	-.16	.87	.05	.02	.06	.95	.10	.03	.14	.89	3.35	.86	3.15	**.01**
Prayer Intensity	-1.26	-.39	-1.51	.15	-.40	-.12	-.37	.71	2.32	.56	2.70	**.02**	-1.04	-.19	-.79	.44
Prayer Importance	1.06	.35	1.36	.19	-.37	-.11	-.37	.72	-1.12	-.30	-1.35	.20	-.93	-.19	-.73	.48
Systolic BP	.00	.00	.00	1.00	-.15	-.34	-1.54	.14	-.34	-.61	-2.87	**.01**	.20	.28	1.11	.29
Diastolic BP	-.03	-.06	-.28	.79	.20	.41	1.53	.15	.16	.24	1.32	.21	-.07	-.08	-.36	.73
Pulse Rate	-.25	-.63	-2.72	**.02**	.05	.12	.43	.68	-.10	-.27	-1.45	.17	-.02	-.05	-.21	.84

Note. BP= Blood Pressure; $p< .05$

4.7. Discussion

This experimental study was conducted with the purpose of exploring whether prayers are significantly related to physiological responses (such as Skin Conductance Response, blood pressure, and heart rate), and psychological indicators (such as subjective and psychological well-being variables). Regarding the physiological responses, given in both tables and figures, increased responses in the SCRs were revealed when reading prayer texts in comparison to the baseline condition. In contrast to the experiment group, no increased SCR changes obtained in control group when reading non-religious texts. From the present study, Hypothesis 1 has been corrected as increased arousal in SCR was found to be a consequence of prayer-reciting engagement. In addition, Hypothesis 2 was partially confirmed by a cardiovascular response being obtained, witnessed as a significant difference in the mean of heart rate between the two groups ($p<$ .05). However, a significant difference was not observed in the other cardiovascular responses measured by systolic blood pressure and diastolic blood pressure between the treatment groups or within the treatment groups based upon the pre-post measures.

In regards to the correlational results as to the associations of the physiological responses with the psychological measures, the existing links have varied based on the overall sample analysis and the two separate groups analysis. Contrary to Hypothesis 4 and 5, Hypothesis 3 was confirmed, whereby the findings demonstrate a positive significant association between frequency of prayer and positive affect schedule among the overall sample. On the other hand, a number of significant combinations have been observed when the physiological responses and prayer inventories as predictor variables were regressed on the psychological assessments as the outcome variables. However, none of the obtained combinations have predicted the outcome variables beyond the chance level as the regression models were not significantly different from zero at a multivariate level. Therefore, these results rejected Hypothesis 6 and 7. However the linear combinations of the predictors employed were found to be meaningful only for the control group in which positive affect schedule was found to be positively predicted by prayer intensity and negatively predicted by systolic blood pressure ($p<$ .05). It is possible to say that the participants in the control group who reported higher prayer intensity showed increased positive affect but also increased systolic blood pressure, as does not indicate a low stress level. In regards to the final step of the analysis, the expected

conditions based on the recommendation of Baron and Kenny (1986) for mediational analysis did not occur with the current variables when seeking to examine whether the prayer inventories mediated the associations of emotional reactivity and cardiovascular responses with the psychological outcomes. Thus, Hypothesis 8 has also been rejected. That is, none of the prayer inventory aspects (such as prayer frequency, prayer intensity and prayer importance), in contrast to our hypothesis, play a mediational role in the possible relationships between psychophysiological responses (due to prayer activity) and psychological outcomes.

Our findings regarding increased arousal in the SCRs are partially consistent with the study of Lindeman *et al.* (2014) on the emotional arousal of atheists and religious people when they dare to God to do unpleasant things. Their findings result that both atheists and religious people showed equally increased arousal when reading God statements. Likewise, Salam *et al*. (2013) found increased changes in the galvanic skin response (GSR) when individuals undertake Quran recitation and *taubah*. Similarly, Das and Anand (2012), as reported that the practice of prayer and meditation invokes a significant increase in GSR values, from which it is suggested that individuals can encounter decreased levels of stress and increased levels of relaxation.

With respect to cardiovascular reactivity, Hypothesis 2 has partially been confirmed as significant changes occurred in heart rate values when the two groups were compared besides the increased arousal observed on the emotional reactivity measured via SCR due to prayer engagement. This is indicated by a significant difference in the mean of heart rate between the two groups ($p<$ .05). This is congruent with the experimental study of Abu Bakar (2014), whereby the effects of listening to Holy Quran recitation by Muslims was measured by mechanically ventilating the physiological stress responses of the participants. Here, it was found that listening to the Quran significantly affected the mean heart rate over time in the intervention group. Similarly, some studies have found that meditation prayer reduces heart rate (Danucalov *et al*., 2008; Telles *et al.,* 1998) and blood pressure (Yucel, 2007). However, in contrast with our findings, Mardiyono and Sulistyowati (2007), as studied the effects of a 25-minute period of dhikr therapy and found no significant differences between the experimental and control groups in relation to the vital signs of blood pressure, temperature, respiration and pulse.

This outcome may derive from the strength of the stimuli's contents. With regards to its definition, prayer refers to an internal mental practice in which one can contact the beyond High Power in order to feel better. For instance, *Ayat al-Kursi* includes the phrase: 'His throne extends over the heavens and the earth, and He feels no fatigue in guarding and preserving them'. The Quran emphasises the importance of du'a (supplication) in the verses saying that gaining and maintaining inner peace and comfort in people's lives as long as they make dua's (10:106), seeking help from God (2:23) and praising God to reach His mercy (17: 52, 101) (Yucel, 2007). Likewise, dhikr (invocation) is mentioned in Az-Zumar (39:23): "Allah has sent down the best statement: a consistent Book wherein is reiteration, the skins shiver there from of those who fear their Lord and then their skins and their hearts relax at the remembrance of Allah" (Abu Bakar, 2014, 170). These physiological changes, as arise through the undertaking of certain prayers, can be interpreted as a stress reduction response to daily life situations. As the current evidence suggests that some prayer phrases can invoke the changes of emotional reactivity, so that, prayers may enable the alleviation of physiological stress responses that indicate emotional states.

In summary, with regard to emotional reactivity, increased physiological arousal was observed when compared to the rest conditions in the prayer group. However, the increased physiological arousal derived from the recital of a number of religious statements was not statistically meaningful. With reference to vital signs, decreased changes were obtained in heart rate variability in contrast to the other variables (systolic and diastolic blood pressure). The summarised results of the held variables show that supplications/du'as correspond with better well-being as it can be helpful in building positive relationships with others and positive outcome in the affective behaviours of individuals. Therefore, prayers can be applied in clinical settings and health services to modulate negative emotions.

Although these findings generally support the engagement hypothesis as derived from the literature, the present study needs to be replicated to support the accuracy of our findings. In the present study, the tasks were designed as 30-second blocks of reading engagement. Thus, in addition to the present study, the subsequent research (Chapter 5) should evaluate audio-based stimuli as well as verbal-based stimuli within this kind of research inquiry with a longer duration (such as 3 to 5-minute blocks), doing so to identify which (if any) physiological changes (as an arousal) arise.

Chapter Five

The Physiological Effects of Prayer on Skin Conductance Response (SCR) (Replicating and extending of the previous SCR-related study)

Abstract

Objectives: Within psychophysiological research, prayer has been observed to have a significant impact, namely in reducing anxiety and stress. However, the physiological effects of prayer have not been previously explored in laboratory settings in relation to individuals grouped by prayer activity and control activities. The current study thus aims to invoke physiological arousal among its research subjects with the aid of Skin Conductance Response (SCR) and cardiovascular biofeedback, doing so in order to identify whether physiological changes can be induced via prayer or physical activity.

Methods: 78 healthy participants were randomised to the prayer or control groups and were subsequently asked to read and listen to a number of religious and non-religious statements in order to track any changes in emotional arousal. The SCR was recorded during the task sessions (as comprised of approximately a half an hour duration) while cardiovascular signs were collected before and after the task sessions. In addition, preliminary questions and measures of the Hospital Anxiety and Depression (HADS), the Physical Health Questionnaire (PHQ) and the Perceived Stress Scale (PSS) were administered among participants at the beginning of their participation.

Results: Increased physiological changes in the SCR during prayer texts were recorded when compared to the rest condition while SCR changes were found to significantly increase during the prayer texts to a greater extent than during the control texts. Moreover, a significant difference was recorded in the systolic blood pressure after the prayer session was undertaken when compared to the control session. In addition, the SCR changes as a consequence of reading prayer were found to have a positive correlation with heart rate measures.

Conclusion: The results indicate that prayer performance could be recommended by health practitioners for improving mental and physical health.

5.1. Introduction

The association between religion and mental and physical health has become one of the most prevalent subjects of consideration in recent years. During last decades, the researchers investigated the effects of religion on people's psychological problems (such as stress, anxiety, depression, pain etc,) have rapidly grown. Hence, religiosity has been found to be a significant provider of health benefits across all demographics (Koenig *et al.,* 2001). Consequently, in improving quality of life and mental health through the controlling of emotions, the guidance of religion is considered to be one of the most effective factors in this endeavour. Notably, the use of prayer has assumed a central role within psychological and psychiatric inquiries, with this being related to the findings which have shown that higher levels of religious engagement is associated with lower levels of anxiety and depression (Fitchett & Powell, 2009), while reminders of God have been found to increase prosocial behaviour (Shariff & Norenzayan, 2007) and temptation resistance (Laurin, Kay & Fitzsimons, 2012). Furthermore, several studies have revealed that religious meditation and prayer can serve to relax, improve health conditions and achieve calm for the human mind and body (Lee, Ahn, Lee, Choi, Yook, & Suh, 2007; Doufesh *et al.,* 2012; Doufesh, Ibrahim, Ismail, & Ahmad, 2014). It is therefore stated that prayer has the potential to increase self-awareness, to shift attention away from negative thoughts and to lead to the promotion of relaxation.

5.2. Skin Conductance Response as an Emotional Reactivity

Skin Conductance Response (SCR) is a form of electrodermal activity and was used in 'arousal-relaxing' effects by alerting verbal, sound, or video stimuli (Das & Anand, 2012; Yang & Liu, 2014; Lindeman *et al.,* 2014). Emotional response occurs when the subject shows a reaction to a stimuli and this creates changes in the skin conductance as the self-reflection of feelings such as happiness, sadness, fear, angry, surprise, and so forth (Burleson, 2003). So that, the changes in the skin linked to the sweat secretion means to be elicited any emotional stimuli.

One area that has received limited attention pertains to the role of religious engagement in regard to psychophysiological responses. The physiological responses of religious behaviours have been conducted recently among non-religious communities but Muslim prayers have not particularly been considered to be tested via Skin Conductance

Response (SCR) (Salam *et al.,* 2013; Abdul Wahab & Salam, 2013). In this study, the purpose is to investigate whether there is any effect of specific aspect of prayer – Quranic recitation as a prayer will be tested in this study, on the emotional arousal, namely the Skin Conductance Response.

5.3. Prayer and its Impact upon Emotional Levels

Sound or music therapy was a very common technique used lately to investigate to what extent it reduces stress or anxiety levels and to what extent it provides physical and mental health benefits. Research has shown that the improving of mental and physical health results in the improving of autonomic system balance. It is important to clarify this phenomena in terms of the effects of prayer on the autonomic nervous system through the objective measurement of emotional reactivity and heart rate variability. Hypotheses are held as to how religious behaviours can modulate the autonomic nervous system, with the meditative approach hypothesis focusing on reducing levels of arousal by inducing internal states while the religious engagement hypothesis focuses on increasing physiological arousal and therefore promoting relaxation (Das & Anand, 2012; Shashi, 2011).

Recently, several studies tended to text the effect of religious meditation and prayer on mental and physiological health (Nasiri *et al.,* 2015; Mahjoob, Nejati, Hosseini, & Bakhshani, 2014; Pashib, Khaqani, Bahrainia, & Abedi, 2014; Abu Bakar, 2014; Abdul Wahab & Salam, 2013; Salam *et al.,* 2013; Das & Anand, 2012; Masters & Knestel, 2011). Findings derived from those studies have revealed that subjects who practiced prayer activities showed lower psychological states such as pains, anxiety, depression, and stress, and its beneficial effects on physiological variabilities such as heart rate, respiratory rate, and blood pressure was found statistically significant. With the growth of evidence-based studies, it seems reasonable to consider that religious behaviours may influence psychophysiological states.

In a similar vein, the beneficial effects of rhythmic prayer recitation on depression among Pakistani samples were examined, and religious music as one of the six different treatments was administered among samples during one month for one hour along with level of depression and anxiety measures. The researchers found that when participants listened to the religious statements, depression level decreased significantly (Rana & North, 2007). Another study conducted to investigate the effect of prayer recitation on

anxiety among Iranian patients. The researchers found statistically significant differences between groups in terms of STAI (The Spielberger's State-Trait Anxiety Inventory) scores. The findings revealed that anxiety scores among the participants who were asked to listen to prayer recitation decreased compared to the participants who were asked to do nothing (Babamohamadi, Sotodehasl, Koenig, Jahani, & Ghorbani, 2015).

Given that, the studies have demonstrated that reading or reciting prayer might significantly be important factor in reducing psychological stress variables such as stress, anxiety, mental illnesses, and so forth (Kazemi, Ansari, Alah, & Karimi, 2004; Mahjoob *et al.,* 2014).

5.4. Research Aims and Hypothesis

In Chapter 4, the effects of reciting prayer on the autonomic nervous system of individuals were measured. Here, it was identified that emotional arousal (measured by SCR) increased during the reciting of prayer phrases and a cardiovascular response (assessed by heart rate) significantly decreased after prayer activities, with this latter effect being referred to as a marker of psychophysiological relaxation. Since the Quran recitation is defined as heart healer and a cure guidance in the Islamic resources (Sadeghi, 2011) in the literature, Quran recitation is revealed to be taken account into consideration as a sound stimuli to induce emotional arousals. Although the majority of the Quran studies have focused on the relationship between reading/reciting the Quran and its relation with mental health, yet listening to the Quran and its relation to psychological stress outcomes remained very limited. In a similar vein, as aimed at in the previous chapter, the objectives of the present study were (a) to investigate if any potential physiological arousal manifested through the emotional reactivity derived from prayer and non-prayer activities, (b) to measure cardiovascular changes assessed by blood pressure and heart rate before and after prayer and non-prayer activities and (c) to investigate whether there was a relationship between psychological stress assessments and objective measures. The research questions of the present study were produced as follows;

Question 1. Does the current study replicate the findings of the prior study in terms of verbal stimulus (reading prayer texts) as well as sound stimulus (listening to prayer texts)?

Question 2. Does prayer activity (reading) increase the emotional arousal assessed by SCR over a neutral activity as acts as a control?

Question 3. Does prayer activity (listening) produce the same emotional arousal assessed by SCR over a neutral activity as reading prayer does?

Question 4. Does prayer activity (both reading and listening) reduce the cardiovascular responses assessed by blood pressure (BP) and heart rate (HR) over a neutral activity?

Question 5. Do people who pray more frequently have lower levels of psychological stress assessments (perceived stress, physical health, anxiety and depression)?

Question 6. Do people who pray more intensely have lower levels of psychological stress assessments (perceived stress, physical health, anxiety and depression)?

Question 7. Do people who consider praying more important have lower levels of psychological stress assessments (perceived stress, physical health, anxiety and depression)?

Question 8. Are there any significant relationships between emotional reactivity (SCR) and psychological stress assessments?

Question 9. Are there any significant relationships between physiological responses (BP and HR) and psychological stress assessments?

Question 10. Do background prayer assessments (prayer frequency, prayer intensity and prayer importance) play a mediation role between physiological responses and psychological stress variables?

Based on the research questions above, a number of hypothesis were produced as follows;

Hypothesis 1. The current study would replicate the findings of Study 2 (Chapter 4).

Hypothesis 2. There would be increased emotional arousal during prayer activities versus during non-prayer activities as a consequence of reading stimuli.

Hypothesis 3. There would also be increased emotional arousal during prayer activities versus during non-prayer activities as a consequence of listening stimuli.

Hypothesis 4. There will be a significant difference in the means of cardiovascular responses after prayer activity versus after neutral (non-prayer) activity.

Hypothesis 5. There would be significant negative correlations between prayer frequency and psychological stress assessments (perceived stress, lower physical health, anxiety and depression).

Hypothesis 6. There would be significant negative correlations between prayer intensity and psychological stress assessments (perceived stress, lower physical health, anxiety and depression).

Hypothesis 7. There would be significant negative correlations between prayer importance and psychological stress assessments (perceived stress, lower physical health, anxiety and depression).

Hypothesis 8. There would be significant effects of emotional reactivity (SCR) on psychological stress assessments.

Hypothesis 9. There would be significant effects of cardiovascular responses on psychological stress assessments.

Hypothesis 10. Background prayer assessments (prayer frequency, prayer intensity and prayer importance) would play a mediation role between physiological responses and psychological stress variables if the mediational conditions are appropriate.

5.5. Method

5.5.1. Study Sample

At first, 78 eligible participants were enrolled to the study (with equal number in each group). After 8 distorted data removed from the analysis, the present study was carried out among 70 healthy Muslim participants whose ages ranged between 18 to 45 years (*Mean*= 28.1, *SD*= 8.1). The 70 participants which formed the research sample of this study were randomly assigned to the experiment and control groups. In the prayer group, the sample thus comprised of: *Mean*= 26.4, *SD*= 7.8. In the control group, the sample thus comprised of: *Mean* =29.7, *SD*= 8.2. Overall, the demographics of the sample comprised of 56 (80%) females and 14 (20%) males, while the ages ranged from 18-45

with a mean age of 28.06 (8.12). 40 (57.1%) of the participants were single while 30 (42.9%) were married. The participants consisted of 7 different ethnicities – whereby 22 (31.4%) were South Asian, 22 (31.4%) were Middle Eastern, 4 (5.7%) were African, 3 (4.3%) were East Asian, 1 (1.4%) was Caucasian, 1 (1.4%) was Mixed Race and 17 (24.3%) denoted "Other".

Inclusion criteria for this study were as follows; being Muslim who is able to read and understand Arabic language; aged above 18. The participants were taken via the Experimental Participation Requirement (EPR) program in the University of Leicester, Psychology Department, whereby the researcher posted an invitation by offering credits for their participation. And also, the study was advertised in various areas in the university campus to recruit more participants with a prescribed payment offer (Appendix C).

5.5.2. Psychological Assessments and Questionnaires

Demographic information was obtained from participants based on age, gender, marital status, and ethnic background. The subjective measures (Appendix G) that participants were also asked to complete were as follows;

The Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983, 14 Item). This scale was designed to facilitate health professionals understanding how the patients feel. The inventory was composed of statements regarding anxiety and depression (e.g. "I feel tense or wound up" [item 1-anxiety], "I still enjoy the things I used to enjoy" [item 2 - depression]). In this study, this scale had coefficient alpha of .80.

The Physical Health Questionnaire (PHQ; Spence, Helmreich, & Pred, 1987, 14 Item). The scale included the assessment of sleep disturbance, headeches, respiratory infections and gastrointestinal problems with acceptable validity and internal consistency (Schat, Kellloway, & Desmerais, 2005). Higher mean scores here represent less physical health symptoms, while lower scores represent more physical health symptoms. Internal consistency for this scale was, in the present study, obtained as a coefficient alpha of .79.

Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983, 10 Item). This scale was designed for assessing the extent to which individuals perceive the life as stressful. Items contains the questions of how much stress the individual has experienced within the last month. The researchers that developed this scale have reported internal consistency of .85. In this study, this scale had coefficient alpha of .76.

Background Inventory of Prayer The frequency, the intensity and the importance aspects of particular prayer (such as supplication *(du'a)* prayer that leads an adherent to communicate with God either with own words or through the Quranic texts, gratitude to God, blessings, asking for forgiveness, becoming closer to God; and invocation (*dhikr*) prayer in which a person could feed his soul, praising God) were assessed. Responses for each items were made on a 5-point Likert scales. For example; 'how often do you engage in (a particular type of prayer) a week?', and the response scale was (1) never (2) once a week (3) twice/three times a week (4) every day (5) more than once every day, 'When engaging in (a particular type of prayer), how intense the experience to you?' , and the response scale was (1) not at all (2) a little (3) somewhat (4) a lot (5) extremely, and 'how important to you is engaging in (a particular type of prayer)?' , and the response scale was (1) not at all (2) moderately important (3) slightly important (4) quite important (5) very important. The cronbach's alpha of the frequency, the intensity, and the importance of prayer were .70, .73, and .79 respectively.

5.5.3. Objective Measures

Skin Conductance Response (SCR). This objective measurement aims to assess emotional reactivity. During the experiment, the SCR of every participant was recorded using a Neulog logger sensor via a computer. Based on previous studies' suggestions (Sigmon *et al.,* 2000; Lindeman *et al.,* 2014), two electrodes were placed on the phalange of two fingers of the non-dominant hands.

Blood Pressure and Heart Rate Variability. Cardiovascular responses have often been used to identify psychological states such as stress and anxiety. In this study, the blood pressure and heart rate of the participants (as responded to the set tasks) were both measured via Labquest equipment. 3-minute sequences of blood pressure and heart rate values were obtained before and after the SCR-task sessions for both the prayer group and the control group.

Prayers as Research Stimuli: In Chapter 3 and 4, the contents of prayer have been detailed and noted as being one of the most important forms of religious practice in Islam. Prayers are verbally or ritually performed, which could be self-structured or divine phrases from the Holy Quran. Various prayer forms – such as bodily movements (*salat*), supplications (*du'a*), the remebrance of God (dhikr) or the recitation of religious phrases (*Quran recitation*) – are highly recommended by the Holy Book. In the previous chapter,

recitation of the short Quranic prayers has been investigated in terms of its effects upon emotional psychological outcomes. However, listening to the Quranic chapters has not been tested in the same purpose in previous studies. Therefore, besides recitation of the longer Quran chapters, listening to the same Quranic chapters was considered here.

5.5.4. Procedure and Data Acquisition

Data was collected based on two stages; at first stage, the study contained a survey that aimed to obtain demographic information (age, sex, marital status, and ethnic background), researcher-made several prayer questionnaire that targets to assess their frequency of performing Muslim prayers, the intensity of such practice and its importance to them. And also, answers related to physical health states measurements from each individuals in both groups were obtained.

At second stage, the study consisted of a number of prayer activities (such as reading and listening activities) for the case group, and a number of non-prayer activities (reading and listening again) for the control group. The participants who placed in the experimental group were asked to read and listen a number of Quranic statements respectively, and in the same way, the participants who placed in the control group were asked to read and listen a couple of non-religious statements respectively. Quranic chapters for the present study were chosen randomly. In the reading part, the participants were expected to read Surah al-Yaseen and Surah al-Fath during approximately 3 to 5 minutes for each chapters. In the listening part, the participants were asked to listen to Surah al-Yaseen, Surah al-Fath, and Surah ar-Rahman throughout an estimated time of 10 minutes. The emotional reactivity (SCR) of each samples were recorded on a computer via a NeuLog galvanic skin response logger sensor (NUL-217). A slideshow of prayer and non-prayer activities was presented through Microsoft Office PowerPoint programme.

The stimuli contained reading and hearing religious phrases sessions as well as baseline level recording. In the reading part, the respondents were to engage in reading two chapters from the Quran: first two pages of Surah al-Yaseen, and first two pages of Surah al-Fath during 10 minutes. The participants were instructed to read the randomly ordered texts silently while skin conductance responses were recorded during the task. There was a 40-sec pause before the next text after each chapters and phrases.
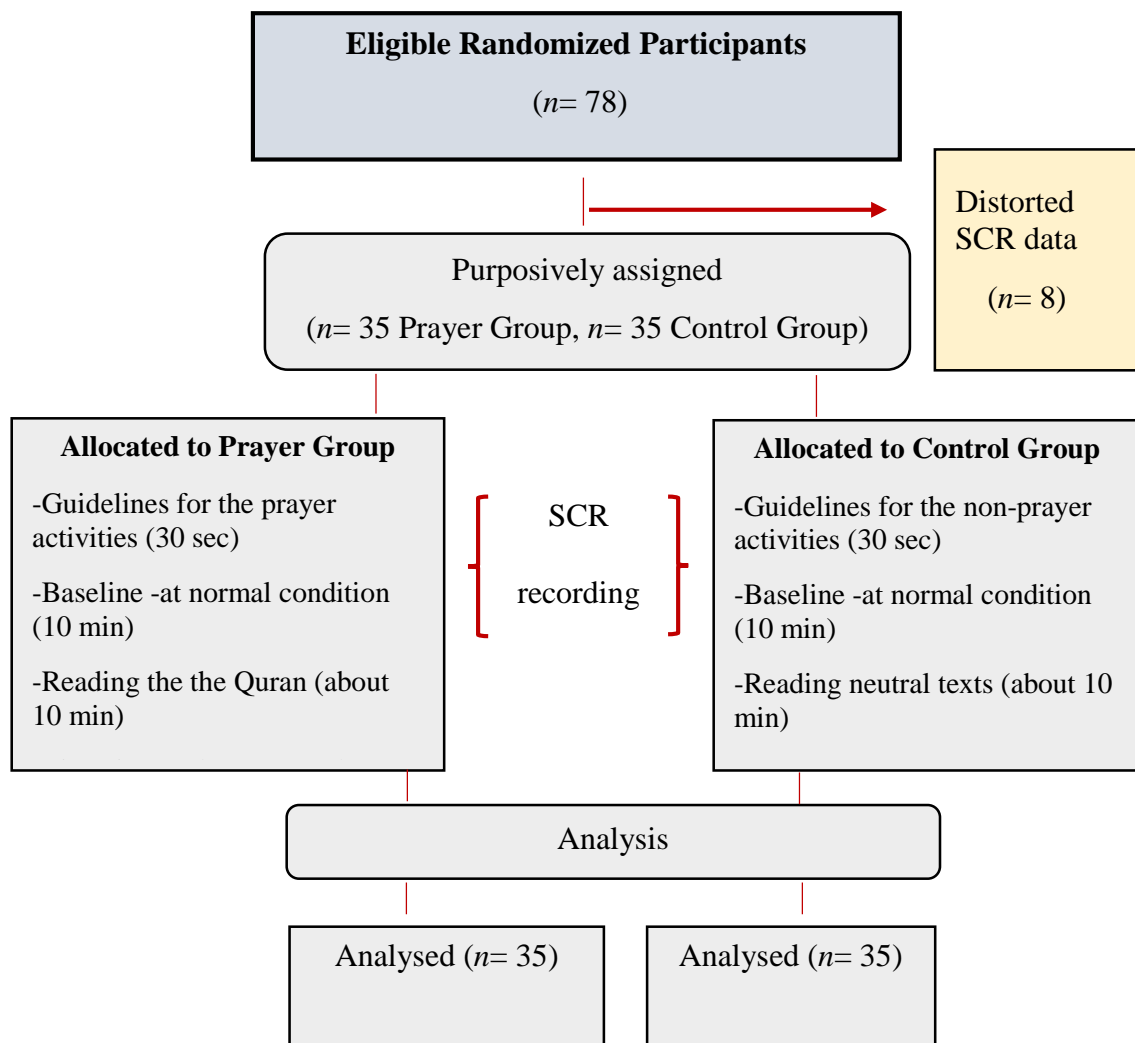
Figure 7. Consort diagram for recruitment procedures.

Figure 7 demonstrates the flow charts of the present study that aims to display how the religious statements and non-religious statements were designed in terms of an emotional reaction lab settings. At first, 78 eligible participants were enrolled to the study (with equal number in each group). Of the 78 participants who were randomly assigned to the experiment, 8 of them were determined as outliers due to distorting the data recording. Therefore, the average scores of the SCL at normal condition and the average scores of the SCRs at task conditions (i.e. verbal and sound stimuli) were obtained from each groups ($n= 35$ for the experiment group, $n= 35$ for the control group).

Baseline SCL as a rest condition and task conditions (reading – listening) were computed in terms of the average score of SCR across two groups for each of the two conditions for each subject. In order to compute the differences in responses, we have

subtracted the average of baseline (skin conductance levels) scores from the average of prayer scores.

5.5.5. Ethical considerations

Before the experiment study was conducted, an informed consent form was obtained from all participants, and the researcher provided a sufficient explanation about the study details, confidentiality and anonymity of the subjects (Appendix H). This study was approved by the Ethics Board of Psychology Department, the University of Leicester *(Reference number: 9045-jm148-neuroscience,psychologyandbehaviour)* (Appendix E).

5.5.6. Statistical Analysis

The purpose of this study was to investigate the effects of engaging in reading and listening to Quranic prayer texts on physiological responses. Data analysis was performed using the Statistical Package for Social Science (SPSS-PC software, Version 24). Descriptive statistics as to the mean, standard deviation, standard error and numbers were obtained to describe the participants' characteristics in each group. An independent sample t-test was conducted to determine the differences between the experimental and control groups in terms of the participants' scores as to the psychological stress assessments (i.e., Perceived Stress, Physical Health, Anxiety and Depression) and background assessments of prayer (i.e., prayer frequency, prayer intensity and prayer importance). Also, emotional arousal induced responses (measured by SCR, BP and HR) were examined using paired t-tests for each of the treatment groups separately. The analysis of variance (two-way ANOVA) was undertaken to explore the interaction of emotional arousal (SCR) between the experimental group and the control group at the baseline and during the task sessions (both reading and listening). In addition, a two-way ANOVA was also conducted to investigate the interactions of cardiovascular responses (systolic blood pressure, diastolic blood pressure and heart rate) before and after the prayer sessions. Then, the relationship between physiological responses (emotional reactivity: SCR; cardiovascular responses: BP and HR) and the preliminary questions of self-reported psychological stress assessments were investigated using Pearson moment correlation coefficients analysis. Finally, a standard multiple regression model was employed to understand the observed associations related to the dependent variables with the inclusion of the demographic variable. Furthermore, in order to be able to achieve a high level of power and to reduce the risk of making a Type II error, the estimation of the sample size was performed using the statistical software package G*Power 3.1 (Buchner,

Erdfelder & Faul, 1997). Through this analysis, the minimum sample size was found as 64 for this study, as seems adequate in terms of the statistical procedures undergone in an effort to answer the research questions held. *P-value* < .05 was accepted as statistically significant.

5.6. Results

5.6.1. Descriptive Statistics for Preliminary Questionnaires

A preliminary survey was administered to identify to what extent the participants practiced prayers while additional variables assessed the participants' psychophysiological states (such as anxiety, depression, stress level and physical health). The difference of random assignment in the group equivalence was tested by conducting an independent-sample *t*-test on the participants' responses to the preliminary questions and additional assessments. Statistical analysis shows no group differences among the demographics or other variables except for the intensity of prayer (*p*= .00). The mean and standard deviations of the variables as found between the two groups are presented in Table 12 (below).

Table 12

Descriptive statistics for sample demographic and preliminary questions between prayer (experiment) and control groups.

	Experiment Group (*n*= 35)	Control Group (*n*= 35)		
	Mean (*SD*)	Mean (*SD*)	t	p
Age	26.4 (7.8)	29.7 (8.2)	-1.30	.20
Female	28 (80%)	28 (80%)	-	1.00
Single	23 (65.7%	17 (48.6%)	-	.15
Prayer Frequency	8.49 (2.75)	8.69 (2.46)	-.32	.75
Prayer Intensity	7.97 (2.28)	9.43 (1.80)	-2.96	**.00**
Prayer Importance	10.00 (2.30)	10.86 (1.61)	-1.81	.08
Perceived Stress	18.31 (6.88)	17.57 (4.55)	.53	.60
Physical Health	22.89 (12.13)	27.86 (10.80)	-1.81	.08
Anxiety	7.03 (3.95)	6.91 (3.28)	.13	.90

Depression	4.43 (3.26)	4.66 (2.79)	-.32	.75		

Note. Values are shown as Mean (*SD*) or Number (%)

p< .05

5.6.2. SCR due to Prayer Activities versus Baseline SCL

The increased pattern responses of SCR are presented below (Figure 8 and 9). Firstly, SCR changes were evaluated during two conditions of prayer performance (reading and listening to phrases from the Quran) and during the rest conditions (SCL). The mean (*SD*) of the baseline SCL was 2.43 (2.06). A two-way ANOVA was conducted to investigate the impact of the two groups and the tasks (baseline SCL condition, reading session, and listening session) on emotional reactivity. And then, the paired sample *t*-test was conducted to identify statistical significant differences in the SCR changes when the each text was read and the baseline SCL period was taken (Table 13 below). There was not a significant main effect of the tasks within the subjects, $F(1, 68)= 1.53$, $p= .22$, and there was not a significant interaction between the groups and the tasks within the subjects, $F(1, 68)= .11$, $p= .90$. However, a significant main effect of group between the subjects was obtained in the experiment group; $F(1, 68)= 5.19$, $p= .03$. However, with regards to the average scores, increased SCR changes were noted following reading and listening activities when compared to the rest conditions. One possible reason for this is that the spikes at the onset of verbal stimuli (reading session) and sound stimuli (listening session) were considered due to the possible shock of a new stimuli beginning (Bloomer *et al*., 2014). The SCR changes decline after each repetition of the texts – a notion reported by Bloomer, Hitt, Olson, and Wruck (2014).

Table 13

The SCRs in response to reciting and listening to religious texts and baseline SCL condition within prayer group were paired.

	Tasks	Experiment Group			*t*	*df*	*p*
		Mean	*SD*	*SE*			
Verbal Stimuli (Reading)							
Baseline SCL	Surah al-Yaseen	2.59	1.80	.30	-.75	34	.46
	Surah al-Fath	2.26	1.76	.30	.66	34	.51

	Dhikr prayers	2.93	2.26	.38	-1.66	34	.11

Sound Stimuli (Listening)

	Surah al-Yaseen	2.83	2.12	.36	-1.55	34	.13
Baseline SCL	Surah al-Fath	2.70	2.12	.36	-1.37	34	.18
	Surah ar-Rahman	2.89	2.19	.39	-1.42	30	.17

Note. p< .05

5.6.3. Prayer Group versus Control Group

Table 14 contains the summary of the descriptive statistics in response to SCR activities for both experiment and control groups. Although the paired sample *t*-test did not show statistically significant changes between the SCL and SCR changes due to prayer activities, the independent sample *t*-test shows significant differences in relation to the changes of verbal stimulus (Reading 3: *t(68)*= 3.02, *p*= .00) and listening stimuli (Listening 1: *t(68)*= 2.90, *p*= .01 and Listening 2: *t(68)*= 2.45, *p*= .02) between the two groups.

The summarised results of the skin conductance responses in all subjects witnessed during the task sessions are illustrated in Figure 8. The average scores were computed as religious texts of a 10-minute duration were read and about 12-minute duration were listened following a 5-min baseline period which was considered as the skin conductance level for each participant's emotional reaction. From these results, the physiological changes invoked by reading and listening to particular phrases from the Quran while recording SCR showed a distinct increased pattern in comparison to the baseline (rest condition) in the experimental group, yet the same pattern failed to occur in the control group.

Table 14

Descriptive statistics and comparisons of SCR changes between the two groups.

	Tasks	Experiment Mean (*SD*)	Control Mean (*SD*)	*t*	*df*	*p*
Reading	SCL (baseline)	2.43 (2.06)	1.62 (1.37)	1.95	68	.06
Reading	1. Surah al-Yaseen	2.59 (1.80)	2.05 (1.30)	1.45	68	.15
Reading	2. Surah al-Fath	2.26 (1.76)	1.59 (1.19)	1.89	68	.06
Reading	3. Chanting God	2.93 (2.26)	1.58 (1.41)	3.02	68	**.00**
Listening	1. Surah al-Yaseen	2.83 (2.12)	1.61 (1.29)	2.90	68	**.01**
Listening	2. Surah al-Fath	2.70 (2.12)	1.66 (1.36)	2.45	68	**.02**
Listening	3. Surah ar-Rahman	2.89 (2.19)	2.03 (1.53)	1.85	64	.07

Note. Values are presented as Mean (*SD*).
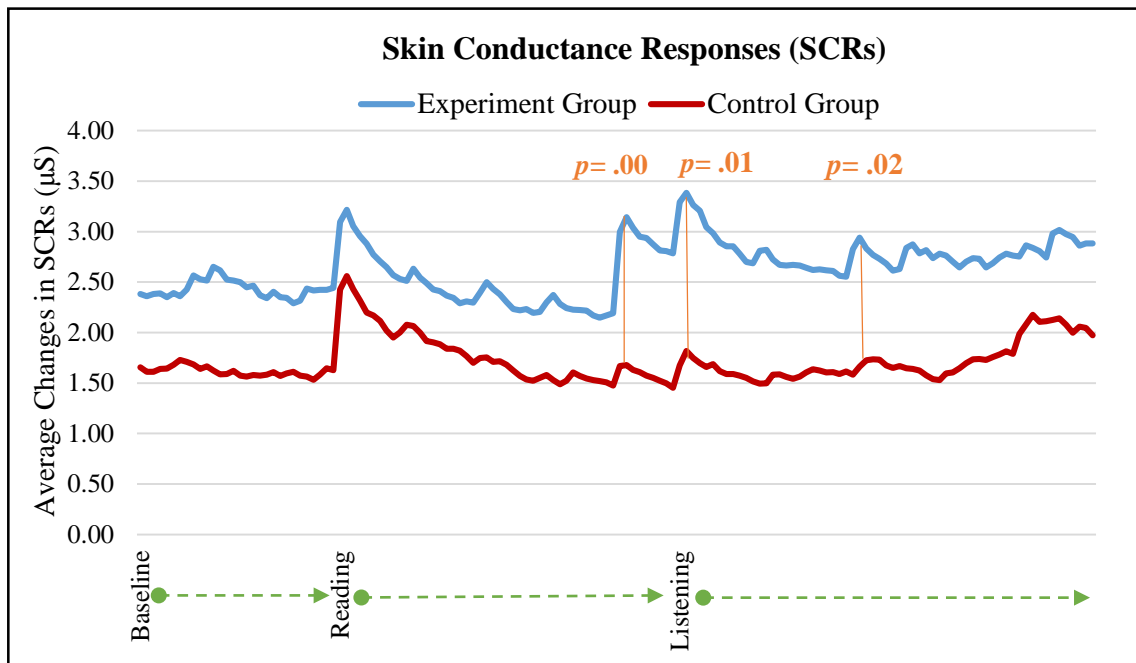
Figure 8. The emotional reactivity via the SCR due to reading and listening sessions and the corresponding *p*-values.

5.6.4. Vital signs before and after prayer and control conditions

There was a significant main effect of the pre-post measure of systolic blood pressure within the groups – $F(1, 65)= 6.67$, $p= .01$ – with the mean of the pre-test measure (M= 110.88) being in contrast to the post-test measure (M= 107.56). However,

a significant main effect of the groups was not obtained; $F(1, 65)= .00$, $p= .96$. A significant main effect was also not encountered in relation to the pre-post measure of diastolic blood pressure $F(1, 66)= .13$, $p= .72$ and the pre-post measure of heart rate within the subjects, $F(1, 68)= 2.65$, $p= .11$. Additionally, no significant main effect of the groups was obtained for diastolic blood pressure, $F(1, 66)= 1.41$, $p= .24$; or for heart rate, $F(1, 68)= 3.40$, $p= .07$.

The mean of the vital signs in prayer group before and after the SCR activities are illustrated in Figure 9 while the mean values of the prayer group are presented in Table 15 (below). The paired sample *t*-test illustrated that the mean of the vital signs pre-measures were scored more highly than the vital signs post-measures within the prayer group yet the mean values did not change in the pre-post measures in the control group. The test also indicated a significant difference in the mean of the systolic blood pressure before and after the prayer session ($t(33)= 2.41$, $p= .02$), while the mean changes were not statistically significant regarding other variables (diastolic blood pressure and heart rate).
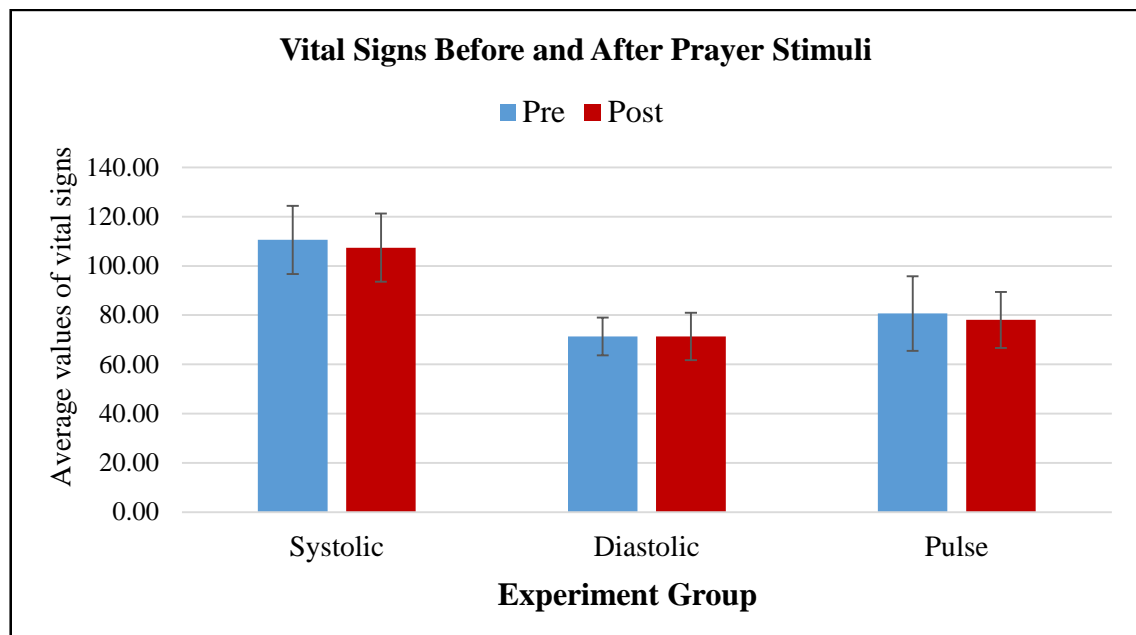
Figure 9. This figure shows the average scores of cardiovascular responses observed before and after exposure to the prayer stimuli.

Table 15

Comparison of cardiovascular responses in the prayer group before and after emotional reactivity (SCR).

	Pre-test	Post-test			
Variables	Mean (*SD*)	Mean (*SD*)	*t*	*df*	*p*
Systolic BP, mmHg	110.88 (13.95)	107.56 (14.01)	2.41	33	**.02**
Diastolic BP, mmHg	70.88 (7.35)	70.5 (8.43)	.35	33	.73
Pulse Rate, bpm	80.69 (15.13)	78.09 (11.36)	1.39	34	.17

Notes. N= 35; Values are presented as Mean (*SD*); BP= Blood Pressure

5.6.5. Bivariate Correlational Analysis

Two correlations procedures that were conducted between the preliminary prayer inventory, psychological outcome assessments and physiological reactivity results as derived from prayer activity were presented in Table 16 and 17, with this responding to the overall sample and the separate group samples respectively.

Correlational Analysis Among the Overall Sample

Table 16 showed the Pearson product moment correlation coefficients employed between all of the psychological variables and physiological responses among the whole sample. The results of the correlational analysis produced between the prayer inventory and psychological measures revealed that the background inventory of prayer (assessed by prayer frequency, prayer intensity and prayer importance) shared significantly negative associations with the perceived stress scale (*r*= -.25, *p*< .05; *r*= -.26, *p*< .05; *r*= -.26, *p*< .05, respectively), with these being medium effect sizes. However, no correlations were found as to other psychological assessments (such as physical health, anxiety and depression).

Correlational Analysis Among the Group Sample

In relation to the experimental group, Table 17 demonstrated that prayer frequency and prayer intensity were significantly negatively related to the perceived

stress scale ($r=$ -.39, $p<$ .05; $r=$ -.40, $p<$ .05 respectively). Furthermore, a significant negative association was found between anxiety as a psychological assessment and skin conductance changes derived from sound stimuli among the experiment group ($r=$ -.40, $p<$ .05). However, other psychological measurements did not show any associations with the physiological responses. Among the control group, anxiety showed a significant positive correlation with diastolic blood pressure ($r=$ .35, $p<$ .05). With regards to emotional reactivity, the SCR results (as a consequence of the reading and listening activities) were found to have a significant correlation only with heart rate ($r=$ .36, $p<$ .05; $r=$ .42, $p<$ .05 respectively), while other physiological responses (such as systolic blood pressure and heart rate variability) did not show any significant correlations with either the dependent measures of the psychological assessments or the SCR results. As expected, the participants experiencing more perceived stress also experienced more depression ($r=$ .36, $p<$ .01), anxiety ($r=$ .38, $p<$ .01) and lower physical health symptoms ($r=$ .54, $p<$ .01).

Although the correlational analysis in Table 16 and 17 revealed negative relationships between the background assessments of prayer and perceived stress scale among the overall sample, the mechanisms of these associations have not been clearly explained in terms of their unique contribution to the shared variance. Therefore, further step has been undertaken via regression analysis in order to determine differencial effects among the variables of interest.

5.6.6. Mediational Analysis

In order to assess Hypothesis 10, the final analysis aimed at producing a meditational analysis between cardiovascular responses, psychological assessments and the prayer background inventory, if appropriate. As the observed correlations with the variables of interest did not meet the guidelines of Baron and Kenny's (1986) meditational analysis (note: the required conditions for a mediation analysis have been detailed in Chapter 4), Hypothesis 10 has thus been rejected. Since the correlations and intercorrelations were obtained between aspects of the psychological assessments and physiological responses, standard multiple regressions were performed in order to explain the shared variance in predicting the outcome variables. Based on the correlational results detailed above, this step of analysis aimed at performing separate multiple regression anlysis for each psychological assessment used as an outcome variable and the physiological responses used as a predictor variable, both among the overall sample and

Table 16

Pearson-coefficient correlations between all variables by the overall sample (*N*= 70).

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12
1.Prayer frequency	8.59	2.59	1	.51**	.64**	-.25*	.05	-.02	-.06	.12	.13	-.10	.13	.13
2.Prayer intensity	8.70	2.17		1	.57**	-.26*	.01	-.09	-.04	-.02	-.06	-.03	.08	-.05
3.Prayer importance	10.43	2.02			1	-.26*	.07	-.14	-.09	.00	-.05	.09	.03	-.02
4.Perceived Stress	17.94	5.80				1	.54**	.38**	.36**	.10	-.08	.23	-.15	-.10
5.Physical health	25.37	11.67					1	.56**	.45**	.17	.17	.21	-.08	-.18
6.Anxiety	6.97	3.61						1	.71**	.14	.07	.15	-.11	-.21
7.Depression	4.54	3.01							1	.16	.02	.20	-.18	-.15
8.Systolic BP	-2.49	8.49								1	.32**	-.09	.06	.02
9.Diastolic BP	-.03	5.83									1	.07	.16	.14
10.Heart Rate	-1.86	9.51										1	.11	.04
11.SCRs due to reading	-.04	1.18											1	.61**
12.SCRs due to listening	1.06	2.55												1

Notes. BP= Blood Pressure; SCRs= Skin Conductance Responses

**p< .01; * p< .05

Table 17

Correlations between subjective assessments and objective measures by the two treatment groups.

	1	2	3	4	5	6	7	8	9	10	11	12
1. Frequency of prayer	1	.64**	.65**	-.39*	.02	-.23	-.27	-.10	.16	-.18	.22	.26
2. Intensity of prayer	.38*	1	.49**	-.40*	-.11	-.12	-.23	-.10	-.02	-.08	.19	.19
3. Importance of prayer	.64**	.63**	1	-.27	.11	-.22	-.24	-.11	.00	.17	.17	.19
4.Perceived Stress	-.01	.01	-.20	1	.54**	.39*	.23	.02	-.14	.20	-.28	-.25
5.Physical health	.07	-.01	-.10	.62**	1	.59**	.36*	.16	.08	.10	-.18	-.20
6.Anxiety	.27	-.04	.01	.38*	.56**	1	.79**	.00	-.10	.13	-.25	-.40*
7.Depression	.22	.19	.12	.61**	.58**	.60**	1	.04	-.13	.16	-.31	-.23
8. Systolic Blood Pressure	.33	.00	.09	.24	.17	.30	.28	1	.31	-.27	.03	.04
9. Diastolic Blood Pressure	.08	-.15	-.15	.06	.31	.35*	.25	.36*	1	.06	.17	.16
10. Heart Rate	.02	-.02	-.12	.33	.376*	.20	.26	.12	.10	1	.01	.01
11. SCRs due to reading	-.03	-.06	-.25	.18	.16	.17	.07	.14	.14	.36*	1	.63**
12. SCRs due to listening	-.07	-.04	-.28	.30	.22	.22	.10	.14	.19	.42*	.92**	1

Note. Experimental group above the diagonal (*N*= 35); Control group below the diagonal (*N*= 35)

**p< .01, *p< .05

the treatment groups respectively.

As evidenced in Table 16 (above), no correlations were obtained between aspects of the psychological assessments and physiological responses assessed by SCR, BP or HR among the overall sample. Therefore, a linear multiple regression was performed in order to identify whether prayer frequency, prayer intensity or prayer importance uniquely contributed to the shared variance in predicting the perceived stress variable (with age and gender, as are known to be associated with psychological outcomes, being included).

Table 18

Regression models predicting perceived stress scale.

	B	SE	β	t	*Sig.*
Step 1					
Age	-1.80	.81	-.26	-2.23	**.03**
Gender	2.64	1.67	.18	1.58	.12
Step 2					
Age	-1.29	.87	-.19	-1.48	.14
Gender	2.55	1.74	.18	1.47	.15
Prayer Frequency	-.10	.36	-.04	-.28	.78
Prayer Intensity	-.47	.40	-.18	-1.19	.24
Prayer Importance	-.11	.48	-.04	-.23	.82

Note. p< .05

Model 1 includes the demographic variables of age and gender. Model 2 adds all of the background prayer inventory (i.e., prayer frequency, prayer intensity and prayer importance). As presented in Table 18, age accounted for 7% of the variance explained by Model 1 in which the regression statistic (R) was significantly different from zero [$F_{(2, 67)}$= 3.70, r= .32, r^2= .10, adj. r^2= .07, p< .05]. However, no significant predictor was found in Model 2 in which the regression model was not significantly different from zero [$F_{(5, 64)}$= 2.20, r= .38, r^2= .15, adj. r^2= .08, p> .05].

Based on the correlational evidence in Table 17, multiple regression analysis was performed in relation to the separate treatment groups. However, no significant multivariate effects were found for the background assessments of prayer or the

physiological responses on each of the psychological stress assessments (perceived stress, physical health, anxiety and depression).

5.7. Discussion

This experimental research was designed to investigate, in a laboratory setting, emotional reactivity differences between a religious-text oriented group and a non-religious text oriented group of individuals. While previous research has increasingly focused on religious meditation and prayer forms (Nasiri *et al.,* 2015; Mahjoob, Nejati, Hosseini, & Bakhshani, 2014; Pashib, Khaqani, Bahrainia, & Abedi*,* 2014; Abu Bakar, 2014; Abdul Wahab & Salam, 2013; Salam *et al.,* 2013; Das & Anand, 2012; Masters & Knestel, 2011), our research has sought to extend those previous findings to specific religious prayer forms among a specific religion population in a controlled laboratory procedure, thus revealing the specific physiological arousal which occurs in this context. Hence, it is important to note that such earlier studies did not employ emotional reactivity alongside cardiovascular responses (vital signs) among the individuals grouped by religious-text and secular-text orientation.

As far as the present study was concern, the findings reveal that greater physiological arousal occurs following participation in the prayer conditions when compared to the rest condition. Although no statistically significant difference was found within the conditions, significant SCR changes during the task sessions were achieved between the prayer group and the control group. Evidently, the reading of and listening to religious texts caused increased arousal whereupon skin conductance changes were as expected in Hypothesis 2 and 3. The results as to such SCR changes are in agreement with the previous findings pertaining to the effects of prayer on emotional responses. For example, one study conducted as to prayer and "Om" meditation found a significant increase in skin conductance response due to the consequences of prayer and meditation, measuring this with a single group while SCR was recorded pre and post the intervention (Das & Anand, 2012). Similarly, Shashi (2011) reported that the practice of Om chanting resulted in greater galvanic skin response (GSR) than the GSR recorded during the task. Likewise, spiritual activities (such as chanting God's names and performing forgiveness requests) have been found to invoke significant changes in the physiological responses of individuals (Abdul Wahab & Salam, 2013). By the same token, Salam *et al*. (2013) have found that the use of prayer and listening to the Holy Quran produces increased GSR

changes, as can calm one's mind by alleviating negative thoughts and feelings (Salam *et al.*, 2013). As previously reported in such studies, when SCR scores increase, stress levels decrease and this therefore promotes relaxation. In addition, blood pressure and heart rate are known to increase or decrease through physical activities (Abdul Wahab & Salam, 2013).

In the present study, a pre-post measure of general cardiac sympathetic activation was obtained in order to objectively identify physiological changes in the autonomic nervous system due to prayer and non-prayer activities. With regards to the vital signs, the prayer group was observed to demonstrate a significant reduction in systolic blood pressure after the prayer session, which also confirmed Hypothesis 4. Aside from a significant reduction in systolic blood pressure before and after the task sessions for the prayer group, the pre- and post-tests did not induce any significant changes in diastolic blood pressure or heart rate whereas a significant change in heart rate variability arose in our first SCR study (see Chapter 4). According to Hypothesis 1, in our case, it is possible to say that engaging in prayers, regardless of whether one is hearing or reading religious texts, would help individuals to modulate negative feelings and relax their mind and body in response to stressors (Gao, Fan, Wu, Zhang, Chang, Hung *et al.* 2017).

Moreover, at the outset of the study, the participants were required to complete a questionnaire asking about their perceived stress, physical health, hospital anxiety and depression states. Contrary to Hypothesis 8 and 9, the objective measures (i.e., the SCR and vital signs) have been found to have no significant associations with any of background inventories of prayer or the indices of the physiological assessments among the overall sample. On the other hand, as predicted in Hypothesis 5, 6, and 7, those who scored highly in terms of prayer frequency, prayer intensity and prayer importance reported lower perceived stress scores. At the multivariate level, regression analysis has been employed to explore the unique contributions of each prayer inventory aspect in lowering the perceived stress level after controlling for age and gender. Interestingly, age was found to be a significantly effective factor in predicting perceived stress, with a small effect size over the prayer inventory aspects being found here. Although the sample size was adequate in obtaining a small to medium effect in the variables of interest, it may not have been good enough to detect a smaller effect from the other psychological outcome variables, as was also the case in Study 2. The final hypothesis (10) expected that background prayer assessments (prayer frequency, prayer intensity and prayer

importance) would play a mediation role between physiological responses and psychological stress variables if the mediational conditions were appropriate. However, testing for mediational analysis failed to arise with the current variables, so Hypothesis 10 has thus been rejected as it was in Study 2 (see Chapter 4).

As previous findings suggest that the use of religious behaviours – especially prayers in response to daily life situations – could be a very important factor in terms of dealing with the life stressors. Given that, our results is consistent with this approach by asserting that prayer increases psychophysiological responses by modulating emotional control as then reduces perceived stress and therefore leads to a calming mind and relaxation. Together, these results thus lend support to the engagement hypothesis, whereby an increased skin conductance response throughout prayer activities appeared most in terms of physiological activation – as indicates better psychophysiological states.

Despite our results are compatible with the previous findings as to this area as reported in the available literature, the present study demonstrates a number of limitations that deserve consideration. Although the structure of our method of group comparison has rarely been used in previous research, it has been proven to be a fruitful method of research in such experiments. It is, however, important to consider that the real reflection of the materials used in the laboratory context may not match with the real world due to space and time constrains (Masters & Knestel, 2011). Moreover, the sample population was limited in regards to the specific religious population due to the context of the research being produced in England. While females were the dominant demographic in both groups, no statistical significance was obtained between the two groups in regards to the demographic questions (age, gender, marital status, and ethnicity) and thus it is uncertain as to what extent this affects the generalisability of our findings.

As a conclusion, previous experimental studies as to prayer has been debated whether the use of prayer can lift disturbed emotions by regulating autonomic system balance. As emotion-related experiences intensely affect autonomic system balance, the present study has sought to adapt this phenomena to religious-related behaviours – particularly prayer forms. Despite the abovementioned methodological limitations, the present study clearly reveals that the performance of prayer results in increased skin conductance response and decreased cardiac sympathetic activation in terms of

autonomic system balance – thereby noting that such activities may thus invoke some kind of a relaxed state of mind.

In summary, from the obtained findings, both emotional reactivity (SCR) sessions and pre-post vital sign measures showed significantly increased SCR changes and decreased systolic blood pressure from prayer activities when compared to the non-prayer activities in which neutral texts were used. In other words, participants instructed in relation to prayer-related text encountered greater autonomic activation than those who were not instructed in relation to prayer-related texts. Considering the stable and consistent results of both the second study (Chapter 4) and this present study, the ability of SCR and vital signs to act as physiological measurements demonstrates convincing objective evidence for the optimising of the autonomic nervous response in relation to the undertaking of prayer activities.

5.8. Summary of the Three Studies (Chapter 3, 4, & 5)

Subsequent studies with Muslim samples that focused on the psychophysiological effects of prayer types were indicated. Across three studies, whereupon the parameters of psychological assessments alongside physiological coherence have been assessed, focus has been given to specific types of prayer in a scientifically-testing approach. Hence, Study 1 investigated whether multi-dimensional models of prayer differently relate to psychological and subjective well-being variables, with these being key components of mental health. It was found that the supplication prayer model predicted better psychological well-being, while the invocation prayer model predicted better subjective well-being. In Study 2, the physiological responses of the individuals who engaged in the recitation of supplication and invocation prayers were tested through their demonstrated emotional reactivity (SCR) and vital signs (blood pressure and heart rate). This study revealed that engaging in prayers increased the emotional arousal (SCR) of these individuals but did not have a significant effect. In contrast, this activity caused a significant reduction in heart rate variability. However, physiological changes (such as increased emotional responses and decreased cardiovascular responses) did not show any association with the well-being assessments. Following the investigation of the recitation of prayer, Study 3 aimed at assessing the effects of both the recitation of (verbal stimulus) and listening to (sound stimulus) prayers on physiological and emotional responses. It was again obtained that both the reading of and listening to prayers increased emotional

arousal and decreased the vital signs over that witnessed when an individual undertook a neutral activity. This study revealed that the reciting and hearing of Quranic chapters significantly affected both emotional and cardiovascular responses. Likewise, there were no significant relationships between increased emotional arousal and decreased vital signs against the stress-related assessments.

It is possible that the use of other measures (such as personality and resilience traits) may lead to stronger results in determining different prayer types and their relationships with other aspects of mental health measures. This personality research aims to expand the variable types used and the populations targeted within the current thesis, as is to be examined in subsequent chapters.

PART B

Chapter Six

6.1. Religion and its Relationship with Personality: A General Perspective

6.1.1. Introduction

It is noted that religion and personality function similarly in terms of people's life expectancy. As drawn upon by an early decade scientist, Emmons proffers the idea that religion and personality might play a naturally similar role in one's life by sharing common ultimate goals and directions in regards to how to survive in a decent way (Emmons, 1999; Kirkpatrick, 1999). Hence, previous research on this subject has suggested that personality models may manifest as a useful resource in understanding the extent to which individual responses to religion fit in with that figure's basic personality qualities.

When reviewing the literature as to the subject of religiosity, it is clear that an enormous interest has grown in regards to examining the association between religiosity and personality traits – for example, via the "Big Five" personality model. This five-factor model of personality includes the five dimensions of extraversion, agreeableness, openness, conscientiousness and neuroticism. In considering the characteristics of individuals and the goals of religions and, furthermore, how they are intertwined in various religious experiences, previous research has claimed that the association between religiosity, agreeableness and conscientiousness is high, that the association between religiosity and psychoticism is low and that no associations can be found with the other domains of the Big Five personality model (Saroglou, 2002). Besides this, researchers have reported that religious people scored subjective well-being higher and psychosocial pathologies lower (Diener & Tay, 2011). In the early decades of this area of study, researchers predominantly focused on personality and its relationship with negative mental processes (such as stress, anxiety, etc). Consequently, the study of the relationship between personality and positive mental processes has remained limited (Huber, Suman, Biasi, & Carli, 2008).

In this sense, personality psychology is one of the most important life factors, particularly as it can hold an increased dialog with religion. While religion and personality can coherently exist and thus can lead to understandings being gained as to how religious

influences reside within a person's life experiences, the role of religion within personality functioning has been mostly ignored within the pertinent literature (Emmons, 1999; Salehinezhad, 2012).

6.1.2. Personality as a Component of Mental Health

Personality psychology is generally described as the diverse manifestations of an individual's behaviour, thought and emotion (Salehinezhad, 2012). Here, the main themes, as emphasise the consideration of personality theorising, are twofold in pertaining to human nature and individual differences (Salehinezhad, 2012). Human nature refers to the shared characteristics of individuals that correspond to psychological mechanisms such as goals, motives, decision-making and influencing the environment (John, Naumann, & Soto, 2008). Individual differences, in contrast, may be seen to manifest in an individual's mental health. Evidence is accruing, through the conducting of numerous studies, that some individual differences are more like to contribute to and/or promote mental health, while some individuals show a greater tendency to encounter mental illness (Salehinezhad, 2012). In this sense, it is considered that both human nature and individual differences are coherently linked with each other in the field of personality psychology (John *et al.,* 2008).

6.1.2.1. Models of Personality

Since a fair amount of research has revealed that individual differences in personality can be observed in religious beliefs and practices, investigation has been given to various personality models and their relationship with religiosity. However, to date, much of the produced research has presented contradictory findings (Francis, 1991; Gartner *et al*., 1991; Taylor & McDonald, 1999; Piedmont, 1999; Piedmont, 2005). In response, attempts have been made to find proper personality theories and measures. In recent decades, various personality models – such as Eysenck's Taxonomy (Eysenck & Eysenck, 1985), the Jackson Personality Inventory, the Myers-Briggs Type Inventory (Briggs & Myers, 1987), the California Q-Set (Block, 1961), the Sixteen Personality Factor Questionnaire (Cattell, Eber, & Tatsuoka, 1970) and the Temperament and Character Inventory (TCI) (Cloninger, 1994) – have been developed (Taylor & McDonald, 1999; Saroglou & Garcia, 2008). Yet, due to the variance of these conceptions and their measures, their adoption may fail to adequately capture the individual differences in personality and religion (McCrae & Costa, 2008).

6.1.2.2. Five-Factor Model of Personality

It seems that there are several personality models that strongly pertain to involving individual differences in personality within the examination of mental health. Trait personality is commonly defined as a relatively stable pattern in human personality over time, with these habitual patterns being composed of aspects such as purposes, values and motivations (Naeem, 2012). In the field of personality psychology, the 44-item Big-Five Inventory (BFI) (Bennett Martinez & John, 1998; John & Srivastava, 1999), the 60-item NEO Five-Factor Inventory (NEO-FFI) (Costa & McCrae, 1992; Costa & McCrae, 2003) and Goldberg's 100-item trait descriptive adjectives (TDA) (Goldberg, 1992; brief version Saucier, 1994, 40-item) have also been established (Gosling, Rentfrow, & Swan, 2003).

Nevertheless, due to the length of the existing Big Five measures, a brief version of these instruments has become an essential tool. With regards to a theoretical framework here, a well-established Big Five model of personality has been developed by Gosling *et al*. (2003) as a brief version of the previous Big Five instruments, a result of this model having emerged through a wide and substantial range of evidence in the field of personality of psychology (Gosling *et al*., 2003; Löckenhoff, Ironson, O'Cleirigh, & Costa, 2009). Notably, the five-factor models of trait personality were drawn from various empirical studies rather than from theories through factor analysis.

Five Dimensions	Can be Characterised as	Rather Than
Extraversion	Decided and outgoing	Quiet and reserved
Agreeableness	Supportive and polite	Hostile and rude
Conscientiousness	Task-focused and orderly	Distractible and muddled
Openness	Having a broad range of interests, prefer Novelty to routine, and sensitive	Having a narrow range of interests and indifferent to art and beauty
Neuroticism	Prone to experiencing negative emotions (such as anxiety, depression, angry hostility etc.)	Emotionally resilient

Figure 10. Personality traits descriptors (adapted from Gosling *et al.* 2003; Soto & Jackson, 2013)

This above-mentioned personality model has been commonly labelled as comprising five dimensions; Agreeableness, Conscientiousness, Extraversion, Openness to Experience and Neuroticism (emotional stability) (Gosling *et al.*, 2003). Those dimensions that have been reliably obtained across a number of studies thereby pertain to specific facets of individual behaviour and emotional reactions (see Figure 11). Each of these dimensions, as pertain to the natural functioning of individuals, may promote or reduce mental health. McCrae and Costa (2008) have asserted that these dimensions correspond with some characteristic adaptations, with such factors being characteristic due to their ability to deal with psychological adjustments of the individual. These are further considered to be adaptations due to their ability to help (Salehinezhad, 2012).

In regards to the brief description given to the five factors, extraversion is often referred to as an interest in social interaction being held with others and excitement-seeking. Agreeableness pertains to characteristics such as being kind, caring, getting along with others rather than being hostile, displaying self-centeredness. Conscientiousness invokes notions of being responsible, undertaking deliberation, preferring orderliness and demonstrating self-discipline. Openness is often presented as possessing novelty, intellect, an interest in different experiences and an openness to values and ideas. Finally, emotional stability (vs. neuroticism) corresponds to when a person faces specific negative emotions and feelings such as impulsiveness, self-consciousness, anxiety, depression and vulnerability (Saroglou & Garcia, 2008; Saroglou, 2002).

6.1.3. Definitions of Resilience and the Trait Resilience Model (EEA)

In the face of stressors, negative events or adversity, resilience is considered to be the most common recovery response. The notion of recovery in terms of mental health first appeared within the literature in the 1980s and subsequently gained a great deal of attention within professional health practices (Eltaiba & Harries, 2015). Resilience thus stands as an important key component of mental health in regards to psychological, clinical and public health concerns (Cloninger & Zohar, 2011; Gooding, Hurst, Johnson, & Tarrier, 2012; Peng, Zhang, Li, Li, Zhang, Zuo, Miao, & Xu, 2012) such as suicidal

thought (Johnson, Wood, Gooding, Taylor, & Tarrier, 2011) and the pernicious impact of stress (Johnson, Gooding, Wood, & Tarrier, 2010).

No consistency as to the measurements and conceptualisations of resilience has emerged within the research produced to date. This is generally examined through a buffering approach that alienates the vital influence of negative events, the impact of adversity, trauma and/or unpleasant experiences (Yi-Frazier, Smith, Vitalino, Yi, Mai, Hillman, & Weinger, 2009; Johnson *et al.,* 2011; Windle, Bennett, & Noyes, 2011; Peng *et al*., 2012; Eley, Cloninger, Walters, Laurence, Synnott, & Wilkinson*,* 2013), approaches to childhood resilience and social relations (Rutter, 2013). Moreover, Windle *et al.* (2011) have reported, through a methodological systematic review focusing on fifteen original resilience measures and four refinements of these original measures, a number of different approaches (e.g., psychological hardiness, ego-resiliency, psychological resilience and personal and spiritual influences) in both general and clinical settings. Windle *et al.* (2011) further reported that there is no "gold standard" (p.1) for assessing resilience since each aspect lacks different areas of information as to the psychometric properties (Windle *et al.,* 2011). Furthermore, Salehinezhad (2012) pointed to research that has investigated resilience in the context of economic hardship, social disequilibrium and unpleasant events (e.g., trauma, loss and depression). Many studies have emphasised how resilience plays crucial and protective roles in physical and psychological health and well-being (Salehinezhad & Besharat, 2010), recovering diseases (Yi-Frazier *et al*., 2009) and encouraging positive emotions (Philippe, Lecours, & Beaulieu-Pelletier, 2009). It has thus been highlighted that the framework of psychological resilience is twofold, thereby consisting of the buffering approach and trait resilience (Maltby, Day, & Hall, 2015). As stated above, resilience achieved through the buffering approach refers to the opposite of the risk form that reduces the impact of negative events. On the other hand, trait resilience assesses how individuals generally behave in the face of life-concerning events and the capacity of individuals to bounce back (Maltby *et al*., 2015).

Recently, the scope of trait resilience has been refined within ecological system theory as postulated by Holling (2006). This approach assesses three mechanisms; engineering resilience, ecological resilience and adaptive resilience (EEA) (Maltby *et al*., 2015). With regards to their constructs, engineering resilience refers to an individual's ability to deal with setbacks from adversity. Ecological resilience, in contrast, has been

described as the capacity to demonstrate resistance against negative events and the ability to recover quickly to one's normal psychological state. Finally, adaptive resilience is considered to be the capacity of resilience to adapt well in response to difficult events or experiences (Maltby *et al*., 2015).

6.1.4. Religiosity, Personality and Resilience

Recent studies have shown that the relationship between spirituality/religiosity, personality traits and resilience is worthy of investigation, particularly if an understanding is to be gained as to whether religion has the ability to promote improved resilience (Womble, Labbe, & Cochran, 2013) and its relation to personality. Many studies have stressed the notion that religion may represent personality traits in terms of individual differences in relation to personality predictiveness. Two ideas grounded in previous findings as to health and personality associations are that personality traits may emerge either as an important health risk or as an important health protective factor across many disciplines of psychology and health (Womble *et al*., 2013).

6.1.5. Relationship between Religiosity, Personality and Resilience: Empirical Evidence

As stated in the previous chapter, William James and his contemporaries have tended to examine to what extent religion links to mental health (Emmons & Paloutzian, 2003). In recent years, the five-factor formulation (as the most exclusive framework) has been widely used to explore this sort of inquiry (Saroglou, 2002; Löckenhoff *et al*., 2009). A person with ties to a certain religious affiliation may think, feel or behave differently in the face of adversity when compared to a non-religious person (Saroglou & Garcia, 2008).

James' hypothesis as to religious behaviour has been found to be useful in exploring the relationship between religious dimensions and social attitudes and behaviours (Hills, Francis, Argyle, & Jackson, 2004). Generally, religion means different things to specific groups of people who struggle with understanding the meaning of life. This, likewise, helps to understand individual differences in personality. An early meta-analysis has stressed that religiosity can impact upon a number of individual differences. For example, studies that have used Eysenck's three-factor model (PE) – as incorporates psychoticism, extraversion, neuroticism – have found religion to be associated with low psychoticism while the remaining two factors showed either a relation or no relation with

religion (Saroglou, 2002). Similarly, religion-related five-factor personality model studies have found that religious people are more likely to possess a high degree of agreeableness and conscientiousness and a low degree of psychoticism. No clear relations were found with the other factors of the FFM (Saroglou, 2002). Later, Egan and her colleagues (Egan, Kroll, Carey, Johnson, & Erickson, 2004) examined the relationship between religiosity and Eysenck's personality model among a psychiatric outpatient sample, ultimately finding that intrinsic religion and psychoticism have a negative correlation. Only extraversion has been found to possess a positive relation with the frequency of prayer among men. Likewise, when Maltby and Day (2001) assessed the relationship between Eysenck's personality dimensions and spiritual beliefs among undergraduate students, only extraversion witnessed a variance (between 9% and 14%) in spiritual scores. Furthermore, those researchers also investigated the relationship between religiosity and mental health by using Ferguson's (2001) model of personality and several religious coping factors. When integrating Ferguson's model of personality and coping factors, "a factor structure of the personality, coping and religiosity scale was consistent with Ferguson's model; with extrinsic religiosity and negative religious coping loading on a neuroticism-coping factor (N-COPE), and intrinsic religiosity and positive religious coping loading on a low psychoticism-coping factor (P-COPE)" (Maltby & Day, 2004).

Although the five-factor model has been widely accepted as a framework through which characteristic adaptations can be understood, religious beliefs and practices in the field of psychology of religion have rarely investigated people's experiences of the sacred. As religiosity has often been conceptualised as relying on traditions and institutions, it is frequently centered on a certain set of behaviours or systems (such as prayer, worshipping and place attendance) (Löckenhoff *et al.*, 2009; Unterrainer *et al.*, 2014). However, little interest has been given to the relationship between religion, personality and resilience. Since the results that have emerged have contradicted previous findings, the above-mentioned inquiry has remained unclear in the area of personality psychology.

6.2. Associations between Religion and Personality, and Well-being: Islamic Context

Within the literature, two different arguments as to the constructs of religious behaviour have been provided. The first asserts that religious belief and practice enables

individuals to cope with adversity and further helps such people to endure suffering and negative life events (Hills, Francis, & Jennings, 2006). In contrast, religious beliefs and practices are also considered to be threatening factors towards well-being, a result of the fear of sin and wrath following unpleasant behaviours (Wink, Ciciolla, Dillon, & Tracy, 2007). Although some studies have investigated the role and function of religious behaviour through the two different approaches in daily life (Naeem, 2012), the field of psychology has not identified sufficient evidence as to the relationship between personality dimensions and religiosity, especially among cross-country populations.

6.2.1. Personality Inquiries in Islamic Context

As generally emphasised, religion may be perceived and practiced differently by believers belonging to different faith groups (such as Christians, Jews, and Muslims). Consequently, such differences in religion and personality dimensions might reveal various correlations. Using mainly Eysenk's model of personality, numerous studies have demonstrated an agreed salient result that religiosity is positively related to agreeableness, conscientiousness and is negatively linked to psychoticism among Christian samples (see, for example, Francis, 1991, 1993; Lewis & Maltby, 1995; Maltby, 1997, 1999; Hills *et al.,* 2004). However, no consensus has emerged as to the association between religiosity and extraversion and neuroticism (Lewis & Maltby, 1995; Maltby & Day, 2001; Francis & Jackson, 2003; Hills *et al*., 2004).

However, it is important to examine this association among cross-cultural Muslim populations due to this being the second largest religious group in the world. One study, having extended previous findings among 50 Muslim college students in the UK, found religiosity to be linked to lower psychoticism and to higher lie scores (as assessed via Eysenck's model) (Wilde & Joseph, 1997). In another study as to personality-religiosity relations, agreeableness and conscientiousness were found to possess the strongest link to religiousness (Aghababei, 2013). It is worth mentioning that differences may arise between a Muslim sample based in a secular country and one based in an Islamic country (Abdel-Khalek, 2013). For example, to the best of my knowledge, research has found that Kuwaiti samples scored a higher mean on religiosity than US samples (Thorson, Powell, Abdel-Khalek, & Beshai, 1997; Abdel-Khalek & Lester, 2012).

In addition, most previous studies have revealed personality as a positive indicator of well-being, with personality dimensions having further been shown to be negatively

linked to negative psychological adjustments (e.g., anxiety, stress and negative affect) and positively related to self-esteem and positive affect (Aghababaei, 2013). For instance, among Iranian university students, Joshanloo and Nosratabadi (2009) found that extraversion, neuroticism, conscientiousness and agreeableness held significantly different associations with flourishing, good mental health and languishing (Joshanloo, Rastegar, & Bakhshi, 2012). Likewise, Joshanloo and Rastegar (2007) have found that meaning in life and personal growth were positively predicted by conscientiousness among Iranian female students and by conscientiousness, agreeableness and extraversion among Iranian male students. In another study, Joshanloo and Afshari (2011) identified that extraversion, agreeableness, conscientiousness and neuroticism possess a significant correlation with life satisfaction among Iranian university students. This persistent line of research conducted in relation to personality measures and models has been asserted to be valid in other cross-cultural samples in terms of its generalisability towards mental health (Joshanloo, Rostami, & Nosratabadi, 2006; Erdle & Aghababaei, 2012; Aghababaei, 2013; Abdel-Khalek, 2013).

In the literature as to the relationship between religion and personality, it has generally been asserted that individuals who often turn to their religious beliefs in any circumstances are agreeable, sociable and possess better well-being, a higher level of self-esteem and increased emotional intelligence (Emmons, Barrett, & Schnitker, 2008; Aghababaei, 2013).

6.2.2. Resilience (Trait Theory) in Islamic Context

As described earlier in this chapter, resilience simply refers to the capacity of individuals to challenge situations and difficulties, with this being held to be a protective factor in terms of mental health. Although the roles of religion on mental health have widely been overlooked, limited studies have focused on understanding how religious behaviour contributes to psychological resilience in everyday life events among faith-based communities.

A general consensus of religion-related health studies has been reached that religious behaviour plays a positive role in the mental, psychological and physical health of individuals. For example, recent research had revealed that an increased involvement in religious activity was found to lead to a higher level of mental health and well-being (Koenig *et al*., 2001; Moreira-Almeida *et al.,* 2006) and a better ability to adapt to life

stressors (Abu-Ras & Abu-Bader, 2008). In addition, studies have reported that religious and spiritual-coping fosters resilience for military personnel when such individuals face stress, suicidal situations and trauma contexts (Chang, Skinner, Zhou, & Kazis, 2003; Brenner, Homaifar, Adler, Wolfman, & Kemp, 2009; Pietrzak, Johnson, Goldstein, Malley, & Southwick, 2009; Abu-Ras & Hosein, 2015)

As people across the world may commonly encounter various stressors and negative life events, researchers suggest that religious behaviour may be a form of resilience (Mitha & Adatia, 2016). Religious beliefs and behaviour are important components of Islamic teaching, a result of it being obligatory for Muslim individuals to engage in prayers at several fixed times each day. Religious behaviour, as a source of meaning-making, is of great importance in shaping attitudes relating to an environment after stress has been faced (Joakim & White, 2015). Recent studies have highlighted how individuals who face traumatic events or adversities tend, in the respective recovery periods, to turn to their faith to understand and interpret the meanings and purposes that lay behind their negative experiences (Joakim & White, 2015), thus suggesting a relationship between resilience and religiosity.

Although religion and resilience engagement has yet to be fully explored, it is important to gain a deeper understanding as to what extent religious behaviours promote resiliency for those who undertake such religious practices in the face of negative events.

6.2.3. Links between the Muslim Faith, Personality and Resilience Traits

In the literature, recent interest has been given to the potential impacts of religious beliefs and practices on certain aspects of human behaviour, despite everyday life risks and stresses. However, in the field of psychology of religion, research as to the topic of faith-related reactions to negative events, stress and adversity among Muslim groups and communities has remained limited. Consequently, the present study seeks to investigate the relationship between the Muslim faith, personality and the psychological resilience of Muslim individuals living in the US.

There is no doubt that human beings have a natural tendency to adapt to unusual conditions encountered in their internal and external world, particularly in terms of psychological, physical, and mental processes (Annalakshmi & Abeer, 2011). As alluded to in previous sections of this work, the most common adaptation behaviour employed in an attempt to operate normally towards a given set of conditions (such as environmental

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hazards or circumstances) is defined as resilience. This term refers to adaptation, recovering and the ability to bounce back from multiple negative life events (Annalakshmi & Abeer, 2011; Maltby *et al*., 2015). As religiosity involves certain dimensions of human experience and behaviour, it is of great significance for believers when undertaking adaptive functioning in the face of adversities.

As mentioned above, each religion has its own set of beliefs and practices for its followers. For example, Islam has a unique form of worshipping – as manifests in ritual prayer (*salat*), almsgiving (*zakat*), fasting (*savm al-Ramadan*) and pilgrimage (*hajj*). Such teachings of Islam are viewed as the coding of life, whereby believers can find ways through which to manage self or ego or to develop social and personal skills (Annalakshmi & Abeer, 2011).

Chapter Seven

Examining Different Prayer Types and their Association with the Five-Factor Personality Model and Trait Resilience (EEA)

Abstract

Objectives: The purpose of the present study has been to contribute to the scarce literature pertaining to what extent the associations between different prayer types (obligatory, voluntarily, supplication and invocation) are related to the personality of individuals in terms of the Five-Factor Model (FFM) of personality and trait resilience (EEA).

Methods: Here, 173 participants (female= 60, male= 113) completed a number of preliminary questions pertinent to prayer types (i.e., how frequent, how intense and how important is their performance of prayer) in addition to a measure of the personality inventory within five domains (extraversion, agreeableness, conscientiousness, neuroticism and openness) and a measure of trait resilience within three domains (ecological, engineering and adaptive resilience).

Results: The correlational results highlight that Extraversion is significantly associated with obligatory, voluntary and supplication forms of prayers, while Openness is significantly associated with only the obligatory form of prayer. In contrast, the other personality traits failed to demonstrate any association with a prayer type. In addition, Ecological trait resilience over other forms of trait resilience was significantly related with four prayer measures. The multiple regression analysis findings suggest that Extraversion (positive) and Conscientiousness (negative) traits are better predictors of the obligatory and supplication prayer types while Ecological (positive) trait resilience scores, over other trait measures, are the strongest predictor of all prayer types, despite the marital status differences being observed.

Conclusion: These results may enable a useful understanding to be gained as to the relationship between different prayer types and personality and resilience traits in terms of mental health.

7.1. Introduction

7.1.1. Religiosity and the Five-Factor Model (FFM) of Personality

One subject which has been neglected within research as to the psychology of religion is the notion that religiosity may be related to personality differences in terms of personality traits (Saroglou & Garcia, 2008). Personality differences have been examined through two routes; personality traits and personality values (i.e., cultural adaptations) (McCullough, Tsang, & Brion, 2003; Saroglou & Garcia, 2008). Over the past two decades, research in this area has focussed upon the question of whether individual differences in religious behaviour may reflect the differences witnessed in the held personality traits of religious people. From this, a number of studies have investigated how different personality factors relate to people's religiosity in regards to how such figures think, feel and behave. It is expected that religious people may act in certain ways due to their personal traits – as may be characterised as being talkative, having social interaction functioning (extraversion), increased compromising, being friendly (agreeableness), being highly responsible and organised (conscientiousness), being easily stress, having affective dysregulation (neuroticism) and being highly curious of novelty (openness to experience).

From this point of view, many studies have exclusively focused on the relationship between religiosity and personality through the use of Eysenck's taxonomy (PEN; Psychoticism, Extraversion and Neuroticism) – see, for example, Francis (1992) and Piedmont (2005). This model has produced research which has revealed that religious orientation, frequency of church attendance and personal prayer are negatively related to Psychoticism and Neuroticism (Hills *et al.,* 2004). However, no systematic evidence has been produced through which to draw a basis distinction as to individual personality trait differences and different aspects of religiosity association (Saroglou & Garcia, 2008).

More recently, the Five-Factor Model (FFM) – also known as the Big Five – has become one of the most widely accepted models of personality to facilitate understandings as to the links between religiosity and personality, thus arising as a framework that may help guide and develop interconnected discussions of religion and its relationship with personality (Piedmont, 2005b; Emmons & Paloutzian, 2003; McCrae, 1999). Hence, the FFM (Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness) has cross-cultural validation (Saroglou & Jaspard, 2000;

McCrae & Costa, 1999) and is embedded in a comprehensive structure of human traits (Henningsgaard & Arnau, 2008).

Consistent with the notion that religiosity and personality traits may be related, in a recent meta-analysis Saroglou (2002) reported that religiosity is consistently related with a high degree of Agreeableness and Conscientiousness, while no systematic relation pattern was found to occur for the other personality traits of FFM. Besides which, the effect sizes were small here. For instance, spirituality was correlated with a high degree of Extraversion, Openness and Emotional Stability, while intrinsic religiosity was related to a high degree of Extraversion but a low degree Openness. This was also found between religious fundamentalism and Openness association, while extrinsic religiosity was associated with Neuroticism (Saroglou, 2002). Similarly, seven out of the eight studies reported a clear pattern whereby religiosity was related with low Neuroticism (Saroglou & Jaspard, 1998). One recent study also reported differential relations between religious orientations and the FFM traits (Henningsgaard & Arnau, 2008). It is suggested that one possible reason for the different dimensions of religiosity being found to somewhat relate to personality factors is due to the different parameters of the religious measures used within the research questions posed. In contrast, others suggest that this relationship may be due to the lack of representativeness as to possessed human traits. This is because previous attempts have been limited by the use of a single-item measure of religiosity. In furtherance to this, the religious behaviours (particularly prayer types) employed might also contribute to this kind of inquiry at some level. There is reason to hypothesise that as religious people tend to demonstrate a high degree of Agreeableness and Conscientiousness and a low degree of Neuroticism, through their prayers such individuals may similarly evoke a high degree of Extraversion, Agreeableness, Conscientiousness and Openness, alongside a low degree of Neuroticism. Therefore, our expectations held as to the individual differences in prayer should also be applied to certain prayer types in predicting personality traits among specific religious communities.

7.1.2. Religiosity and Trait Resilience (EEA)

As researchers tend to understand the influences of individual differences of personality upon people's religiosity in the face of life stressors, the investigation of trait resilience and religious behaviour associations should also be considered within the psychology of religion. With regards to the analysis of resilience, the concept of resilience includes both psychological and biological structures that are related to the recovery of a

subject from negative events and/or adversity. In the past decade, researchers have investigated psychological resilience in order to identify pertinent protective factors for those who encounter negative events (Yehuda, Flory, Southwick, & Charney, 2006). A recent study explored the characteristics of those people who encounter high-risk situations – such as "positive affect and optimism, cognitive flexibility, active coping (including religious coping), social support and intimacy, ability to regulate negative emotions, and mastery (Yehuda *et al.*, 2006)" (Tuck & Anderson, 2014). Studies have tended to develop deeper understandings through the gaining of empirical results, finding in the process that religion is a resource imbued with a protective factor.

Throughout the pertinent literature, a number of different definitions as to resilience have been provided. Nonetheless, a general consensus is held that personality characteristics of resiliency can be broadly defined as the capacity of enhancing an individual's positive adaptation against adversity or negative stressors (Eley *et al.,* 2013; Maltby *et al.,* 2015). Here, researchers have evaluated the function of trait resilience towards negative events. Various approaches as to the measuring of resilience have been utilised within disparate theoretical and empirical investigations, with these being witnessed across the spectrum of studies that have explored as to what extent traits resilience play a buffering role in relation to the negative consequences of stressors and to the ability of individuals to recover from negative events or adverse circumstances (Maltby *et al.*, 2015). From this, researchers have sought to investigate the role of trait resilience in mental health-related situations. Therefore, Maltby *et al*. (2015) have recently refined traits of resilience that has originated from ecological theory, with this being classified via the three mechanisms (Ecological, Engineering and Adaptive resilience (EEA)) as described by Holling (2006). According to this novel measure, Engineering resilience refers to one's ability to setback from adversity. In addition, Ecological resilience has been described as the capacity of resistance against negative events and the ability to recover quickly to the normal psychological state. Finally, Adaptive resilience is considered to be the capacity of resilience to adapt well in response to difficult event or experiences (Maltby *et al.*, 2015).

Nonetheless, how religious behaviours and practices related to trait resilience has never been an inquiry in the field of psychology of religion. Thus, from the research on the religion and mental health association that has been conducted to date, the relationship between religiosity and trait resilience remains unclear. It is important to explore whether

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resilience traits – within which the psychological resilience approach is known to play a healthy and protective role in people's lives whereupon individuals encounter difficulties or health-related stressors – may also be relevant to prayer types in terms of the psychology of religion.

7.2. Present Study

From the literature review conducted in the present research, it appears as if no previous studies have specifically examined how prayer types, personality traits and traits resilience are linked. Since previous studies have usually researched two variable in this context (such as the relationship between religiosity and personality factors or the interactions of religiosity and psychological resilience), this research focuses on all three variables and their relationships among a a specific population. This is to be undertaken in order to examine whether a relationship exists between different Islamic prayers and personality and resilience traits among the US Muslim community. As it is expected that Muslim individuals engage in prayers at several fixed times during their daily lives (obligatory), while also performing highly recommended prayers encouraged by the Prophet Mohammed (voluntarily), asking God for support and guidance either for themselves or for others (supplication) and feeling closer to God by means of communicating with Him (invocation), it is important to explore whether these engagements have meaningful relations with personality traits and trait resilience for those who undertake such religious practices in the face of life events.

7.3. Research Aims and Hypothesis

In light of the above-mentioned aspects, multi-dimensional models of prayer, as the primary variable of interest in the present study, were generated on a self-reportage basis as to the obligatory, voluntary, supplication and invocation prayer types. Therefore, the specific objectives of the present study were **(1)** to determine the descriptive statistics of the scales in terms of the gender-related differences, **(2)** to examine how the use of different prayer types is related to the five-factor personality model and three traits of resilience among Muslim populations living in the US and **(3)** to determine predictors of a prayer type after controlling for demographics and personality traits. Here, a number of research questions were generated as follows:

Research Question 1. Are there any gender-related differences on the study

variables?

Research Question 2. Is there any significant association between prayer types, the five-factor personality model and EEA traits resilience?

Research Question 3. Do any prayer types predict the resilience trait after controlling for demographics (gender, age, marital status, education and ethnicity) and personality traits?

Based on the addressed research questions above, six hypotheses were determined below:

Hypothesis 1. There would be no significant gender-related differences on the study variables.

Hypothesis 2. There would be significant correlations between prayer types and both personality factors (positive) and traits resilience (positive).

Hypothesis 3. Given the consistency across Cultural Studies as to the associations of religiosity and personality factors (Saroglou, 2002), Extraversion, Agreeableness, Conscientiousness, and Openness would positively predict a prayer type whilst Neuroticism would be found to be unrelated to a prayer type.

Hypothesis 4. The Engineering resilience trait would be found to be the best predictor of a prayer type after controlling for demographics and personality factors.

Hypothesis 5. The Ecological resilience trait would be found to be the best predictor of a prayer type after controlling for demographics and personality factors.

Hypothesis 6. The Adaptive resilience trait would be found to be the best predictor of a prayer type after controlling for demographics and personality factors.

7.4. Methods

7.4.1. Sample Characteristics

The sample of the study consists of 173 adults (as comprised of 60 (34.7%) females and 113 (65.3%) males) from the United States who were aged between 18 and 45 years old ($M=$ 29.09 years, $SD=$ 6.56). The research subjects were all workers within the Amazon Mechanical Turk system. 78 (45.1%) of the respondents reported their ethnicity as South Asian (e.g., Indian, Pakistani), 47 (27.2%) were Caucasian (White

European), 17 (9.8%) respondents were Middle Eastern (e.g. Lebanese, Palestinian and Arabic), 11 (6.4%) respondents were Black (e.g. African American, Caribbean or African), 9 (5.2%) reported that they defined as mixed race, 4 (2.3%) were East Asian (Chinese, Japanese), and 7 (4.0%) respondents stated "other" in response to the question. Among the sample, 103 (59.5%) respondents stated that they were single, 65 (37.6%) were married, 3 (1.7%) were divorced and 2 (1.2%) respondents were widowed. In terms of educational qualifications, 37 (21.4%) respondents stated their highest educational level as them having graduated from high school, 76 (43.9%) respondents possessed a bachelor's degree, 50 (28.9%) respondents had gained a master degree, 3 (1.7%) had been awarded a PhD and 7 (4.0%) respondents stated "other" in response to the question.

7.4.2. Measures and Questionnaires

The demographic questionnaire asked the age, gender, marital status, educational level and ethnicity of the participants. The prayer items were designed by the researcher to collect information as to the frequency, intensity and importance of prayers to the Muslim respondents along with personality and resilience trait scales (Appendix I).

The Refined Resilience Scale (EEA; Maltby *et al*. 2015, 12 Item). This measure that consisted of Engineering, Ecological and Adaptive traits resilience is designed in a 4-point response format whereby responses are denoted between 1= strongly disagree and 4= strongly agree. Here, Values of Cronbach's alpha for this study is measured at .76.

The Ten-item Personality Inventory (TIPI; Gosling *et al*. 2003, 10 Item). This measure was constructed by). This constructed scale is a short version of the Big Five personality factors (60 items). The five-factor model of personality contains five domains; extraversion, agreeableness, conscientiousness, neuroticism and openness, This short version of personality measure includes 2 items for each of the 5 domains, with a 7-point response scale whereby 1= disagree strongly, 2= disagree moderately, 3= disagree a little, 4= neither agree nor disagree, 5= agree a little, 6= agree moderately and 7= agree strongly. Here, the Cronbach's alpha values for the five-factor personality measures in general were found as $\alpha = .64$.

Types of Prayer. The prayer forms of obligatory prayer (performing prayers five times a day as daily reminder of God), voluntarily prayer (undertaken in following the Prophet Muhammad's acts to earn love of God), supplication payer (open-ended conversation with God with a full sense of His presence), and invocation prayer (quiet

reflection as to the universe and creation) were used in the present study (see Appendix A). The Cronbach's alpha of prayer measures was here .95 for obligatory prayer, .96 for voluntarily prayer, .95 for supplication prayer, and .92 for invocation prayer.

7.4.3. Research Procedure

An online recruitment system was used for the current study by utilising Amazon's Mechanical Turk samples. These samples thus contained a pool of workers who were employed to complete the questionnaires. In addition, Amazon MTurk is considered to be a practical tool for organisational research whereby target populations can be obtained in a very short period of time (Keith, Tay & Harms, 2017). In this study, the employed set of surveys (as pertained to the five-factor model of personality, EEA trait resilience and four Muslim prayer types) was administered. This design was chosen in order to examine the relationship between all three of the variables.

7.4.4. Ethical Consideration

All of the participants were above 18 years old and gave their consent to participate in the research. To ensure informed consent, all of the individual respondents were asked to select an "*I agree*" button to demonstrate their affirmative consent with reference to participating in the research. In addition, the researchers guaranteed the confidentiality of the respondents. None of the answers given by the respondents have been shared with any other researcher or revealed in any other studies. The data collection procedure of this research gained ethical approval from the University of Leicester, Department of Neuroscience, Psychology, and Behaviour Ethics Board (Reference number: 9035-jm148-neuroscience,psychologyandbehaviour) (Appendix J).

7.4.5. Statistical Analysis

The statistical analysis of this research was undertaken through the Statistical Package for the Social Sciences programme (SPSS Statistics, Version 24). Pearson product moment correlation analysis was conducted to examine the relationship between all of the measures (i.e., multi-dimensional prayer forms, the five-factor model of personality and EEA trait resilience). The effect size for the correlations was measured as $r= .10$ representing a small effect, $r= .24$ representing a medium effect and $r= .37$ representing a large effect (McGrath & Meyer, 2006). Then, hierarchical multiple regression analysis was used to determine whether a type of prayer predicts trait resilience after demographics (age, gender, marital status, education and ethnicity) and personality

factors are controlled for. For this, Cohen's convention is used in terms of whether the variance is accounted for, whereby it can be denoted if the variable is small ($f^2= .02$), medium ($f^2= .15$) or large ($f^2= .35$) (Cohen, 1988). As previous findings have revealed contradictory results towards the relationship between prayer types and personality traits (Saroglou, 2002), statistical analysis was here performed separately for each prayer type. Furthermore, in order to be able to achieve a high level of power and to reduce the risk of making a Type II error, the estimation of the sample size was performed using the statistical software package G*Power 3.1 (Buchner, Erdfelder & Faul, 1997), with a power value of .80, an alpha level of .05 and a medium effect size based on the recommendations of Cohen (1988, 1992). Through this analysis, the minimum sample size was found as 159 for this study, as seems adequate in terms of the statistical procedures undergone in an effort to answer the research questions held.

7.5. Results

7.5.1. Descriptive statistics

Table 19

Cronbach's alpha score, means, and standard deviations of the variables by gender.

Variables	α	Female (n= 60) Mean (SD)	Male (n= 113) Mean (SD)	t	p
Prayer Types					
Obligatory prayer	.95	14.88 (7.11)	13.93 (8.06)	.77	.44
Voluntarily prayer	.96	26.05 (14.99)	22.88 (15.29)	1.31	.19
Supplication prayer	.95	12.7 (8.11)	10.88 (8.09)	1.40	.16
Invocation prayer	.92	6.9 (3.94)	6.13 (4.25)	1.16	.25
Five-factor Personality					
Extraversion	.40	7.35 (2.34)	6.82 (2.12)	1.50	.14
Agreeableness	.19	7.68 (2.43)	7.65 (2.29)	.10	.92
Conscientiousness	.44	6.57 (2.5)	6.66 (2.1)	-.27	.79
Neuroticism	.43	8.48 (2.63)	8.19 (2.51)	.71	.48
Openness	.14	7.62 (2.42)	7.91 (2.37)	-.77	.44

Trait Resilience (EEA)					
Ecological	.50	6.58 (2.25)	6.44 (1.9)	.44	.66
Engineering	.80	9.63 (1.96)	9.23 (2.18)	1.20	.23
Adaptive	.78	7.83 (2.53)	7.74 (2.42)	.23	.82

Note. p< .05

With respect to the personality measurement, as presented in Table 19, the TIPI scales have shown the lowest reliability when the Cronbach's alpha was employed due to the small number of items on each scales (Gosling *et al.,* 2003). For the resilience trait, the ecological and adaptive traits reached satisfactory levels of internal consistency reliability (*α*= .80 and *α*= .78 respectively), except for the engineering trait in which the Cronbach's alpha was .50. Consequently, it is considered to have relatively low reliability (Kline, 2011).

In to identify the significance (if any) as to the differences for all of the set variables (the four different prayer types, personality factors and EEA resilience variables) by gender, an independent sample *t*-test was conducted. Table 19 also illustrates that no significant difference can be identified between the two genders (male and female). In regards to the different types of prayer comparison, females scored higher than males, but the differences were not statistically significant. Likewise, no gender differences were found for any indices of the FFM personality and EEA trait resilience.

7.5.2. Bivariate Correlation Analysis

Pearson product moment correlation analysis was computed for the collected data in order to present the scores of the different prayer types (obligatory, voluntarily, supplication, and invocation), personality inventory (TIPI) and the resilience traits (EEA), as is shown in Table 20.

It can be seen that a number of significant correlations are identifiable between all of the variables. Table 20 indicates that the Obligatory prayer, as Muslims are obligated to perform five times a day and on every Friday, is statistically and significantly correlated with Extraversion and Openness as domains of personality inventory, and furthermore, Ecological resilience as a domain of the trait resilience (EEA), (*r*= .27, *p*= .00; *r*= .16, *p*= .04; and *r*= .30, *p*= .00 respectively). In terms of effect size, these correlations are of a medium effect size, except for the correlations between obligatory prayer and openness –

as has a small effect size. Voluntarily prayers were found to witness a significant correlation with Extraversion ($r= .27$, $p= .00$) and with Ecological resilience ($r= .23$, $p= .00$), as suggests that these correlations reveal a medium and small effect size, respectively. Likewise, the Supplication prayer is found to be significantly associated with Extraversion ($r= .22$, $p= .01$) and with Ecological resilience ($r= .21$, $p = .01$) and these correlations are of small effect size. Finally, the Invocation prayer is found to be significantly correlated with Ecological resilience ($r= .25$, $p= .00$) which is of medium effect size, yet it failed to demonstrate a correlation with any of the personality factors. Agreeableness, Conscientiousness and Neuroticism as well as Engineering resilience and Adaptive resilience were found to be unrelated to the prayer types. In this case, higher levels of Extraversion predicted higher levels of obligatory, voluntary and supplication forms of prayer – as was expected. Furthermore, higher levels of Ecological resilience predicted higher levels of all prayer types.

Table 20

Correlations between all of the variables (prayer types, the five-factor personality models, and EEA resilience traits).

	Mean	*SD*	5	6	7	8	9	10	11	12
1. Obligatory prayer	14.26	7.74	.27**	.11	-.10	.14	.16*	.04	.30**	.09
2. Voluntarily p.	23.98	15.22	.27**	.12	-.06	.05	.12	.04	.23**	.14
3. Supplication p.	11.51	8.12	.22**	.06	-.10	.06	.14	.07	.21**	.11
4. Invocation p.	6.40	4.15	.15	.05	-.06	.13	.06	-.04	.25**	.10
5. Extraversion	7.01	2.21	_	.33**	.27**	.38**	.34**	.18*	.18*	.29**
6. Agreeableness	7.66	2.33		_	.05	.44**	.43**	.22**	.30**	.20**
7.Conscientiousness	6.63	2.24			_	.13	.16*	.09	.10	.34**
8. Neuroticism	8.29	2.54				_	.46**	.02	.24**	.08
9. Openness	7.81	2.39					_	.12	.14	.17*
10. Engineering	6.49	2.02						_	.27**	.15
11. Ecological	9.37	2.11							_	.45**
12. Adaptive	7.77	2.45								_

Note. N= 173; p.= prayer

** $p< .01$; * $p< .05$

7.5.3. Hierarchical Regression Analysis

Although the correlational analysis in Table 20 revealed a number of significant relationships between different types of prayer, personality, and resilience scales among the entire sample, the mechanisms of these associations have not been clearly explained in terms of their unique contribution to the shared variance. Therefore, the next step of analysis aimed to conduct hierarchical regression analysis in order to determine differencial effects between the variables of interest. Four hierarchical multiple regression analyses were used to identify whether resilience factors predicted a prayer type after controlling for demographics and personality factors. Table 21 demonstrated each prayer type as an outcome. In the first step, demographic variables were entered into the model. In the second step, the five-factor model of personality measures was added into the model. In the final step, trait resilience was entered into the model.

In Model 1, the total variance of the linear combination of ratings for the demographics accounted for in relation to obligatory prayer was small (3.5%) and not statistically significant $F(5, 167)= 2.24$, $r= .25$, $r^2= .06$, $p> .05$. Here, the regression of ethnicity accounted for the unique variance in predicting the obligatory prayer type ($\beta= .17$, $p= .03$). In Model 2, the total variance of the linear combination of ratings for the demographics and personality measures was able to account for 10.4% of the variance in the obligatory prayer type, $F[10, 162]= 3.00$, $r= .40$, $r^2= .16$, $p< .00$. When controlling for the effect of the demographic variables, the linear combination of two traits which contributed significantly to this variance were ethnicity ($\beta= .16$, $p= .00$), Extraversion ($\beta= .27$, $p= .00$) and Conscientiousness ($\beta= -.19$, $p= .02$). In contrast, other trait measures did not make a significant contribution in the prediction of obligatory prayer. In Model 3, the total variance in demographics, personality and resilience traits were able to account for 17.7% of the variance in obligatory prayer, $F(13, 159)= 3.85$, $r= .49$, $r^2= .24$, $p< .00$. When controlling for the effect of personality variables, the linear combination of four factors which contributed significantly to this variance were ethnicity ($\beta= .17$, $p= .02$), Extraversion ($\beta= .28$, $p= .00$), Conscientiousness ($\beta= -.18$, $p= .02$), and Ecological trait resilience ($\beta= .34$, $p= .00$). Hence, the findings suggest that two of the big five personality traits (Extraversion and Conscientiousness) and Ecological trait resilience are significant in predicting the obligatory prayer type. Additionally, the findings indicate that ethnicity explained a significant amount of the variance in the obligatory prayer scores.

In regards to the regression undertaken as to the voluntary prayer type, the total

variance of the linear combination of ratings for the demographics was able to account for 3.9% of the portion in Model 1 $F(5, 167)= 2.38$, $r= .26$, $r^2= .07$, $p< .05$. Here, the regression of marital status accounted for the unique variance in predicting the voluntary prayer type ($\beta= .18$, $p= .02$). In Model 2, the total variance of the linear combination of ratings for the demographics and personality measures was able to account for 8.7% of the variance in the voluntary prayer type, $F(10, 162)= 2.63$, $r= .37$, $r^2= .14$, $p< .00$. The linear combination of a trait which uniquely contributed to this variance was found to be Extraversion ($\beta= .27$, $p= .00$). In contrast, other trait measures did not make a significant contribution in the prediction of the voluntary prayer type. In Model 3, the total variance in the demographics, personality and resilience traits was able to account for 11.5% of the variance in the voluntary prayer type, $F(13, 159)= 2.72$, $r= .43$, $r^2= .18$, $p< .00$. The linear combinations of three factors that contributed significantly to this variance were found to be ethnicity ($\beta= .15$, $p= .04$), Extraversion ($\beta= .27$, $p= .00$) and Ecological trait resilience ($\beta= .21$, $p= .02$). The findings suggest that one of the big five personality traits (Extraversion) and Ecological trait resilience are significant in predicting the voluntary prayer type.

With respect to the regression undertaken as to the supplication prayer type, the total variance of the linear combination of ratings for the demographics accounted for in the obligatory prayer type was quite small (1.8%) and not statistically significant in Model 1 $F(5, 167)= 1.65$, $r= .22$, $r^2= .05$, $p> .05$. However, none of the demographic variables accounted for the unique variance in predicting the supplication prayer type. In Model 2, the total variance of the linear combination of ratings for the demographics and personality measures was able to account for 6.1% of the variance in the supplication prayer type, $F(10, 162)= 2.11$, $r= .34$, $r^2= .12$, $p< .00$. The linear combinations of three traits that contributed significantly to this variance were Extraversion ($\beta= .22$, $p= .01$) and Conscientiousness ($\beta= -.18$, $p= .02$). In contrast, other trait measures did not make a significant contribution to the prediction of the supplication prayer type. In Model 3, the total variance in the demographics, personality and resilience traits were able to account for 8.1% of the variance in the supplication prayer type, $F(13, 159)= 2.17$, $r= .39$, $r^2= .15$, $p< .00$. The linear combinations of three factors that contributed significantly to this variance were found to be Extraversion ($\beta= .22$, $p= .02$), Conscientiousness ($\beta= -.19$, $p= .02$) and Ecological trait resilience ($\beta= .20$, $p= .03$). Here, the findings suggest that two of the big five personality traits and Ecological trait resilience are significant in predicting

the supplication prayer type.

As a result of the regression undertaken as to the invocation prayer type, the total variance of the linear combination of ratings for the demographics was able to account for 1.1% of the portion in Model 1 $F(5, 167)= 1.38$, $r= .20$, $r^2= .04$, $p> .05$. Here, none of the demographic variables accounted for the unique variance in predicting the invocation prayer type. In Model 2, the total variance of the linear combination of ratings for the demographics and personality measures was able to account for 1.8% of the variance in the invocation prayer type, $F(10, 162)= 1.31$, $r= .27$, $r^2= .08$, $p> .00$. The linear combination of personality traits did not make a significant contribution in the prediction of the invocation prayer type. In Model 3, the total variance in the demographics, personality and resilience traits was able to account for 6.9% of the variance in the invocation prayer type, $F(13, 159)= 1.98$, $r= .37$, $r^2= .14$, $p< .00$. The linear combination of all factors that contributed significantly to this variance only pertained to Ecological trait resilience ($\beta= .27$, $p= .00$). Hence, the findings suggest that only Ecological trait resilience is significant in predicting the invocation prayer type.

Table 21

Hierarchical multiple regression analysis for different prayer types and resilience traits, after demographics and five-factor personality traits controlled for.

	Obligatory (fard) prayer				Voluntarily (sunnah) prayer			
	B	β	t	Sig.	B	β	t	Sig.
Step 1								
Age	-.02	-.01	-.19	.85	.17	.07	.95	.35
Gender	-.25	-.02	-.20	.84	-2.09	-.07	-.86	.39
Marital Status	1.81	.15	1.97	.05	4.13	.18	2.29	**.02**
Education	.82	.10	1.30	.19	1.38	.09	1.12	.26
Ethnicity	.79	.17	2.25	**.03**	1.33	.15	1.93	.06
Step 2								
Age	-.02	-.02	-.25	.80	.13	.06	.72	.47
Gender	.11	.01	.09	.93	-1.51	-.05	-.62	.53
Marital Status	1.10	.09	1.21	.23	2.75	.12	1.52	.13
Education	.96	.12	1.58	.12	1.36	.08	1.12	.26
Ethnicity	.72	.16	2.13	**.03**	1.24	.14	1.85	.07
Extraversion	.93	.27	3.13	**.00**	1.86	.27	3.15	**.00**
Agreeableness	-.12	-.04	-.42	.68	.20	.03	.35	.73
Conscientiousness	-.64	-.19	-2.44	**.02**	-.88	-.13	-1.70	.09
Neuroticism	.15	.05	.54	.59	-.48	-.08	-.90	.37

	B	β	t	Sig.	B	β	t	Sig.
Openness	.24	.07	.82	.41	.39	.06	.67	.50
Step 3								
Age	-.05	-.04	-.53	.60	.11	.05	.63	.53
Gender	.53	.03	.45	.66	-1.01	-.03	-.42	.67
Marital Status	.75	.06	.86	.39	2.35	.10	1.31	.19
Education	1.09	.13	1.84	.07	1.46	.09	1.21	.23
Ethnicity	.80	.17	2.45	**.02**	1.37	.15	2.05	**.04**
Extraversion	.98	.28	3.36	**.00**	1.85	.27	3.09	**.00**
Agreeableness	-.32	-.10	-1.14	.26	-.10	-.02	-.17	.86
Conscientiousness	-.64	-.18	-2.42	**.02**	-1.00	-.15	-1.87	.06
Neuroticism	-.03	-.01	-.13	.90	-.68	-.11	-1.25	.21
Openness	.30	.09	1.07	.29	.46	.07	.80	.42
Engineering	-.17	-.05	-.61	.54	-.35	-.05	-.60	.55
Ecological	1.25	.34	4.05	**.00**	1.54	.21	2.45	**.02**
Adaptive	-.23	-.07	-.84	.40	.13	.02	.24	.81

	Supplication (du'a)				Invocation (dhikr)			
	B	β	t	Sig.	B	β	t	Sig.
Step 1								
Age	.05	.04	.53	.59	.03	.05	.64	.52
Gender	-1.55	-.09	-1.17	.24	-.57	-.07	-.84	.40
Marital Status	1.85	.15	1.90	.06	.57	.09	1.15	.25
Education	.92	.11	1.39	.17	.38	.09	1.11	.27
Ethnicity	-.03	-.01	-.07	.95	.33	.13	1.75	.08
Step 2								
Age	.06	.05	.60	.55	.03	.05	.64	.53
Gender	-1.37	-.08	-1.05	.30	-.42	-.05	-.61	.54
Marital Status	1.17	.09	1.19	.23	.42	.07	.81	.42
Education	1.01	.12	1.54	.12	.47	.11	1.37	.17
Ethnicity	-.07	-.01	-.19	.85	.31	.12	1.62	.11
Extraversion	.81	.22	2.54	**.01**	.24	.13	1.44	.15
Agreeableness	-.21	-.06	-.69	.49	-.11	-.06	-.69	.49
Conscientiousness	-.64	-.18	-2.28	**.02**	-.21	-.11	-1.42	.16
Neuroticism	-.08	-.02	-.26	.79	.19	.12	1.24	.22
Openness	.42	.12	1.35	.18	.02	.01	.12	.90
Step 3								
Age	.05	.04	.51	.61	.02	.04	.48	.63
Gender	-1.10	-.06	-.85	.40	-.25	-.03	-.38	.71
Marital Status	.95	.08	.97	.33	.29	.05	.57	.57
Education	1.06	.12	1.62	.11	.51	.12	1.53	.13
Ethnicity	.01	.00	.03	.98	.34	.14	1.80	.07
Extraversion	.80	.22	2.47	**.01**	.25	.13	1.51	.13
Agreeableness	-.38	-.11	-1.20	.23	-.20	-.11	-1.20	.23

Conscientiousness	-.69	-.19	-2.38	**.02**	-.23	-.13	-1.56	.12
Neuroticism	-.17	-.05	-.57	.57	.11	.07	.72	.47
Openness	.46	.13	1.47	.14	.05	.03	.29	.78
Engineering	-.05	-.01	-.16	.88	-.18	-.09	-1.11	.27
Ecological	.77	.20	2.27	**.02**	.53	.27	3.04	**.00**
Adaptive	.03	.01	.09	.93	.01	.00	.03	.97

Note. p< .05

7.6. Discussion

In considering the characteristics of individuals, the present study set out an important way through which an understanding could be gained as to the unstudied relationships that exist between different types of Islamic prayer (obligatory (fard), voluntarily (sunnah), supplication (du'a) and invocation (dhikr) prayers) against the Five-Factor Model of personality and the measure of the EEA resilience trait. In confirming Hypothesis 1, no significant difference was identified in the *t*-test comparison analysis between all of the study variables. Additionally, the demographic variables showed no significant effect upon any of the prayer types. The only exception to this is that a small significant difference in marital status was found in relation to the voluntary prayer type when hierarchical regression analysis was performed. In the correlational analysis of the FFM and prayer types, the results provide support for some of our hypotheses (Hypothesis 2), whereupon a significant relationship can be identified between certain prayers (obligatory prayer, voluntary prayer and supplication prayer) and the Extraversion trait and Openness as domains of the FFM of personality traits. Moreover, when applying personality traits to a prayer type at the multivariate level, the findings demonstrated that Extraversion and Conscientiousness were the best predictors of obligatory and supplication prayer types over the other variables. However, Conscientiousness showed a negative relation with the two prayer types in the present study. Although it has been indicated that Agreeableness and Conscientiousness have a steady positive association with the indices of religious involvement and intrinsic religiosity in the available literature, Conscientiousness has also been found to have the opposite association with Quest religiosity (Henningsgaard & Arnau, 2008). This does not provide support for our findings. Thus, Hypothesis 3, in terms of Conscientiousness, has been rejected. As such, the present findings suggest that the expressions of obligatory and supplication forms of prayer do not fit well into the characterisation of those individuals who are responsible, task-focused and orderly. One possibility that seems to explain these findings is that

individuals who are less task-focused or less self-disciplined may be less motivated to practice obligatory and/or supplication prayer types because they might be easily influenced by other social factors – such as ethnic differences (Henningsgaard & Arnau, 2008; McCullough, Tsang & Brion, 2003). Also, one of the big five personality traits (Extraversion) and Ecological trait resilience are significant in predicting the voluntary prayer type. For the invocation prayer type, the Beta weights demonstrated that the relationship with a prayer type was largely because a positive relationship arises with the Ecological trait. When taken together the voluntary and invocation prayers, the findings suggest that when prayers are practiced in ways that the focus is on worshiping God to earn His love (voluntary), and that a connection with God with full attention being given to being in His presence, individuals are characterised by the ability to be assertive and outgoing in social interactions with others and also by the capacity to deal with difficulties and challenges throughout their life via their ability to maintain stability following disturbances.

In contradiction to the general expectations, our results did provide partial support for the previous findings (Saroglou, 2002) within which a number of consistent patterns were observed between different dimensions of religiosity and the FFM traits. In the previous research, for example, high-degree associations were identified with Conscientiousness and, sometimes, with low links in relation to Neuroticism. Although our study generates little conflicting evidence regarding Conscientiousness, some important associations have arisen between Extraversion, obligatory and supplication prayer types which need to be taken into consideration. As a last finding as to personality traits, a weak significant association was obtained between Openness and obligatory prayer, whereby a similar result and significant pattern was observed for spirituality and Openness in the meta-analysis study conducted by Saroglou (2002). This finding suggests that the expressions of obligatory and supplication forms of prayer fit well into the characterisation of those individuals who are socially-adapted, action-oriented and assertive when having the opportunity to engage with others. Perhaps the expression of obligatory prayers may also reflect the possession of a greater openness to a variety of experiences and of being appreciative as to the significance of intellectual curiosity by seeking out novel experiences. The result also suggest that the reflections of voluntarily prayer fit well into the character trait that is of being interested in social interactions. From this perspective, those who define themselves as more friendly, socially-adapted and as

having a high degree of awareness of feelings believe, when encountering stressors or difficulties that they cannot endure or solve, that God can guide them towards dealing with the situation in a more effective way.

From the multivariate analysis produced as to the resilience traits with prayer types, another noteworthy finding is that a significant association was found only between Ecological trait resilience and all prayer types, with this confirming Hypothesis 5 while rejecting Hypothesis 4 and 6. From this perspective, it can be suggested that prayers might be related to underpinning personal qualities when attempting to reduce the influence of negative events. This gives those who believe in God's purposes and guidance increased resilience and endurance when facing such problems.

Therefore, despite the fact that Extraversion has complex relations with the indices of religiosity (Saroglou, 2002; Francis, 1992), Extraversion trait as personality factor and Ecological trait as resilience factor have been found to be significantly and positively related with certain types of prayer. Due to this, these scales may be considered to be contributing to the question of whether such aspects are valuable in measuring prayer as well as other indices of religiosity (e.g., religious orientation, spirituality and religious fundamentalism).

Like any study, this study has some limitations that need to be addressed for future research. The first limitation concerns the fact that the Agreeableness and Neuroticism scales demonstrated no performance with any of the prayer measures, with this being inconsistent across previous research. Due to the short version of the personality scale used in the present study, its lack of representativeness of human nature produces less reliability and therefore correlates weakly with other variables (Gosling *et al.,* 2003). The second limitation pertains to our sample being diverse in terms of demographic background – a result of the sample of Muslims living in the US being gained via the Amazon-Mechanical Turk system. Thus, in order to generalise these findings, this study has the potential to extend the understanding possessed as to the relationships between different prayer types against the measure of resilience and personality traits among other populations, individuals who report themselves as belonging to different communities.

Despite these limitations, the findings of the current study manifest as an important contribution to the understandings held as to the associations between different prayer performances, personality traits and resilience traits. This is important for health

practitioners when assisting individuals in determining who may benefit from which prayers and how.

Chapter Eight

Discussion of Findings

8. Introduction

In recent decades, researchers have shown evidence of a connection between religious behaviour and psychological functioning. Through this identification, health providers can give attention to the extent to which religious practices alter the negative thoughts and behaviours of individuals who face daily life concerns and difficulties, potentially in an attempt to promote better well-being. Notably, multiple forms of prayer have been proven to be beneficial in facing everyday stress (Poloma & Pendleton, 1991; Loewental & Cinnirella, 1999). Furthermore, different prayer forms have been considered as an effective key in mental health services and in therapeutic practice (Poloma & Pendleton, 1991; James & Wells, 2003).

From this, the current thesis has comprised four studies – as have been designed **(1)** to investigate the relationship between different prayer types and well-being in terms of mental health and to explore whether prayer forms have beneficial effects upon the psychophysiological responses of individuals and **(2)** to examine the relationship between different prayer forms, personality traits (TIPI) and trait resilience (EEA) in terms of mental health. The first research question pertains to one empirical correlational study and two experimental studies in which religious behaviours (particularly different prayer forms) and their relations with well-being and with physiological response (or emotional reactivity) have been respectively examined. The second research question pertains to one correlational study in which prayer types and their associations with personality traits and trait resilience have been explored.

In this regard, the purpose of the present discussion chapter is to review the findings gained from the data collected via surveys and physiological responses, to interpret their scientific implications in terms of the understanding held as to the roles of religious behaviour on the lifespans of individuals in the face of daily life concerns and to provide a number of suggestions for future research and practice. Here, Section 8.1 provides a summary of the gained findings of each study and subsequently provides the contributions of each study towards the understanding held in relation to the mental health and psychophysiological states encountered among a specific religious community. To

do so, Section 8.1.1 summarises the findings of three studies in regards to whether prayer types and well-being are related within the application of the cognitive-behavioural framework (and if they are, how) and the effect of prayers on physiological responses (such as the Skin Conductance Response -SCR), blood pressure (BP) and heart rate (HR) via laboratory-based research. This section also discusses the implications of those three studies. Section 8.1.2 provides the gained findings from Study 4 and their implications in understanding the individual differences encountered when performing prayers and to what extent these relate to the personality and resilience variables. Section 8.2 details the research limitations or challenges that have been inferred from the results and draws attention to a number of possible directions for further research in this field of inquiry. Lastly, Section 8.3 summarises the conclusions of the thesis.

8.1. Summaries of the Findings and Their Implications

This thesis has aimed to explore the relationship between prayer types as a key component of religious behaviour and mental and psychophysiological health among Muslim individual samples, achieved by examining the well-being and physiological responses demonstrated as deriving from prayer activities as well as personality and resilience traits. The data reported in Chapter 3, 4, 5, and 7 is here presented and discussed in terms of its implications under two basic components of mental health; **a)** findings as to the well-being variables, as include survey data and physiological responses data and, **b)** findings as to personality and resilience, as include the Five-Factor Model (FFM) of personality data and Trait Resilience (EEA) data.

8.1.1. Findings as to Prayer and Well-Being Associations

This section discusses the findings as pertain to the well-being aspect of mental health and its relationship with prayer (i.e., Chapter 3, 4, and 5). This has been achieved by utilising a comparative study to examine whether beneficial relationships arise between prayer types and psychological and subjective well-being. Furthermore, two experimental studies have investigated the power of prayer types on physiological responses, as measured by emotional reactivity (SCR; Skin Conductance Response) and vital signs (BP; Blood Pressure, and HR: Heart Rate).

In light of this, Study One (Chapter 3) investigated the associations between different prayer types and psychological and subjective well-being in terms of mental health within the application of a cognitive-behavioural framework, with this having been

suggested by James and Wells (2003). The types of prayer utilised in this study were obligatory, necessary, voluntary, supererogatory, supplication and invocation (in the Islamic sense, these are considered to be fard, wajib, sunnah, nawafil, du'a and dhikr, respectively). All of the research participants in this study were Muslim and were familiar with all of the prayer types explored. The results have demonstrated that females scored significantly higher than males in regards to the obligatory, supplication and invocation prayer types as well as in relation to self-acceptance, life satisfaction and negative affect (as are held as domains of psychological and subjective well-being). With regards to the correlational analyses undertaken between six types of prayer (obligatory, necessary, voluntarily, supererogatory, supplication and invocation models) and the well-being variables, the findings have suggested that the obligatory form of prayer is positively associated with the environmental mastery component of psychological well-being and positive affect component of subjective well-being. Here, there is also a negative association with the negative affect domain of subjective well-being. The voluntary prayer type is positively correlated only with environmental mastery as a domain of psychological well-being. The supplication prayer type is positively associated with three domains of psychological well-being (personal growth, positive relations with others and purpose in life). Lastly, the invocation prayer type is positively correlated with the self-acceptance domain of psychological well-being and the satisfaction of life and positive affect domains of subjective well-being. On the other hand, two models of prayer (necessary and supererogatory) have failed to show any correlation with the well-being components. In terms of regression analyses, the supplication and supererogatory forms of prayer have demonstrated scores which account for the unique variance in the psychological well-being variable while the invocation prayer model score accounts for the unique variance in the subjective well-being variable.

Study Two (Chapter 4) has examined the potential effects of prayer within emotional and physiological reactivity as measured by Skin Conductance Response (SCR), blood pressure and heart rate. In this study, 46 participants (23 for the prayer group and 23 for the control group) completed three tasks; 1) a preliminary questionnaire that includes the items assessing the frequency, intensity and importance of participating in the prayer commitments (in the Islamic context) and the items of the well-being variables, 2) the recording of emotional reactivity as measured by SCR via the use of prayer readings as verbal stimuli, and 3) the recording of pre-post vital signs variability before and after

the experiment sessions as measured by blood pressure and heart rate. A number of supplications, short Quranic chapters and dhikr (chanting God) were read by the participants in the prayer group whilst a number of non-prayer texts (written also in Arabic but not religion-related) were read by the other group to act as a control in determining to what extent prayer affects the responses of the participants. The results of the objective measure demonstrated that an increased arousal in SCR was obtained from the prayer reading activities, yet this was not statistically significant. In contrast, no increased arousal was observed in the control group as a consequence of their non-prayer reading activities. As another objective measure, a significant difference was gained in regards to heart rate before and after the reading activities when the experimental and control group were compared. However, no statistical differences were found between the prayer and non-prayer activities in their effectiveness in decreasing blood pressure. Correlational analysis between the subjective and objective measures has suggested that the results as to emotional reactivity have shown no correlation with the well-being variables. However, the vital signs were found to have significant associations with psychological well-being domains (such as systolic blood pressure being positively correlated with personal growth, diastolic blood pressure being negatively associated with purpose in life and heart rate being negatively related with self-acceptance). The results of the preliminary survey on prayer performance suggest that the intensity of prayer was found to significantly differ when the two groups were compared.

Study Three (Chapter 5) has sought to replicate and extend the findings of Study Two through the objective measures (SCR and vital signs – blood pressure, heart rate) in relation to three distinct categories; the reading of prayers, the listening to prayers and the rest condition. The recitation and listening to chapters from the Holy Quran was chosen for the reading and listening prayer tasks. Of the participants, 70 of them completed a series of tasks; 1) the completing of preliminary self-reported assessments that measured the status of prayer performance in terms of its frequency, intensity and importance as well as demographics and various physiological assessments; 2) the encountering of emotional reactivity as measured via SCR during the reading of Quranic chapters in addition to the rest condition; 3) the encountering of emotional reactivity as measured via SCR during the listening to Quranic chapters; 4) the measuring of vital signs variability in terms of blood pressure and heart rate before and after the reading and listening tasks. The results have revealed that the emotional changes witnessed as derived from the prayer

reading and listening activities were of a greater extent than when compared to the resting baseline SCL condition. A comparison of the increased changes pattern was found to be significantly different when the prayer group and control group were compared. In addition, with regards to the vital signs variability, systolic blood pressure was found to be altered to a more significant extent after the prayer activities than after the non-prayer activities undertaken by the control group. Furthermore, the results of the correlational analysis between the subjective self-rated measures suggested that higher scores being recorded as to prayer frequency, intensity and importance are associated with lower levels of perceived stress. However, other physiological self-reported measurements (such as anxiety, depression and physical health) failed to show any significant associations in this regard. Moreover, the SCR changes derived from the reading of prayers was significantly correlated only with heart rate.

8.1.1.1. Implications of Study One

Here, the discussions and implications made in relation to the findings of the present correlational study are given. In this study, the relationships between certain types of prayer and the well-being aspect of mental health were explored within the two mechanism of a cognitive-behavioural framework as suggested by James and Wells (2003). As described in Study One (Chapter 3), a large number of significant correlations provide evidence that some dimensions of religiosity, particularly the prayer types explored in this thesis, represent important components of psychological and subjective well-being. The findings of this study seem to contribute to a theoretical understanding held as to whether (and to what extent) religiosity promotes well-being. It is worth noting that the results of the present study have theoretical and empirical implications for mental health professionals and practitioners.

First, the cognitive aspect of James and Wells' model (2003) refers to a generic mental model in which religiosity contributes to appraisals by influencing the responses of individuals in times of daily life difficulties being faced. This hypothesis is derived from the findings of Peterson and Roy (1985) and McGuire (1981), as proposed that religiosity provides an interpretative framework whereby individuals can find meaning in life events, can make sense of the purpose of life events and can understand their existence in the world. Within this model, it was theorised that people whose religious orientation is intrinsic religiosity are more likely to report better mental health and whose religious orientation takes the form of extrinsic religiosity are more likely to encounter poor mental

health (James & Wells, 2003; Maltby *et al.,* 2010). As is consistent with this first mechanism of reasoning, the supplication prayer type in the present study was found to provide support for the cognitive mechanism by acting as a predictor of better psychological well-being. This leads to the implication that the supplication prayer type (as acts as a way of communicating with God and of asking for guidance in relation to life events) helps to view religion as giving meaning and purpose by providing an interpretation towards it allowing adherents to understanding the world that they live in and the problems that they encounter in that world. Thus, one can assume that this type of prayer is an important source of finding meaning and purpose, as enhances the mental health and well-being of individuals.

Second, the behavioural aspect of James and Wells' model points to the self-regulation of the thinking process reducing the self-focused intention towards internal events (such as stress, worry and rumination processes) alongside enhancing well-being and mental control. Within this model, it is hypothesised that religious behaviours contribute to self-regulatory processes by reducing self-focused attention, worry and stress, and this therefore alters the well-being of individuals. This hypothesis is based on the findings of Poloma and Gallup (1991) and Poloma and Pendleton (1991), as suggests that meditative prayer is associated with better well-being. It is suggested that people whose prayer takes the form of meditation are more likely to encounter good mental health (James & Wells, 2003; Maltby *et al*., 2008). As is consistent with this second mechanism, the invocation prayer type explored in the present study has been found to predict better subjective well-being. However, this might be at the chance level as the regression model was not statistically significant. This result implies that the act of remembering God by undertaking quiet reflection might be more likely to affect self-regulatory processes but not beyond the chance level. This is likely to be evidence that the supplication prayer type is a better predictor of meaning and purpose being provided than is found among other prayer types, while the invocation is better predictors of self-regulation of the thinking process. In terms of the present findings, it was not a surprise to obtain findings that the supplication and invocation prayer types contribute to the well-being of individuals alongside the fact that those prayer forms highly recommended and practiced within the Islamic tradition are beneficial for believers.

On the other hand, the most surprising finding obtained in this study is that the supererogatory prayer type also seems to predict psychological well-being over other

prayer models, despite this prayer type not showing any correlations with the well-being components. However, its relation with psychological well-being was found in an opposite direction. This finding could be considered to be one of the most significant contributions of this present study as this form of prayer seems to be practiced more frequently at a personal need level due to it being beyond the required duties. It seems that performing prayers in a way in which the focus is predominantly on the self rather than on God (supererogatory) fails to boost psychological well-being.

In addition to the theoretical implications, the results of the present study reveal that religious elements, particularly prayer types, also invoke significant empirical implications for mental health practitioners and professionals. The proposed cognitive and behavioural hypotheses seem to link the well-being aspects of mental health to certain types of prayer. Maltby *et al*. (2008) has examined the links between prayer and subjective well-being within the same theoretical contexts as proposed by James and Wells (2003). In the study of Maltby *et al*. (2008), it was shown that ritual prayer, meditative prayer, prayer experience and praying with others are significantly correlated with subjective well-being, yet only prayer frequency, prayer experience and the meditative prayer scores accounted for the unique variance in better subjective well-being. In our study, obligatory prayer, voluntary prayer, supplication prayer and invocation prayer (over other prayer variables) were significantly associated with certain components of psychological and subjective well-being. However, at multivariate level, the supplication prayer type positively affected the psychological well-being aspect of mental health, the supererogatory prayer type negatively affected the psychological well-being dimension of mental health while the invocation prayer type positively affected the subjective well-being aspect of mental health. Therefore, it is reasonable to think that the potential associations of religiosity and mental health depend on which prayer models and well-being dimensions are considered (Peterson & Roy, 1985).

Another important implication is that the majority of previous research as to the religiosity variables has revealed that the positive relationships of religiosity on mental health are frequently designed to utilise single-item religiosity measures. Notably, this would limit the effectiveness of religiosity on well-being. In this study, when multiple measures of religiosity (such as different prayer types) have been employed, it was observed that the links between religiosity and well-being varied.

Ultimately, based on the proposed theoretical framework above, it is recommended that engagement in those prayer models seems to work as a therapeutic function in mental health for individuals who encounter difficulties in life. However, it is important to incorporate prayer types into therapy, yet the religious background of an individual's identity should be sensitively acknowledged. The importance of the applicability of belief structures within certain community settings should thus be taken into account.

8.1.1.2. Implications of Study Two

This section reviews the importance of the findings of Study Two, and subsequently discusses its implications.

In the available literature, religiosity has long been provided health benefits in promoting mental health states by altering the individuals' responses to life stress (Hackney & Sanders, 2003). Evidence on this demonstrate that religious practice and behaviours are often considered as a way out of negative thoughts and behaviours through directed conversation with God (Dixon & Wilcox, 2016). Therefore, among various religious behaviours, prayer is believed as the most popular and common religious practices that would help live through the stressful life events and alleviate stress. On the basis of literature, the debate on the effect of prayer on emotional responses were made in two ways: 1) meditative approach that focuses on decreasing arousal by inducing internal states such as self-awareness, or self-attention, and leads to decreasing physiological stress and calming, and 2) the engagement approach which points to religious behaviours whereby the one connects with God, and this connectedness potentially leads to the increased level of arousals and promotes relaxation. Connected to this, in this thesis, two-laboratory research have been ruled out to investigate the potential effects of prayers on the individuals' emotional and physiological reactivity in the skin conductance, blood pressure, and heart rate when compared to non-prayer (control) group.

A number of short chapters from the Holy Quran and a number of dhikr (glorifying God such as through suphanAllah, alhamdulillah and allahuakbar) were chosen as the prayer stimuli in Study Two. The gained results indicated that SCR change increased in the prayer group when compared to the control group, despite these increased changes not being statistically meaningful, with this being partially consistent with

previous research. For instance, the benefits of prayer performance have previously been reported as invoking increased skin conductance due to the effect of certain prayer activity – such as taubah (repentance) and listening to the Quran (Salam *et al.*, 2013) – while significant improvement in SCR are derived from prayers like taubah and dhikr (Abdul Wahab & Salam, 2013). In our study, as most of the prayer conditions increased arousal but did not significantly differ from each other when compared to the non-prayer conditions in the control group, it seems that it is not possible to prove that those greater changes in skin conductance and heart rate derived from a specific prayer-reading condition. It is therefore reasonable to imply that each prayer condition is equally valuable for individuals, regardless of the specific form or method when being used to deal with stress in real life.

In addition, it is worth saying that the degree to which changes in blood vessels and heart rate variability derive from changes in the degree of the autonomic balance is of great importance for health benefit considerations in terms of controlling the physiological reactions given to external stimuli (Stanley, 2009). In our study, besides increased arousal in skin conductance, a significant reduction in heart rate was obtained only within the prayer group. This pattern of results may imply that reading chapters from the Quran or glorifying God may help with the physiological responses given towards stress, a consequence of the benefit of prayer performance for people dealing with life difficulties.

Furthermore, we expected to find that the increased arousal in skin conductance and reduction in heart rate derived from the prayer performance would be correlated with higher well-being measures scores, yet no correlations were observed between SCR and the well-being components. It is possible that the emotional and physiological changes derived from the prayer activity can explain the unique ability of prayers to modulate the maladaptive emotion of individuals by turning this into positive behavioural changes. Thus, the findings of this experiment were conclusive in this regard, with such conclusions being valuable for professionals as they seek ways through which to improve health outcomes by helping individuals with their problems.

8.1.1.3. Implications of Study Three

This section reviews the importance of the findings of Study Three and discusses the implications of these findings.

A series of prayer conditions have been utilised as both verbal and sound stimuli in this experiment, with this having elicited statistically significant increased changes in skin conductance and decreased changes in vital signs (such as blood pressure and heart rate). Over other emotional physiological variables, the results of this experiment yielded statistically significant increased arousal only in skin conductance and decreased values in systolic blood pressure in response to the prayer recitation and listening activities. In addition, an expectation was held that increased arousal in skin conductance and changes in vital signs would be observed as the prayer activities would be correlated with the dependent measures of the self-reported physiological assessments (such as perceived stress, physical health, anxiety and depression). However, no links were found to arise between the objective measures and the subjective measures – as was the case with the well-being variables in our first experiment. However, the SCR results derived from reading the Quranic chapters were significantly linked with heart rate with a moderate effect size. This is in line with the idea that emotional physiological changes could be an indicator of the relaxation response, with this being a consequence of one being connected with God – as was shown in a study conducted by Abu Bakar (2014), whereby it was stated that when people are detached from life and the divine One, they develop fear, loneliness and despair. Thus, listening to the Quran creates a way through which people can reconnect with life, themselves and their sacred ones. Thus, our results imply that being reactive when reading and listening to Quranic chapters may lead individuals to feel relieved from emotional burdens due to their belief that they are connecting with God through such chapters, thereby becoming less scared and more pleasant.

These results extend the findings of our first experiment (Chapter 4), as indicated that recitation prayer activity elicits sustained effects on emotional arousal despite it not being statistically meaningful. Hence, it is worth mentioning that including additional stimuli (such as the listening prayer activity) was undertaken in an attempt to replicate the findings of the first experiment. The physiological data in the present experimental study provides statistically significant results that are notably in contrast to the first experiment and this, therefore, leads to greater accuracy. Ultimately, this supports the hypothesis that prayer has beneficial effects upon the emotional physiological responses of individuals.

Here, in response to the dhikr prayer (glorifying God through the repetition of the SuphanAllah, Alhamdulillah, AllahuAkbar mantras over other verbal stimuli) and

listening to certain chapters from the Holy Quran (like Surah al-Yaseen and Surah al-Fath over other sound stimuli) witnessed significant increased arousals being elicited when compared to the reading and listening of non-prayer statements within the control group. However, the participants experienced greater emotional arousal in response to the sound prayer activity than when engaging in the verbal prayer activity. A possible explanation for this outcome might be due to the strength of the specific prayer conditions, with the musical sounds invoking a greater reaction. As stated in research by Abu Bakar (2014), a good-tuned recitation of a Quranic chapter by a good reciter may enable participants to pay more attention while listening, with this concentration state potentially resulting in the invocation of pleasant arousal. This result also echoes earlier research which has demonstrated that repetitions of a sequence of particular words or tunes of sound may arouse implicit attentiveness that invokes positive thinking (Gao *et al.*, 2017).

With regards to the preliminary self-reported measures, the intensity of prayer experience was reported to be significant among the participants in this experiment when compared to the participants in the control group, with this having also been found in the first experiment. This may suggest that an intense prayer experience may have a positive affect towards stressful events by shifting the mind away from negative thinking. More broadly, believing that certain prayer types can improve appraisals and can enable individuals to find meaning and purpose behind life events (both in regards to the recitation and listening to the Quran as a form of being connected with God) may offer another form of religious schema with similar impacts when paying attention to all of the experiments findings together in relation to the effects of prayer.

8.1.2. Findings as to Prayer and Personality Models and Traits Resilience

In Study Four, the research aimed to examine how four prayer types (obligatory, voluntarily, supplication and invocation) related to the five-factor models (FFM) of personality as developed by Gosling *et al.* (2003) and trait resilience (EEA) as is a character-oriented construct refined by Maltby *et al.* (2015) among individual adherents to Islam. Although no significant gender differences were obtained for any indices of the FFM and EEA, females scored higher than males in relation to four different prayer models. Correlational analysis was conducted to explore the relationships between all of the variables, and the results suggested that Extraversion was positively and significantly associated with the obligatory, voluntarily and supplication prayer forms. Openness was found to have a significant relation with the obligatory prayer type. With regards to the

EEA findings, only Ecological resilience was found to be significantly and positively correlated only with all prayer forms. Yet, other traits of the personality and resilience models showed no relation with any of the prayer forms. On the other hand, multiple regression analysis suggested that Extraversion (positive) and Conscientiousness (negative) character traits were best predictors for obligatory and supplication prayer types, and Ecological traits scores, over other trait measures, is the dominant predictor of individual differences in prayer types.

8.1.2.1. Implications of Study Four

This study revealed a number of important ways that the individual differences in religious activities such as different prayer types in both personality traits and EEA traits resilience can be understood.

Firstly, our findings partially replicate the consensus of findings demonstrated in the meta-analysis of Saroglou (2002) as demonstrated a positive pattern of correlation between Extraversion, Agreeableness, Conscientiousness and Openness with different dimensions of religiosity (such as Intrinsic, Extrinsic, and Guest). The general conclusion here appears as the phenomena of a noteworthy relationship between personality traits and religiosity. From this meta-analysis, it can be seen that dimensions of religious orientations have received considerable attention with regards to their relations with personality traits across a diverse range of national samples (Saroglou, 2002). Hence, one of the most interesting aspects of our study is the providing of further evidence in the field – namely as it is shown that positive and negative relations are produced with the big-five personality factors. Here, for example, Extraversion has been shown to be a positive predictor of the obligatory and supplication prayer forms while Conscientiousness has been shown to be a negative predictor of the obligatory and supplication prayer types. This underpinning of the different facets of religiosity in terms of the general conclusion pertains to a negative link also having been found between Quest religiosity and Conscientiousness (Henningsgaard & Arnau, 2008). A possible explanation for this may be that being responsible, self-disciplined or task-focused might not be so important for individuals who perform prayers with the feeling of carrying out a duty to God on a daily basis (obligatory) or where prayer manifests in focus being given to a conversation with God in relation to their personal desires or the needs of themselves or others (supplication). On the other hand, interest in social interaction being held with others and excitement-seeking might be important for individuals who perform prayers

with the feeling of carrying out a duty to God on a daily basis (obligatory) or where prayer manifests in focus being given to a conversation with God in relation to their personal desires or the needs of themselves or others (supplication). Therefore, this conflict association can be explained in relation to the purpose of the prayer types, as point to religious activities possessing a sense of self-organising, a sense of duty, an awareness of responsibilities towards themselves or God.

On the other hand, what was surprising is that our findings did not replicate previous results as have linked Agreeableness and Neuroticism to religiosity and spirituality, with this having been denoted in terms of prayer types being key dimensions of religiosity. A possible reason for this may derive from the choice of the abbreviated version of the measurement instrument (Aghababaei, 2013). In our study, the ten-item personality inventory (TIPI – 2 items per dimensions) was administered. In previous studies, the reported associations between these two traits were obtained through the longer version of the personality measurement within which the facet-level associations can also be explored (Saroglou & Garcia, 2008; Löckenhoff *et al*., 2009).

To the best of our knowledge, no previous studies have focused on investigating the associations between prayer, personality and trait resilience together. It is worth mentioning that EEA traits resilience also provides an important understanding that underpins the associations between the differences in an individual's relationship with God and their mental health. Here, it was found that Ecological resilience was uniquely associated with all of the prayer types tested. The findings clearly suggest that the individuals whose prayer takes the form of obligatory, voluntary, supplication and invocation tend to show a strong ability to overcome daily life stressors or adversity. It seems likely that personal and social functioning for those individuals who actively engage in social interactions, who embrace novel experiences, and who have the ability to deal with adversity may express regular and intense participation in prayer behaviour (as a form of being connected with God) on a daily basis. This approach adds to the scarce literature of the area by signifying a promising direction for future research in learning more about different religiosity facets besides prayer models.

Besides those explanations, the present findings also point to some important practical implications that are of great importance at the practical level. As the findings suggest that prayer types positively influence mental health through the additional

analysis of resilience, with this mostly depending on the characteristic behaviour of individuals (Löckenhoff *et al*., 2009). This can lead health professionals or therapists to be more careful when determining the characteristic differences of individuals when religion benefits their appraisals of life.

8.2. Research Limitations and Future Recommendations

Although our results from the conducted studies have shown consistency in suggesting that prayer has a beneficial impact on mental health, a number of important challenges have been faced in the research and these must be highlighted.

Challenges Regarding Survey-Based Studies

The sample of the questionnaire-based studies (Study 1 & 4) consisted solely of Muslim populations living in non-Muslim-majority countries (such as the UK and the US), as may influence the generalisability of the results. As the presented findings do not capture diverse populations outside of the UK and the US, Muslim individuals living in Muslim-majority countries could also be investigated to identify whether various demographic groups add further support to the presented and previous findings (Abdel-Khalek, 2010, 2011; Abdel-Khalek & Lester, 2012). On the other hand, the sample in Study 4 consists of a unique composition, whereby Amazon's Mechanical Turk worker database was employed. Although this sample obtained from a certain worker populations, the study data produces effective results, as previous studies have suggested the use of the MTurk database due to its potential in providing quality data as the workers responded well to the research criteria (Buhrmeister, Kwang, & Gosling, 2011).

The other challenges pertain to the poor reliability encountered in Study 4, whereby the abbreviated version of the measures for the Big-Five personality model (TIPI - 2 items per dimensions) failed to sufficiently assess the indices of the personality components and their links to other variables. Although the short-versions of personality models have been used successfully in previous research (Gosling *et al.,* 2003; Aghababaei, 2013), some studies have suggested that the longer versions of such instruments should employed to obtain more accurate psychometric scale properties (Bulmer, Böhnke, & Lewis, 2017). Despite the long-form of such measures producing stronger relationships (Aghababaei, 2013), the associations revealed by our findings were still in the expected direction.

Both Study 1 and 4 witnessed the measurement of religiosity being aimed at assessing the prayers performed as the bodily movements are defined by different phases (like in the obligatory and voluntarily prayer types). In Islam, however, various religious behaviours play a central role in people's lives – such as in asking for forgiveness, charity, ablution, fasting at Ramadan and so forth (Abdel-Khalek, 2010). Future research should employ multiple indices of religiosity to identify whether mental health and religiosity varies in light of different religious behaviours.

Challenges Regarding Experimental Studies

Of particular interest is that the lack of statistically significant data for the objective measures (skin conductance response, blood pressure and heart rate) may have derived from experimental design chosen, the research study condition employed (laboratory setting) and population used. In considering the laboratory conditions when compared to the real world, sounds from outside of the laboratory may have distorted the accuracy of the measurements in the experiment session.

In addition, the effect of the short-form prayer statements (such as in Study 2) and the long-form prayer texts (such as in Study 3) may have modified the results of the experiments. For instance, previous research has revealed that brain activity increases during long-term meditation in contrast to short-term meditation (Lutz, Greischar, Rawlings, Ricard, & Davidson, 2004). On the other hand, prior research has indicated that although a longer duration of stimuli might provide more reliable results in physiological responses, it may also cause the participant to feel reluctant as the time advances (Gao *et al*., 2017). In considering our experimental design with its certain religious label, our findings are consistent with previous studies yet the lack of a different experimental design with a diverse sample population would help to clarify this issue and could produce more conclusive and informative outcomes.

In terms of the sample populations, in both experimental studies (Study 2 & 3), females and university students were overrepresented in the research. As the restricted range of ages and gender may limit the generalisability of the findings, future research should recruit from a greater representative sample to obtain more consistent and stable results through which statistically significant data can be produced for the objective measurements.

Despite the above-mentioned limitations, a number of directions for future research have also been proposed in this section. For one, future studies could examine whether our findings can be applied among more diverse populations (i.e., different underrepresented nations and religious groups). Moreover, future research could address more theoretical mechanisms that have received less empirical attention in the literature, doing so to further the held understanding as to the relationship between religiosity and mental and physical health. Another important aspect is the uniqueness of the religious subjects that have been explored in the current research. However, it is important to understand whether the effects of Islamic prayer texts in autonomic functions might relate to different religious groups as well. Thus, future studies should explore the potential effects of other religions' sacred texts.

8.3. Conclusions

In Islam, multiple practices play a role in reflecting religiosity – such as ablution, prayer, rendering alms, fasting at Ramadan, undertaking pilgrimage to Mecca and remembering Allah. Our findings (as gained from both survey and laboratory studies) have shown that different prayer models – such as practicing certain *salats*, reciting the Holy Quran and remembering Allah – are powerful elements in people's lives, with the research having further explained the nature of religiosity in terms of the mental and physical health states of individuals. Therefore, the performing of such prayers on a regular basis would facilitate a person in dealing with daily life stresses and in improving their ability to recover from negative events. This would enhance an individual's relaxation mood and help them to engage in supportive relationships. In this regard, the current findings have revealed strong relationships between prayer performance and mental health components (i.e., well-being, personality and resilience) alongside prayers and psychophysiological health (i.e., emotional reactivity and vital signs – blood pressure and heart rate) at the univariate and multivariate levels.

To summarise, the present thesis has provided further subjective and objective evidence from diverse cultural contexts to gain general conclusions that pertain to the key aspects of religiosity (such as various prayer forms) playing a remarkable role in contributing to the healthy functioning of humans.

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APPENDIX A

Different Types of Islamic Prayer Used for Study 1 (Chapter 3)

Name:

Age:

Gender: Female - Male

Marital Status: Single – Married - Other

Education: Less than high school - High school - Bachelor's degree – Master – PhD - Other

Ethnicity:

Denomination:

Email or Phone Number:

Instructions: Below are a number of statements and questions about different types of Islamic prayers concerning your personal prayer life. Please indicate your responses to each question by choosing the answer that best fits you. There are no wrong or right answers and all your answers will remain confidential. Please put a tick '✓' mark in the box of your answer.

Please read all questions carefully and mark the most appropriate answer for you regarding the Obligatory Prayers that you perform daily and weekly, according to the following scale:

For the questions of 'How often do you pray?', please use the following response scale:

(1) Never, (2) Once a week/month, (3) Twice/three times a week/month, (4) Every day OR More than three times a week/month, (5) More than once every day OR Every day

For some item;

(1) Never, (2) Rarely, (3) Sometimes, (4) Mostly, (5) Always

For the questions of 'How intense is the experience to you?', please use the following

response scale:

(1) Not at all, (2) A little, (3) Somewhat, (4) A lot, (5) Extremely

For the questions of 'How important is it to you?', please use the following response scale:

(1) Not at all, (2) Moderately important, (3) Slightly important, (4) Quite important, (5) Very important

	Obligatory Prayers (Fard)					
1.	How often do you engage in the five daily prayers?	Never	Once a Week	Twice/Three Times a Week	Every Day	More than once every day
2.	When engaging in the five daily prayers how intense is the experience to you?	Not at all	A little	Somewhat	A lot	Extremely
3.	How important to you is engaging in the five daily prayers?	Not at all	Moderately Important	Slightly Important	Quite Important	Very Important
4.	How often do you engage in weekly Friday prayers?	Never	Rarely	Sometimes	Mostly	Always
5.	When engaging in weekly Friday prayer how intense is the experience to you?	Not at all	A little	Somewhat	A lot	Extremely
6.	How important to you is engaging in weekly Friday prayers?	Not at all	Moderately Important	Slightly Important	Quite Important	Very Important

Please read all questions carefully and mark the most appropriate answer for you regarding the Necessary Prayers that you perform daily.

	Necessary Prayers (Wajib)					
7.	How often do you engage in Witr prayer after the Salat of Isha in a week?	Never	Once a week	Twice/ Three Times a week	Every Day	More than once every day
8.	When engaging in Witr prayer how intense is the experience to you?	Not at all	A little	Somewhat	A lot	Extremely
9.	How important to you is engaging in Witr prayer?	Not at all	Moderately Important	Slightly Important	Quite Important	Very Important

Please read all questions carefully and mark the most appropriate answer for you regarding the Additional voluntary Prayers that you perform daily, weekly, and monthly.

	Additional Voluntary prayers (Sunnah)					
10.	How often do you engage in Sunnah prayer before and after the five daily prayers in a week?	Never	Once a week	Twice/Three Times a week	Every Day	More than once every day
11.	When engaging in Sunnah prayer before and after the five daily prayers how intense is the experience to you?	Not at all	A little	Somewhat	A lot	Extremely
12.	How important to you is engaging in Sunnah prayer	Not at all	Moderately Important	Slightly Important	Quite Important	Very Important

	before and after the five daily prayers?					
13.	How often do you engage in Istikharah prayer with the intention to ask Allah for guidance on a particular matter in a week?	Never	Once a week	Twice/Three Times a week	More Than Three Times a Week	Every Day
14.	When engaging in Istikharah prayer how intense is the experience to you?	Not at all	A little	Somewhat	A lot	Extremely
15.	How important to you is engaging in Istikharah prayer?	Not at all	Moderately Important	Slightly Important	Quite Important	Very Important
16.	How often do you engage in prayer of Tahajjud in a week?	Never	Once a week	Twice/Three Times a week	More Than Three Times a Week	Every Day
17.	When engaging in Tahajjud prayer how intense is the experience to you?	Not at all	A little	Somewhat	A lot	Extremely
18.	How important to you is engaging in Tahajjud prayer?	Not at all	Moderately Important	Slightly Important	Quite Important	Very Important
19.	How often do you engage in Tarawih prayer during the Ramadan Month?	Never	Once a Month	Twice/Three Times a Month	More than Three	Every Day

					Times a Month	
20.	When engaging in Tarawih prayer how intense is the experience to you?	Not at all	A little	Somewhat	A lot	Extremely
21.	How important to you is engaging in Tarawih prayer?	Not at all	Moderately Important	Slightly Important	Quite Important	Very Important

Please read all questions carefully and mark the most appropriate answer for you regarding the Supererogatory Prayers that you perform daily, weekly or monthly.

	Supererogatory Prayers (Nawafil)					
22.	How often do you engage in Qada prayers when you unable to perform prayers within the prescribed time period in a week?	Never	Once a week	Twice/Three Times a week	Every Day	More than once every day
23.	When engaging in Qada prayer how intense is the experience to you?	Not at all	A little	Somewhat	A lot	Extremely
24.	How important to you is engaging in Qada prayer?	Not at all	Moderately Important	Slightly Important	Quite Important	Very Important
25.	How often do you engage in praying after sunrise in a week (Salât of Ishraq)?	Never	Once a week	Twice/Three Times a week	More than three times a week	Every Day

26.	When engaging in Salât of Ishraq prayer how intense is the experience to you?	Not at all	A little	Somewhat	A lot	Extremely
27.	How important to you is engaging in Salât of Ishraq prayer?	Not at all	Moderately Important	Slightly Important	Quite Important	Very Important
28.	How often do you engage in Salât of Tawbah for seeking the forgiveness of Allah after committing a sin?	Never	Once a week	Twice/Three Times a week	Every Day	More than once every day
29.	When engaging in Salât of Tawbah prayer how intense is the experience to you?	Not at all	A little	Somewhat	A lot	Extremely
30.	How important to you is engaging in Salât of Tawbah prayer?	Not at all	Moderately Important	Slightly Important	Quite Important	Very Important
31.	How often do you engage in Sajdah of Forgetfulness (Salât of Sahw) at the end of the ritual salât prayers you perform in a week?	Never	Once a week	Twice/Three Times a week	Every Day	More than once every day
32.	When engaging in Sajdah of	Not at all	A little	Somewhat	A lot	Extremely

	Forgetfulness prayer how intense is the experience to you?					
33.	How important to you is engaging in Sajdah of Forgetfulness prayer?	Not at all	Moderately Important	Slightly Important	Quite Important	Very Important
34.	How often do you engage in Salât of Duha (Chaasht) prayer in a week?	Never	Once a week	Twice/Three Times a week	More Than Three Times a Week	Every Day
35.	When engaging in Salât of Duha prayer how intense is the experience to you?	Not at all	A little	Somewhat	A lot	Extremely
36.	How important to you is engaging in Salât of Duha prayer?	Not at all	Moderately Important	Slightly Important	Quite Important	Very Important
37.	How often do you engage in Salât of Journey (Safar) prayer before or after your journey in your life?	Never	Rarely	Sometimes	Mostly	Always
38.	When engaging in Salât of Journey prayer how intense	Not at all	A little	Somewhat	A lot	Extremely

	is the experience to you?					
39.	How important to you is engaging in Salât of Journey prayer?	Not at all	Moderately Important	Slightly Important	Quite Important	Very Important
40.	How often do you engage in Salât of Hajaat prayer in a week?	Never	Once a week	Twice/Three Times a week	Every Day	More than once every day
41.	When engaging in Salât of Hajaat prayer how intense is the experience to you?	Not at all	A little	Somewhat	A lot	Extremely
42.	How important to you is engaging in Salât of Hajaat prayer?	Not at all	Moderately Important	Slightly Important	Quite Important	Very Important

Please read all questions carefully and mark the most appropriate answer for you regarding the Dua Prayer that you perform daily.

	Supplicational Prayer (Du'a)					
43.	How often do you engage in Du'a prayer using your own words outside of Salât prayers in a week?	Never	Once a week	Twice/Three Times a week	Every Day	More than once every day
44.	When engaging in Du'a prayer with your own words	Not at all	A little	Somewhat	A lot	Extremely

	outside of Salât prayers how intense is the experience to you?				
45.	How important to you is engaging in Du'a prayer with your own words outside of Salât prayers?	Not at all	Moderately Important	Slightly Important	Quite Important	Very Important
46.	How often do you engage in Du'a prayer with using Quranic texts outside of Salât prayers in a week?	Never	Once a week	Twice/Three Times a week	Every Day	More than once every day
47.	When engaging in Du'a prayer with using Quranic texts outside of Salât prayers how intense is the experience to you?	Not at all	A little	Somewhat	A lot	Extremely
48.	How important to you is engaging in Du'a prayer with using Quranic texts outside of Salât prayers?	Not at all	Moderately Important	Slightly Important	Quite Important	Very Important

Please read all questions carefully and mark the most appropriate answer for you regarding the Dhikr prayer that you perform daily.

	Remembering of Allah (Dhikr)					
49.	How often do you engage in remembering of Allah in a week?	Never	Once a week	Twice/Three Times a week	Every Day	More than once every day
50.	When engaging in remembering of Allah how intense is the experience to you?	Not at all	A little	Somewhat	A lot	Extremely
51.	How important to you is engaging in the remembrance of Allah in prayer?	Not at all	Moderately Important	Slightly Important	Quite Important	Very Important

Psychological Assessments Used for Study 1

Measure 1:

Psychological Well-being (PWB; Ryff & Keyes, 1995, 18 Item)

Could you please rate your answers for how much you agree or disagree with the statements?

(1) strongly disagree, (2) moderately disagree, (3) slightly disagree,

(4) slightly agree, (5) moderately agree, (6) strongly agree.

Autonomy

Definition: High Scorer: Is self-determining and independent; able to resist social pressures to think and act in certain ways; regulates behavior from within; evaluates self by personal standards.

Low Scorer: Is concerned about the expectations and important decisions; conforms to social pressures to think and act evaluations of others; relies on

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judgements of others to make in certain ways.

(-) [6.] *I tend to be influenced by people with strong opinions.*

(+) [9.] *I have confidence in my opinions, even if they are contrary to the general consensus.*

(+) [14.] *I judge myself by what I think is important, not by the values of what others think is important.*

Environmental Mastery

Definition: <u>High Scorer</u>: Has a sense of mastery and competence in managing the environment; controls complex array of external activities; makes effective use of surrounding opportunities; able to choose or create contexts suitable to personal needs and values.

<u>Low Scorer</u>: Has difficulty managing everyday affairs; feels unable to change or improve surrounding context; is unaware of surrounding opportunities; lacks sense of control over external world.

(+) [1.] *In general, I feel I am in charge of the situation in which I live.*

(-) [2.] *The demands of everyday life often get me down.*

(+) [4.] *I am quite good at managing the many responsibilities of my daily life.*

Personal Growth

Definition: <u>High Scorer</u>: Has a feeling of continued development; sees self as growing and expanding; is open to new experiences; has sense of realizing one's potential; sees improvement in self and behavior over time; is changing in ways that reflect more self knowledge and effectiveness.

<u>Low Scorer</u>: Has a sense of personal stagnation; lacks sense of improvement or expansion over time; feels bored and uninterested with life; feels unable to develop new attitudes or behaviors.

(+) [5.] *I think it is important to have new experiences that challenge how you think about yourself and the world.*

(+) [11.] *For me, life has been a continuous process of learning, changing, and growth.*

(-) [13.] *I gave up trying to make big improvements or changes in my life a long time ago.*

Positive Relations with Others

Definition: <u>High Scorer:</u> Has warm satisfying, trusting relationships with others; is concerned about the welfare of others; capable of strong empathy, affection, and intimacy; understands give and take of human relationships.

<u>Low Scorer:</u> Has few close, trusting relationships with others; finds it difficult to be warm, open, and concerned about others; is isolated and frustrated in interpersonal relationships; not willing to make compromises to sustain important ties with others.

(-) [2.] *Maintaining close relationships has been difficult and frustrating for me*

(+) [9.] *People would describe me as a giving person, willing to share my time with others.*

(-) [10.] I h*ave not experienced many warm and trusting relationships with others.*

Purpose in Life

Definition: <u>High Scorer:</u> Has goals in life and a sense of directedness; feels there is meaning to present and past life; holds beliefs that give life purpose; has aims and objectives for living.

<u>Low Scorer:</u> Lacks a sense of meaning in life; has few goals of aims, lacks sense of direction; does not see purpose of past life; has no outlook or beliefs that give life meaning.

(-)   [2.] *I live life one day at a time and don't really think about the future.*

(+) [10.] *Some people wander aimlessly through life, but I am not one of them.*

(-)   [11.] *I sometimes feel as if I've done all there is to do in life.*

Self-acceptance

Definition: <u>High Scorer:</u> Possesses a positive attitude toward the self; acknowledges and accepts multiple aspects of self including good and bad qualities; feels positive about past life.

Low Scorer: Feels dissatisfied with self; is disappointed with what has occurred in past life; is troubled about certain personal qualities; wishes to be different than what one is.

(+) [1.]   *When I look at the story of my life, I am pleased with how things have turned out.*

(+) [5.]   *I like most aspects of my personality.*

(-) [7.]   *In many ways, I feel disappointed about my achievements in life.*

Measure 2:

The Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin 1985, 5 Item)

Directions: Below are five statements with which you may agree or disagree. Using the 1-7 scale below, indicate your agreement with each item by placing the appropriate number in the line preceding that item. Please be open and honest in your responding.

(1) Strongly disagree, (2) Disagree, (3) Slightly disagree, (4) Neither agree or disagree, (5) Slightly agree, (6) Agree, (7) Strongly agree

_____1. In most ways my life is close to my ideal.

_____2. The conditions of my life are excellent.

_____3. I am satisfied with life.

_____4. So far I have gotten the important things I want in life.

_____5. If I could live my life over, I would change almost nothing.

Measure 3:

The Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988, 20 Item)

This scale consists of a number of words that describe different feelings and emotions. Read each item and then list the number from the scale below next to each word. Indicate

to what extent you feel this way right now, that is, at the present moment OR indicate the extent you have felt this way over the past week (circle the instructions you followed when taking this measure).

(1) Very slightly or Not at all, (2) A Little, (3) Moderately, (4) Quite a bit, (5) Extremely

_____1. Interested   _____11. Irritable

_____2. Distress   _____12. Alert

_____3. Excited   _____13. Ashamed

_____4. Upset   _____14. Inspired

_____5. Strong   _____15. Nervous

_____6. Guilty   _____16. Determined

_____7. Scared   _____17. Attentive

_____8. Hostile   _____18. Jittery

_____9. Enthusiastic   _____19. Active

_____10. Proud   _____20. Afraid

APPENDIX B

Ethical Approval for Study 1 (Chapter 3)

University Ethics Sub-Committee for Psychology

09/10/2015

Ethics Reference: 3633-fzg1-neuroscience,psychologyandbehaviour

TO:

Name of Researcher Applicant: Fatumetul Zehra Guldas

Department: IT Services

Research Project Title: Religion and Well-being: The application of a
cognitive-behavioural framework among Islamic Communities.

Dear Fatumetul Zehra Guldas,

RE: Ethics review of Research Study application

The University Ethics Sub-Committee for Psychology has reviewed and discussed the
above application.

1. Ethical opinion

The Sub-Committee grants ethical approval to the above research project on the basis
described in the application form and supporting documentation, subject to the conditions
specified below.

2. Summary of ethics review discussion

The Committee noted the following issues:

Having reviewed the project not significant ethical issues have been raised.

I am therefore happy to approve the present project.

3. General conditions of the ethical approval

The ethics approval is subject to the following general conditions being met prior to the
start of the project:

As the Principal Investigator, you are expected to deliver the research project in
accordance with the University's policies and procedures, which includes the University's
Research Code of Conduct and the University's Research Ethics Policy.

If relevant, management permission or approval (gate keeper role) must be obtained
from host organisation prior to the start of the study at the site concerned.

4. Reporting requirements after ethical approval

You are expected to notify the Sub-Committee about:

- Significant amendments to the project
- Serious breaches of the protocol
- Annual progress reports
- Notifying the end of the study

5. Use of application information

Details from your ethics application will be stored on the University Ethics Online System. With your permission, the Sub-Committee may wish to use parts of the application in an anonymised format for training or sharing best practice. Please let me know if you do not want the application details to be used in this manner.

Best wishes for the success of this research project.

Yours sincerely,

Prof. Panos Vostanis

Chair

APPENDIX C

Research Participant Honorarium Record for Study 2 & 3 (Chapter 4 & 5)

A. To be completed by the experimenter

Researcher:

Supervisor/s if applicable:

Study title:

Ethical approval code:

Experiment duration:

Total payment:

B. To be completed by the participant

I certify that I have received £ _____ as an honorarium for participating in the study listed above.

Name (please print):

Contact Telephone Number:

Signature:

Date:

Participant Consent Form- Study 2 (Chapter 4)

BACKGROUND INFORMATION

Title: The effects of Muslim prayer activities on emotional reactivity: Measuring verbal stimuli through emotional reactivity (Skin Conductance Response: SCR, Blood Pressure: BP, and Heart Rate: HR

Researchers: Fatumetul Zehra Guldas, Dr. John Maltby

Purpose of data collection: PhD Project

Details of Participation: You are invited to take part in an experiment that I am conducting as part of my PhD research studies in Psychology at the University of Leicester. The purpose of this study is to understand the relationship between Islamic prayer types and well-being in terms of emotional reactivity. The experiment basically consists of two sessions; completing a number of self-report assessments, and measuring emotional reactivity during the participant performs prayers. In the first session, you will be asked to complete Psychological Well-being Scale (PWB) (Ryff & Keyes, 1995, 18 items), Subjective Well-being Life Satisfaction Scale (SWLS) (Diener et al., 1985, 5 items) and The Positive and Negative Affect Schedule (PANAS) (Watson et al., 1988, 20 items). In the second session, the experiment contains emotional reactivity measured by Skin Conductance Response (SCR) with Neulog galvanic skin response logger sensor during performing prayer, and blood pressure and heart rate will be obtained before and after the SCR activities.

The whole experiment will take no more than 60 minutes.

CONSENT STATEMENT

1. I understand that my participation is voluntary and that I may withdraw from the research at any time without giving any reason.
2. I am aware of what my participation will involve.
3. My data are to be held confidentially and only Fatumetul Zehra Guldas and Dr. John Maltby, will have access to them.
4. My data will be kept in a locked filing cabinet for a period of at least three years after the appearance of any associated publications. Any aggregate data (e.g. spreadsheets) will be kept in electronic form for up to three years after which time they will be deleted.

5. In accordance with the requirements of some scientific journals and organisations, my coded data may be shared with other competent researchers. My coded data may also be used in other related studies. My name and other identifying details will not be shared with anyone.

6. The overall findings may be submitted for publication in a scientific journal, or presented at scientific conferences.

7. I will be able to obtain general information about the results of this research by giving the researcher my email address now.

I am giving my consent for data to be used for the outlined purposes of the present study.

All questions that I have about the research have been satisfactorily answered.

I agree to participate.

Participant's signature: _____

Participant's name (please print): _____

Date: _____

If you would like to receive a summary of the results by e-mail,

when this is available, please provide your email address: _____

Ethical Approval for Study 2 & 3 (Chapter 4 & 5)

 University Ethics Sub-Committee for Psychology

14/10/2016

Ethics Reference: 9045-jm148-neuroscience,psychologyandbehaviour

TO:

Name of Researcher Applicant: John J. (Dr.) Maltby

Department: Psychology

Research Project Title: Physiological effects of Prayer.

Dear John J. (Dr.) Maltby,

RE: Ethics review of Research Study application

The University Ethics Sub-Committee for Psychology has reviewed and discussed the above application.

1. Ethical opinion

The Sub-Committee grants ethical approval to the above research project on the basis described in the application form and supporting documentation, subject to the conditions specified below.

2. Summary of ethics review discussion

The Committee noted the following issues:

All ethics issues have been considered

3. General conditions of the ethical approval

The ethics approval is subject to the following general conditions being met prior to the start of the project:

As the Principal Investigator, you are expected to deliver the research project in accordance with the University's policies and procedures, which includes the University's Research Code of Conduct and the University's Research Ethics Policy.

If relevant, management permission or approval (gate keeper role) must be obtained from host organisation prior to the start of the study at the site concerned.

4. Reporting requirements after ethical approval

You are expected to notify the Sub-Committee about:

- Significant amendments to the project
- Serious breaches of the protocol
- Annual progress reports
- Notifying the end of the study

5. Use of application information

Details from your ethics application will be stored on the University Ethics Online System. With your permission, the Sub-Committee may wish to use parts of the application in an anonymised format for training or sharing best practice. Please let me know if you do not want the application details to be used in this manner.

Best wishes for the success of this research project.

Yours sincerely,

Prof. Panos Vostanis

Chair

Study 2 & 3 - Emotional Arousal Responses Graphed with 10-mins Baseline Duration (Outliers Included)
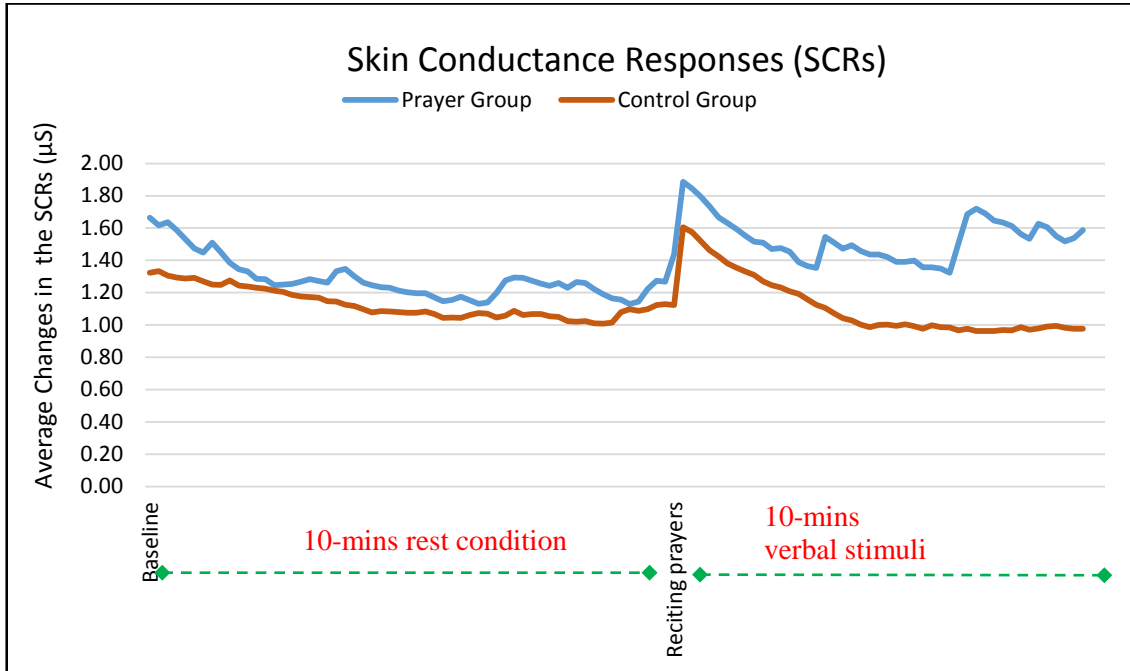

Figure 11. Graph depicts the average responses of 10-min baseline and prayer activities for both prayer and control groups. (Chapter 4)
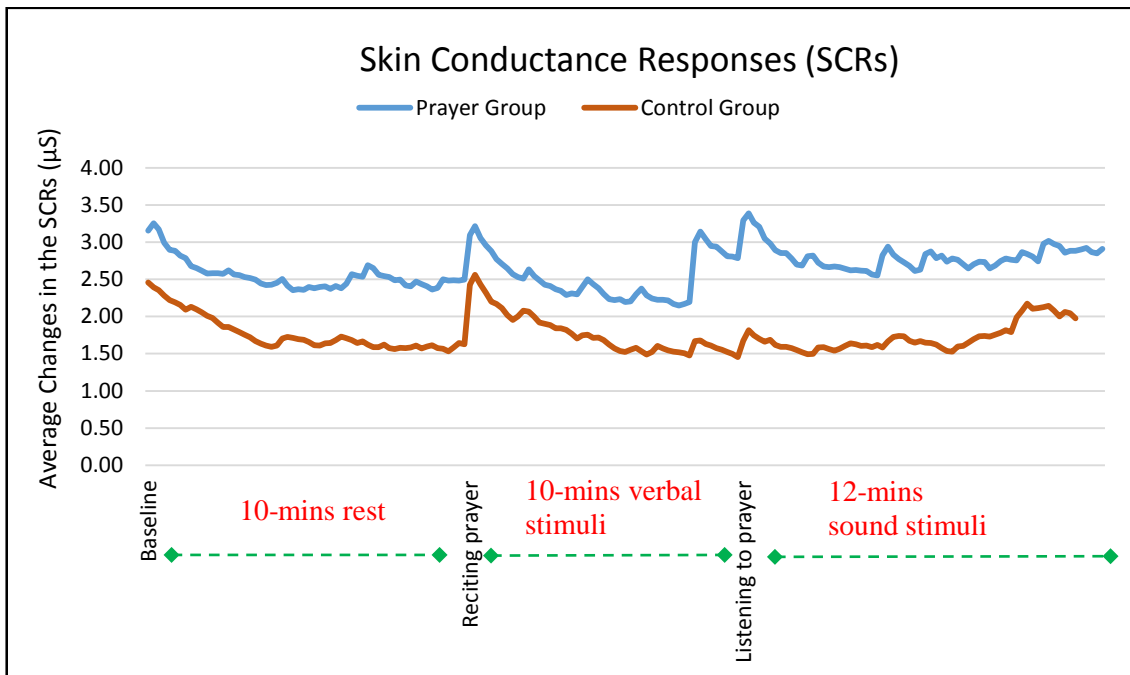

Figure 12. Graph illustrates the average responses of 10-min baseline and prayer activities for both groups. (Chapter 5)

Psychological Assessments Used for Study 3 (Chapter 5)

Measure 1:

The Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983, 10 Item)

Intructions: The questions in this scale ask you about your feelings and thoughts during the last month. In each case, please indicate your response by placing an "X" over the circle representing how often you felt or thought a certain way.

	Almost Never	Fairly Never	Sometimes	Very Often	Often
1. In the last month, how often have you been upset because of something that happened unexpectedly?	○	○	○	○	○
2. In the last month, how often have you felt that you were unable to control the important things in your life?	○	○	○	○	○
3. In the last month, how often have you felt nervous and "stressed"?	○	○	○	○	○
4. In the last month, how often have you felt confident about your ability to handle your personal problems?	○	○	○	○	○
5. In the last month, how often have you felt that things were going your way?	○	○	○	○	○
6. In the last month, how often have you found that you could not cope with all the things that you had to do?	○	○	○	○	○

7. In the last month, how often have you been able to control irritations in your life?	○	○	○	○	○
8. In the last month, how often have you felt that you were on top of things?	○	○	○	○	○
9. In the last month, how often have you been angered because of things that were outside your control?	○	○	○	○	○
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	○	○	○	○	○

Scoring: PSS scores are obtained by reversing responses (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1 & 4 = 0) to the four positively stated items (items 4, 5, 7, & 8) and then summing across all scale items. A short 4 item scale can be made from questions 2, 4, 5 and 10 of the PSS 10 item scale.

Measure 2:

The Physical Health Questionnaire (PHQ; Spence, Helmreich, & Pred, 1987, 14 Item)

Intructions: The following items focus on how you have been feeling physically during the past [period of time]. Please respond by circling the appropriate number.

Over the past [period of time]	Not at all	Rarely	Once in a while	Some of the time	Fairly Often	Often	All of the time
1. How often have you had difficulty getting to sleep at night?	1	2	3	4	5	6	7
2. How often have you woken	1	2	3	4	5	6	7

up during the night?							
3. How often have you had nightmares or disturbing dreams?	1	2	3	4	5	6	7
4. How often has your sleep been peaceful and undisturbed?	1	2	3	4	5	6	7
5. How often have you experienced headaches?	1	2	3	4	5	6	7
6. How often did you get a headache when there was a lot of pressure on you to get things done?	1	2	3	4	5	6	7
7. How often did you get a headache when you were frustrated because things were not going the way they should have or when you were annoyed at someone?	1	2	3	4	5	6	7
8. How often have you suffered from an upset stomach (indigestion)?	1	2	3	4	5	6	7
9. How often did you have to watch that you ate carefully	1	2	3	4	5	6	7

to avoid stomach upsets?							
10. How often did you feel nauseated ("sick to your stomach")?	1	2	3	4	5	6	7
11. How often were you constipated or did you suffer from diarrhea?	1	2	3	4	5	6	7
12. How many times have you had minor colds (that made you feel uncomfortable but didn't keep you sick in bed or make you miss work)?	0 times	1-2 time	3 times	4 times	5 times	6 times	7+ times
13. How many times have you had respiratory infections more severe than minor colds that "laid you low" (such as bronchitis, sinusitis, etc.)?	0 times	1-2 time	3 times	4 times	5 times	6 times	7+ times
14. When you had a bad cold or flu, how long did it typically last?	1 days	2 days	3 days	4 days	5 days	6 days	7+ days

Note. Item 4 should be reverse scored.

Measure 3:

The Hospital Anxiety and Depression (HADS; Zigmond & Snaith, 1983, 14 item)

Instructions: Doctors are aware that emotions play an important part in most illnesses. If your doctor knows about these feelings he or she will be able to help you more. This questionnaire is designed to help your doctor know how you feel. Read each item and circle the reply which comes closest to how you have been feeling in the past week. Don't take too long over your replies: your immediate reaction to each item will probably be more accurate than a long thought out response.

I feel tense or 'wound up':	A	I feel as if I am slowed down:	D
Most of the time	3	Nearly all of the time	3
A lot of the time	2	Very often	2
Time to time, occasionally	1	Sometimes	1
Not at all	0	Not at all	0

I still enjoy the things I used to enjoy:	D	I get a sort of frightened feeling like 'butterflies in the stomach':	A
Definitely as much	0	Not at all	0
Not quite so much	1	Occasionally	1
Only a little	2	Quite often	2
Not at all	3	Very often	3

I get a sort of frightened feeling like something awful is about to happen:	A	I have lost interest in my appearance:	D
Very definitely and quite badly	3	Definitely	3
Yes, but not too badly	2	I don't take as much care as I should	2
A little, but it doesn't worry me	1	I may not take quite as much care	1
Not at all	0	I take just as much care as ever	0

I can laugh and see the funny side of things:	D	I feel restless as if I have to be on the move:	A
As much as I always could	0	Very much indeed	3
Not quite so much now	1	Quite a lot	2

Definitely not so much now	2	Not very much	1
Not at all	3	Not at all	0

Worrying thoughts go through my mind:	A	I look forward with enjoyment to things:	D
A great deal of the time	3	A much as I ever did	0
A lot of the time	2	Rather less than I used to	1
From time to time but not too often	1	Definitely less than I used to	3
Only occasionally	0	Hardly at all	2

I feel cheerful:	D	I get sudden feelings of panic:	A
Not at all	3	Very often indeed	3
Not often	2	Quite often	2
Sometimes	1	Not very often	1
Most of the time	0	Not at all	0

I can sit at ease and feel relaxed:	A	I can enjoy a good book or radio or TV programme:	D
Definitely	0	Often	0
Usually	1	Sometimes	1
Not often	2	Not often	2
Not at all	3	Very seldom	3

Questions relating to anxiety are indicated by an 'A' while those relating to depression are shown by a 'D'. Scores of 0-7 in respective subscales are considered normal, with 8-10 borderline and 11 or over indicating clinical 'caseness'

APPENDIX H

Participant Consent Form- Study 3 (Chapter 5)

BACKGROUND INFORMATION

Title: The effects of Islamic prayers on emotional reactivity: Measuring verbal and sound stimuli through emotional reactivity (SCR, BP, and HR)

Researchers: Fatumetul Zehra Guldas, Dr. John Maltby

Purpose of data collection: PhD Project

Details of Participation: You are invited to take part in an experiment that we are conducting as part of our PhD research studies in Psychology department, the University of Leicester. The purpose of the experimental studies is to explore the relationship between Islamic prayer types and well-being in an experimental setting. First session regards completing a number of self-reported assessments; the Hospital Anxiety and Depress Scale (HADS; Zigmond & Snaith, 1983, 14 items), The Perceived Stress Scale (Cohen et al., 1983, 10 items), and the Physical Health Questionnaire (Spence et al., 1987, 14 items). Second aims to measure emotional reactivity by the SCR with NeuLog galvanic skin response logger sensor during the participant reading and listening a number of religious statements from the Quran. In addition, blood pressure and heart rate will be measured with a Labquest before and after the SCR activities..

The whole experiment will take no more than 60 minutes.

CONSENT STATEMENT

1. I understand that my participation is voluntary and that I may withdraw from the research at any time without giving any reason.

2. I am aware of what my participation will involve.

3. My data are to be held confidentially and only Fatumetul Zehra Guldas and Dr. John Maltby will have access to them.

4. My data will be kept in a locked filing cabinet for a period of at least three years after the appearance of any associated publications. Any aggregate data (e.g. spreadsheets) will be kept in electronic form for up to three years after which time they will be deleted.

5. In accordance with the requirements of some scientific journals and organisations, my coded data may be shared with other competent researchers. My coded data

may also be used in other related studies. My name and other identifying details will not be shared with anyone.

6. The overall findings may be submitted for publication in a scientific journal, or presented at scientific conferences.

7. I will be able to obtain general information about the results of this research by giving the researcher my email address now.

I am giving my consent for data to be used for the outlined purposes of the present study.

All questions that I have about the research have been satisfactorily answered.

I agree to participate.

Participant's signature: _____

Participant's name (please print): _____

Date: _____

If you would like to receive a summary of the results by e-mail,

when this is available, please provide your email address: _____

<center>**APPENDIX I**</center>

<center>**Psychological Assessments Used for Study 4 (Chapter 7)**</center>

Measure 1:

Ten-Item Personality Inventory (TIPI; Gosling et al., 2003)

Here are a number of personality traits that may or may not apply to you. Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement. You should rate the extent to which the pair of traits applies to you, even if one characteristic applies more strongly than the other.

1 = Disagree strongly

2 = Disagree moderately

3 = Disagree a little

4 = Neither agree nor disagree

5 = Agree a little

6 = Agree moderately

7 = Agree strongly

I see myself as:

1. _____ Extraverted, enthusiastic.

2. _____ Critical, quarrelsome.

3. _____ Dependable, self-disciplined.

4. _____ Anxious, easily upset.

5. _____ Open to new experiences, complex.

6. _____ Reserved, quiet.

7. _____ Sympathetic, warm.

8. _____ Disorganized, careless.

9. _____ Calm, emotionally stable.

10. _____ Conventional, uncreative.

TIPI scale scoring ("R" denotes reverse-scored items): Extraversion: 1, 6R; Agreeableness: 2R, 7; Conscientiousness: 3, 8R; Emotional Stability: 4R, 9; Openness to Experiences: 5, 10R.

Measure 2:

EEA Resilience Scale (Maltby et al., 2015)

Description of the Scale:

A new measure of trait resilience (EEA) derived from three common mechanisms identified in ecological theory: Engineering Resilience, Ecological Resilience and Adaptive Capacity.

Engineering resilience: This is the ability to return or recover to an equilibrium following disturbance in terms of speed or status. It is the ability to return to stability from the result of a disturbance.

Ecological resilience: The ability to be robust or persistent, and to accommodate or resist a disturbance. It is measured in terms of the magnitude of disturbance that can be absorbed.

Adaptive capacity: The ability to restructure or to manage and accommodate change and to adapt.

SD = Strongly Disagree, D = Disagree, A = Agree, SA = Strongly Agree

	The Item	SD	D	A	SA
1	I tend to take a long time to get over set-backs in my life				
2	It is hard for me to snap back when something bad happens				
3	It does not take me long to recover from a stressful event				
4	I usually come through difficult times with little trouble				
5	I give my best effort no matter what the outcome may be				
6	I am determined				
7	I work to attain my goals no matter what roadblocks I encounter along the way				

8	I believe I can achieve my goals, even if there are obstacles					
9	Changes in routine are interesting to me					
10	I enjoy dealing with new and unusual situations					
11	I like to do new and different things					
12	I like it when things are uncertain or unpredictable					

Engineering resilience: 1R, 2R, 3, 4

Ecological resilience: 5, 6, 7, 8

Adaptive capacity: 9, 10, 11, 12

APPENDIX J

<u>Ethical Approval for Study 4 (Chapter 7)</u>

 UNIVERSITY OF LEICESTER   University Ethics Sub-Committee for Psychology

10/10/2016

Ethics Reference: 9035-jm148-neuroscience,psychologyandbehaviour

TO:

Name of Researcher Applicant: John J. (Dr.) Maltby

Department: Psychology

Research Project Title: Individual Differences, Affect and Cognitive Learning in relation
 to reactions to the Cold Pressor Task and Pleasant and Unpleasant Visual Stimuli.

Dear John J. (Dr.) Maltby,

RE: Ethics review of Research Study application

The University Ethics Sub-Committee for Psychology has reviewed and discussed the
above application.

1. Ethical opinion

The Sub-Committee grants ethical approval to the above research project on the basis
described in the application form and supporting documentation, subject to the conditions
specified below.

2. Summary of ethics review discussion

The Committee noted the following issues:

Happy to approve this application. Good luck

3. General conditions of the ethical approval

The ethics approval is subject to the following general conditions being met prior to the
 start of the project:

As the Principal Investigator, you are expected to deliver the research project in
accordance with the University's policies and procedures, which includes the University's
Research Code of Conduct and the University's Research Ethics Policy.

If relevant, management permission or approval (gate keeper role) must be obtained
from host organisation prior to the start of the study at the site concerned.

4. Reporting requirements after ethical approval

You are expected to notify the Sub-Committee about:

- Significant amendments to the project
- Serious breaches of the protocol
- Annual progress reports
- Notifying the end of the study

5. Use of application information

Details from your ethics application will be stored on the University Ethics Online System. With your permission, the Sub-Committee may wish to use parts of the application in an anonymised format for training or sharing best practice. Please let me know if you do not want the application details to be used in this manner.

Best wishes for the success of this research project.

Yours sincerely,

Prof. Panos Vostanis

Chair