Introduction

Abstract: Research has found that nearly 75-80% of college students are moderately stressed (Pierceall & Keim, 2007) and at-risk for both anxiety and depression (Pedrelli et al., 2015). Research has highlighted religiosity/spirituality (R/S) as a protective resource likely to reduce the probability of mental diseases and risky behaviors, and to enhance well-being among youth (Ano & Vasconcelles, 2005). Additionally, both Christian and Muslim university students utilize R/S as sources of strength and guidance (Higher Education Institute, 2003). The current study is designed to test the hypothesis that a highly spiritual month (Ramadan) would change the experience of Muslim college students relative to a comparison group of Christian students that is not experiencing a similarly important period in the Christian religious calendar. 82 Muslim-American and 83 Christian college students were tested through a repeated measures design across three time periods (Pre-Ramadan, Ramadan, Post-Ramadan) to assess for Subjective Well-Being, Eudemonic Well-Being, Academic Stress, Religiosity/Spirituality, Perceived Daily Stress and Physical Symptoms of Stress. Demographic information (gender, ethnicity, residency status, English fluency) were entered as co-variates. Results indicated mixed findings such that hypothesized changes for EWB, spirituality and Daily Stress were not found from Pre-Post (for Muslim students) with trend levels matching for SWB, Physical Symptoms of Stress, Academic Stress and Religiosity. Main effects indicated that Muslim-American students are generally more religious than their Christian counterparts.

Introduction

Religiosity and spirituality (R/S) have been implicated as protective factors against negative mental states, mental illness symptomology, and problem behaviors including stress, low self-esteem, depressive mood, and self-abusive behaviors (Vespa, 2010). Ano and Vasconcelles (2005) posit that religion/spirituality (R/S) serves as a protective mechanism during times of stress, with religiosity affecting psychosocial factors through self-regulation and self-control (Tiliouine, Cummins & Davern, 2009). Islamic religiousness in particular has been shown to be positively correlated to holistic mental health and well-being (i.e., happiness, satisfaction in life, optimism), as well as negatively correlated with psychopathology such as anxiety or depression (Kurnaiwan, 2018).

The time of Ramadan may play an integral role in the spiritual development of Muslims. Ramadan is a time of high religious and spiritual involvement, that is expected to strongly impact the lives of Muslims, particularly with changes in R/S and well-being. Nevertheless, the literature review for this study did not find any studies of effects of Ramadan on well-being. The present study is designed to assess the unique effects of Ramadan in a diverse sample of Muslim-American college students. This study will be unique in that the effects of Ramadan will be assessed across three data points: two weeks prior to Ramadan (T1), during Ramadan (T2) and two weeks after Ramadan (T3). To control for potential secular trends, a Christian student group will also be assessed in conjunction with the Muslim student group to more accurately identify fluctuations in R/S, perceived stress, and well-being in two groups of religiously involved college students.

Muslim Religiosity and Spirituality

It is important to distinguish between religiousness and spirituality. McIntosh, Poulin, Silver and Holman (2011) define spirituality as the individual or experiential commitment to one's religious or spiritual belief system. Meezenbroek, Garsen, Berg, Dierendonck, Visser and Schaufeli (2012) identify 'connectedness' as a hallmark of spirituality; where one strives for a deeper connection with oneself, others, nature, and with the transcendent (e.g., God, the Universe, etc.). Meezenbroek et al. (2012) further explore the many facets that may interlock in enabling 'connectedness' such as authenticity, inner harmony, self-knowledge, compassion, gratitude, and search for meaning in life. Spirituality and connectedness can also be experienced by individuals who do not consider themselves to be religious, such as experiencing nature and being deeply moved by the experience (Meezenbroek et al., 2012).

Religion may contribute to something entirely unique once other variables such as social support, physical health status and other socio-demographic variables have been accounted for, particularly in the context of adjustment to critical life events (Pargament, Magyar & Murray, 2005). Additionally; research varies in whether spirituality exists as a component of religiosity or as a separate dimension of individual differences (Magyar & Murray, 2005). Nonetheless, in the current study religion and spirituality are operationalized as separate but overlapping constructs with religion representing an organizational or institutional representation of divine experiences through codified rituals and behaviors and spirituality being an individual experience of the divine (Mizock, Millner & Russinova, 2012). Furthermore, the lack of research on Muslim-American religiosity and spirituality makes it difficult to extrapolate what dimensions of Islam may be most salient to Muslim-Americans.

In the context of Islam, spirituality exists within the framework of the beliefs, values and experiences of the religion. From this standpoint, it is only submission to God's will and

obedience to His law that one may achieve peace and well-being (Abdulati, 2002). Thus, Islam takes an active approach to spirituality such that submission to God's will through daily prayer, almsgiving, fasting, reading holy text, and other sacred actions relieve the soul of ignorance and sin and replaces it with purity (Hall & Breland-Noble, 2011). Ghorbani et al. (2002) distinguishes between extrinsic and intrinsic religious motivations that Muslims may hold. For example, there are extrinsic motivations such as worship and belief being a means to avoid hell, and intrinsic motivations such as worship to attain nearness to God. Pargament (2002) states that 'religiosity' is constantly shifting and evolving; thus extrinsic motivations may be a 'first step' towards a deeper, and more sincere spiritual commitment.

Many studies that have sought to measure Muslim religiosity have used measures validated in Western Christian samples (Rippy & Newman, 2006), which may bias or fail to capture the uniqueness of Islam and its specific practices, beliefs, etc. Due to these measures being standardized under a different cultural/religious lens, assumptions of Western 'religiosity' and what it means to be 'religious' may not generalize to Muslim populations. In fact, some scales have been deemed to be culturally insensitive (Ghorbani, Watson & Khan, 2007). Thus, in the process of conducting this study, efforts will be made to utilize a more representative assessment of Islam than has been captured in the past. It is with this framework, that our current study will use a multi-dimensional religious measure that has been standardized and validated on an international Muslim population, including a Muslim-American sample, to better account for facets of religiosity and spirituality that may have been missed or misconstrued in previous studies.

How Muslims utilize Religiosity/Spirituality

There has been a substantial amount of research conducted on Muslim populations to better understand religious coping and well-being. For instance, Aflakseir and Coleman (2009) found that Iranian veterans from the Iran-Iraq war used positive religious coping methods which were positively correlated with mental health and negatively tied to PTSD symptoms. This is consistent with other studies indicating that religious coping may contribute more fully to the mental health of individuals under stress than present health condition, social support, perceived control and cognitive restructuring (Fry, 2000; Pargament, Koenig & Perez, 2000).

In studies of trauma in Muslim population, Scholte et al. (2004) found that 98% of Afghanis in the Nangarhar province, half of whom who had experienced more than eight traumatic events within the past 10 years, reported using Allah or God as their main source of support when feeling sad, worried, or tense. Hestyanti (2006) found that routine involvement in religious activities such as reading the Qur'an fostered emotional resiliency in 50 Muslim children who had survived the Indonesian tsunami of 2004.

Additionally, studies looking at the impact of physical illnesses in Muslim populations; Errihani et al. (2008) surveyed 1,600 Muslim cancer patients in Morocco; 49% described as 'practicing believers' and 51% as 'non-practicing believers'. A significant portion of non-practicing believers reported feelings of fear and divine punishment and even sought to increase religious practices in an extreme manner such as fasting for prolonged periods. Practicing believers, on the other hand, had greater acceptance of their disease and reported feeling 'pride' in being selected by God for this test. Errihani et al. (2008) concluded "religion plays an important role in Muslim patients, whether practicing or not, in their adjustment to the psychological impact of the disease." (p. 100). Eapen and Reyesz (2003) found that 100% of

children in the United Arab Emirates who had been diagnosed with serious forms of cancer reported relying on their Islamic beliefs to cope.

Coping strategies involving R/S may be especially useful for Muslim-Americans, who are at-risk for symptoms of stress relating to prejudice, hate crimes, hateful rhetoric, defamation, job discrimination and Islamophobia (Human Rights Watch, 2002). Indeed, there are numerous examples of well-documented increases in anti-Muslim sentiment in the US. A Pew Research Center analysis on new hate crime statistics indicated that physical assaults against Muslims in the United States surpassed its level in 2001 between the years of 2015-2016 (Pew Research Center, 2017). Various social-cultural stressors including negative media representations may depict Muslims in a discriminatory manner that may exacerbate stress. Saleem and Anderson (2013) found that terrorism cues implicitly activated anti-Muslim biases in more than 200 American participants, indicating a deep association on terrorism and being Muslim. Saleem, Prot, Anderson and Lemieux (2017) found that constant negative media portrayal of Muslims as terrorists led to Americans supporting military action and civil restrictions against Muslims. Pew Research Center also found that almost half of American adults (49%) think that at least 'some' Muslims in the U.S. are anti-American (Pew Research Center, 2016). Abu-Ras and Abu-Bader (2008) found in a qualitative study of 83 Arab-Americans that fear of hate crimes, threats to personal safety, isolation and stigmatization were amongst the most common themes identified by participants. Additionally, it was found that both groups of participants; Arab Christians and Arab Muslims used positive religious coping strategies such as prayer, reading holy text and forgiving those who showed them hatred to reduce stress associated with prejudice.

In a study looking at coping methods of Muslims living in the United States following 9/11, Abu-Raiya, Pargament and Mahoney (2011) found that all 138 participants reported

experiencing at least one negative interpersonal event following 9/11 with 86% reporting hearing anti-Muslim comments, 60% reporting discriminatory acts such as verbal harassment or hate messages and 32% reporting having their mosques damaged. Although some participants employed non-religious coping methods such as reaching out to family and friends for support; most participants employed positive religious coping strategies. Researchers quantified these coping methods through the Positive Religious Coping Scale (e.g., "I did what I could and put the rest in Allah's hands") from the Psychological Measure of Islamic Religiosity (PMIR), which was further associated with greater posttraumatic growth (e.g., joining interfaith groups to educate people about Islamic beliefs and practices). Conversely, participants who employed coping methods which utilized isolation strategies, such as distancing oneself from Muslims and others, and negative religious coping method (e.g., "I felt punished by Allah for my lack of devotion") experienced more depression and angry feelings (Abu-Raiya, Pargament & Mahoney, 2011).

Our current study builds on previously established research that correlates the role of Islamic religiosity in helping Muslims to overcome trauma, stress, and other psychopathological symptomology. Most of the previous research has focused on the reduction of mental health symptoms through religious coping. A novel contribution of this study is that we will look for increases in well-being through measures of Subjective Well-Being and Eudemonic Well-Being, as well as decreases in stress or mental illness symptoms to better account for overall functioning. This is consistent with a shift toward positive psychology in the field of psychological evaluation (Suldo & Shafer, 2008), and the adoption of the Dual Factor Model of mental health by the researcher.

In the Dual-Factor Model of Mental Health, mental health is comprised of two separate dimensions: Psychopathology symptoms (PTH) and subjective well-being (SWB). The dimensions combine to make up four quadrants in which individuals or students, in our case, may be placed depending on the status of their mental health. Individuals who are "distressed" or "troubled" group fall into the high PTH and low SWB category. Individuals who are "externally maladjusted" or "symptomatic but content" fall into the high PTH and high SWB continuums. These two groups usually represent persons who are identified as Emotionally Disturbed (ED) or comprising behavioral disorders and tend to be identified using traditional mental health evaluations. A novel contribution of Greenspoons and Sasklofske's Model is the two other quadrants; individuals who are low in PTH and high in SWB (i.e., well-adjusted, complete mental health, or flourishing) and individuals who are low in both PTH and in SWB ("dissatisfied" or "vulnerable"). This last group tends to go "under the radar" in most traditional mental health evaluations due to their lack of symptomology but have been found in previous research to demonstrate poor physical health and low academic performance (Suldo & Shaffer, 2008). We are hoping, in the present study, to capture these dimensions in college students by considering both symptomology, in this study the presence of stress, and well-being , looking at SWB as in most DFM studies and a unique contribution by looking at Eudemonic well-being, which may be particularly relevant when considering R/S.

College Students & Stress

Most college students are significantly stressed. Past studies have reported that 75-80% of college students are moderately stressed and 10-12% are severely stressed (Pierceall & Keim, 2007; Pryor et al., 2010). Overextended workloads, time management problems, interpersonal

relationship issues, and fear of academic failure may all contribute to stress amongst college students (Pierceall & Kiem, 2007). In a sample of 675 second year university students, Abouserie (1994) found that academic-related issues were the largest indicator of stress. Hudd et al. (2000) found that students exhibiting high levels of stress were more likely to engage in poor health habits and possess lower levels of self-esteem. Pierceall and Kiem (2007) found that female community college students were more stressed than men and those who were least confident in reaching their academic goals felt the most stress. Misra, Crist and Burant (2003) found a bi-directional relationship between general life stress and academic stress in 143 international students such that higher levels of academic stress predicted higher levels of life stress and lower levels of perceived social support. Conversely, greater life stress produced higher academic stress with academic stress mediating the relationship between social support and reactions to stressors. Stress for college students seems to be getting worse. For instance, annual national surveys conducted on 200,000 full-time students at four-year colleges found that the percentage of students rating emotional and mental health as 'below average' rose significantly in the span of 25 years (Lewin, 2011).

A high number of Muslim-Americans are entering academia and the workforce with about 3 in 10 U.S. Muslims having college or postgraduate degrees, the equivalent to the share among U.S. adults as a whole (31%) (Pew Research Center, 2016). Muslims in the U.S. are estimated to become the 2nd largest religious group, behind Christians, by 2040 (Pew Research Center, 2018). The Muslim-American population is also quite diverse, as no racial or ethnic group makes up a majority of Muslim-American adults (Pew Research Center, 2017). In one report of 2016 U.S. Census Bureau data, 41% of Muslims identified as White, a category that includes those who describe their race as Arab, Middle-Eastern, Persian/Iranian and Caucasian

(Turkish, Albanian, Serbian, etc.), 28% identified as Asian, including those from South Asia (India, Pakistan, Bangladesh) and 20% identified as Black. The majority of Muslims polled finds that 3-in-10 Muslim immigrants have arrived since 2010 and that 69% of all foreign-born U.S. Muslim adults have become naturalized citizens. Furthermore, the vast majority of Muslims living in the U.S. are American citizens (82%).

Muslim-American college students may be especially at-risk for symptoms of stress. The combined roles of being both a college student, a religious minority, and an immigrant may highlight this population as being especially at-risk for mental health symptomology. Muslim immigrants, including international students, may be at-risk for acculturative stress which is broadly defined as the process of adapting to a new country (Berry, 1997). Rippy and Newman (2006) contend that second-generation Muslims are more likely to report perceived discrimination because of a renewed sense of group identification post 9-11. Along with the stress accumulated from being a college student, the distorted lens of how Muslims are portrayed in the media have been found to correlate with how Muslim students feel they are perceived by mainstream culture (Ali, 2014). In a qualitative study on 24 Muslim-American college students, each indicated that media portrayals of Muslims as anti-American, violent and greedy affected their daily experiences leading to cultural and personal isolation, notably having to contend with being viewed as a monolith and a singular "Muslim other" (Ali, 2014).

Shammas (2017) studied 16 Muslim-American students in three focus groups and reported that that Arab and Muslim students were two to four times more likely to feel discriminated against by other students, faculty and administration due to their Islamic identity. Important sources of discrimination arose from Arab/Muslim sounding names, wearing of the *hijab* or headscarf, and observing fast during Ramadan. Additionally, Ahmed, Abu-Ras and

Arfken (2014) found that Muslim-American college students, like other emerging adults, engage in a cluster of risk behaviors such as drug usage, sexual behaviors, gambling and tobacco usage. In a sample of 135 Muslim-American college students, 58.5% were found to have engaged in at least one risk behavior. These studies did not measure R/S or well-being. Currently, the lack of research on Muslim-American trends in mental health, particularly from the DFM perspective, indicate a dire need for research on the well-being characteristics of this at-risk population. It is also important to measure the buffering effect of R/S on stress.

It is also important to conceptualize stress through a multidimensional framework to better allow for what specific determinants of an individual's life are causing stress. Perceived Daily Stress, Academic Stress and Physical Stress are three interrelated yet separate constructs related to stress in one's life, particularly in regards to the life of a college student. The current study used this multi-dimensional framework to capture whether the stress Muslim-American college students were undergoing was due to academic concerns ('Finals week' and having to engage in lots of tests), perceived daily stress (discrimination, environmental stressors, etc.) or physical stress (fatigue in engaging in Ramadan).

Spirituality, Stress, and College Students

The Higher Education Research Institute (2011) identified that nearly 3 in 4 college students in the U.S. consider themselves to be spiritual with more than half (54%) identifying themselves as religious. The Higher Education Research Institute (2003) also found that 69% of first-year college students identified their religious or spiritual beliefs as sources of strength, support and guidance. Schubmehl, Cubbellotti and Van Ornum (2009) also found a significant correlation between GPA scores and Index of Spiritual Experiences scores in 247 Marist College sophomores and juniors. Zera (1989) also found that 251 college students who had a higher

degree of religiousness had better GPA scores than students who did not. Schubmehl et al.
(2009) posit that religion/spirituality may help college students have a sense of control in their
lives and maintain equilibrium, despite rapid adjustments to new environments. Vespa et al.
(2010) also found that patients who had developed lung or large bowel cancer who had high
levels of Inner Spirituality and high levels of Subjective Well-Being (SWB) were able to
maintain psychic and emotional equilibrium in the presence of stress.

There is research to indicate that Muslim students may utilize their Islamic religiosity to
overcome stress and other psychopathological symptoms, as well as enable well-being.
Kurniawan, (2018) found that Indonesian undergraduates had stronger positive associations to
mental and socio-emotional health when they committed themselves to God through Islam.
Ghorbani et al. (2002) also found that Iranian-Muslim college students utilized both external and
internal religious motivations to overcome psychological disturbances such as depression and
anxiety. Khan and Watson (2006) surveyed 129 Pakistani college students on relationships with
religious coping and maladjustment (anxiety, depression, hostility). Greater religious interest was
related to significantly less depression and negative religiosity, such as feeling punished or
abandoned by God, was positively correlated with depression, anxiety and hostility. Aguilar-
Vafaie and Abiarri (2007) found that religious coping was positively related to problem solving,
seeking guidance/support and positive reappraisals in 365 Iranian Muslim college students. A
follow-up study was then administered to 2nd sample of 176 college students (39% female). In
this second study, religious coping was again positively correlated to problem solving, seeking
guidance/support, and acceptance in both men and women (Aguilar-Vafaie & Abiarri, 2007).

Islam has been found to be a central component of Muslims' well-being. A series of
interviews conducted by Abu-Raiya et al. (2008) examining religious/spiritual beliefs across 18

countries found that the nations where Islam was practiced highly were the most likely to self-report as 'highly religious.' In addition; Gardner Krageloh and Henning, (2013) found that international Muslim students were found to be more spiritual/religious than domestic Muslim students in a sample of 114 Muslim students in New Zealand. International Muslim students also utilized more religious coping strategies; the role of being a college student, a religious minority and a recent immigrant were hypothesized to have led to these students using their R/S more strongly. Similar studies have found that students suffering from the most serious conditions of trauma such as homelessness may benefit the greatest from emotional regulation and mindfulness training (Viafora, Mathiesen, & Unsworth, 2015). Abdel-Khalek and Lester (2007) found that levels of religiosity were significantly higher among Muslim university students in Kuwait compared to Christian university students in the US. Researchers in New Zealand also found significantly higher reports of religiosity/spirituality in international Asian students (mostly Muslim), in comparison to domestic students and European students (Hsu et al., 2009; Chai et al., 2012). Asian international students also reported significantly lower scores on Quality of Life (QOL) measures indicating heightened stress levels and utilized religious coping strategies much more than nonreligious students. The use of religious coping strategies improved psychological and social QOL scores for Asian students significantly (Chai et al., 2012).

Christian Spirituality & Well-Being

Most studies looking at the associations of R/S and well-being have used Christian participants (Koenig, 2011). This may be due to the prevalence of Christians in the US. The most recent Gallup survey (Newport, 2017) conducted on 126,965 adults in the U.S. found that Christians make-up about 75% of Americans with 49% identifying as Protestant, 23% as Catholic and 2% as Mormon. A little more than one third (37%) of Americans in the same

survey were reported as being 'highly religious' based on self-reports of church attendance and importance of religion in their daily lives.

Substantial research has found a strong association between SWB, happiness and R/S in Christian populations (Cohen, 2002). Fewer studies have compared Christians and other religious groups. Park and Folkman (1997) found in a comparison between religious motivation in Jews and Christians, that Christians tended to find meaning in their lives by turning to God, whereas Jews tended to cope by belonging to meaningful social groups. Cole and Ahmadi (2010) in a comparison on 66 Muslim-American student and 70 Christian-American student experiences found that the two groups did not differ significantly on their academic performance (GPA), average amount of hours spent studying, time spent discussing politics/religion, support they received from faculty, satisfaction in college and taking ethnic study courses. The study did find that Muslim students had more diversity-related activities, such as attending cultural awareness workshops, socializing with someone of a different ethnic group than their Christian counterparts. Christian students were found to spend more time in religious service or prayer than Muslim students as well (Cole & Ahmadi, 2010).

Most adherents to Christianity, particularly those who are Protestant, believe in order to reach salvation a personal relationship with God must be established (Cohen, 2002). This is similar to the Islamic position of attaining nearness to Allah or God as a means of reaching peace and happiness in this life and the hereafter (Abdulati, 2002). It is with this commonality amongst others (a belief in the Day of Judgement, a belief in most of the same prophets such as Moses, Jesus, Abraham, Noah, etc., charity and almsgiving as integral parts of one's faith, and similar rituals such as fasting during Ramadan and lent) that a Christian college student comparison group was used with the same measures of R/S (accommodated for Christian R/S), well-being

and stress. Thus, although there are some strong similarities between Muslim and Christian R/S; however, there are also notable differences between the religions including stressors unique to Muslims, it seems important to study Muslims specifically in order to understand the relationship between R/S and mental health.

Islamic Religiosity/Spirituality and Well-being

As it currently stands, there is very little psychological research which looks at the intersectionality of Islamic R/S and facets of well-being in Muslim-American college students. Furthermore, we are not aware of any research to indicate whether the dual-roles of being a religious minority and a college student, which has been shown to exacerbate stress (Pierceall & Keim., 2007), are affecting the mental and socio-emotional health of Muslim-American college students. Considering that the rate of Muslims entering academia and the workforce is already high and expected to rise (Pew Research Center, 2017), it is important to understand this population in a culturally sensitive manner and to broaden the research which can help better improve the complete mental health of this population. This requires the study of R/S and well-being.

The importance of overall psychological health on academic outcomes and students school engagement are worth noting. Lyons, Huebner and Hills (2013) found that using the Dual-Factor Model in predicting middle school students' academic performance and student engagement revealed changes in students' GPA, as well as behavioral, cognitive and emotional engagement over a five month time span. Students in the Positive Mental Health group (low psychopathology, high well-being) had the highest average GPA across all indices 5 months later, as well as positive emotional engagement. This builds on previous research which has found that students who report higher life satisfaction tend to receive higher grades over time

(Suldo et al., 2011). Our current study will seek to develop a more complete understanding of psychological health by targeting Eudemonic Well-Being, as well as Subjective Well-Being. Minimal research exists on the impact of religiosity on both dimensions of well-being, let alone its impact on college students, who are especially at-risk for mental health symptomology (Pierceall & Keim., 2007).

Two Kinds of Well-Being

Well-being is a heterogeneous concept with potentially different implications for various types of well-being. The Hedonic worldview equates well-being with subjective happiness, pleasure and momentary experiences of positive over negative affect (Diener, 1984). Hence, an individual would be experiencing high subjective levels of well-being (SWB) if they reported satisfaction in life and greater experiences of pleasure and positivity, over displeasure and negative affectivity (Diener & Lucas, 1999).

The eudemonistic worldview considers well-being as consisting of more than just happiness. From this perspective well-being captures aspects of self-actualization, living well and reaching one's potentials by developing inner capacities that serve to make an individual more fully functioning (Deci & Ryan, 2001). From a eudemonistic perspective, subjective reports of happiness would not capture the true psychological, emotional and social functioning of an individual. A eudemonistic approach is multi-faceted exploring points of convergence between various functioning traits including self-acceptance, personal growth, purpose in life, positive relations with others, environmental mastery and autonomy (Ryff, 1989). Some philosophers and spiritual leaders have even denigrated the notion of happiness. For example, Aristotle considered the attainment of happiness to be a vulgar ideal, turning humans into slaves of their whims and desires (Deci & Ryan, 2001).

For practicing Muslims, the goal of life is not to attain complete happiness, but rather a complete submission and orientation towards God to release oneself from internal and external demands of the world (Ghorbani et al., 2002). Many passages in the Qur'an support the idea that attainment of worldly pleasures is not the ultimate purpose for Muslims. For instance, "And do not extend your eyes toward the splendor of worldly life…the provision of your Lord is better and more enduring." (Qur'an 20:131). Even the term *Islam* translates to "surrender" or "submission" where abiding in mind, body and spirit to the will of God brings harmonious peace to the individual (Gordon, 2002). This paradigm lends itself more closely to a eudemonistic worldview, where mastering one's desires/pleasures through struggle and self-discipline brings one closer to self-actualization.

Joshanloo et al. (2011) found that 300 Iranian undergraduate students from the University of Tehran (297 of whom were Muslim) had higher correlations between predictors of religion/spirituality and eudemonic aspects of well-being than those relating to hedonic aspects of well-being. Ryff's (1989) scale of PWB was used, as well as Keyes's (1998) scale of social well-being and Diener et al. (1985) Satisfaction with Life Scale to measure SWB. Researchers found that nearly 30% of the total variance in EWB was explained by spiritual/religious factors ($R^2 = .287$, $F(4, 212) = 22.70$, $p < .001$). Although both SWB and EWB were positively correlated with R/S; only spirituality was a significant predictor of all three aspects of well-being (i.e., EWB, social well-being, & life satisfaction) when religiousness was removed from the analysis. Joshanloo et al. (2011) suggests that Iranian culture, where personalized religion is the norm particularly amongst youth, may be the reason as to why intrinsic spiritual motivations were higher predictors of EWB and SWB.

Our current study will explore the multi-dimensional construct of Islamic religiosity, as well as spirituality, EWB, and SWB, to better understand what specific facets of religion/spirituality are implicated in well-being amongst ethnically diverse Muslim college students. Considering that these dimensions span across cognitive, behavioral, motivational and emotional aspects of functioning, it is likely that they will affect mental health and well-being in college students (Fatima, Sharif & Khalid, 2018). Krok (2015) highlighted the need to assess specific religiosity factors in relation to EWB of students, to better understand the mechanisms by which students utilize R/S to enable well-being. Using this multidimension model, our study will explore the multi-faceted aspects of religiosity by using Abu-Raiya's Psychological Measure of Islamic Religiosity (PMIR) (2008) which assesses seven distinct but highly reliable factors including: Islamic Beliefs, Islamic Ethical Principles & Universality, Islamic Religious Struggle, Islamic Religious Duty & Obligation, Islamic Positive Religious Coping & Identification, Punishing Allah Reappraisal and Islamic Religious Conversion.

A key consideration in this study is that R/S and well-being are inter-related as a malleable factor, thus making them amenable to intervention. In this study, the authors conceptualize Muslims' observance of Ramadan as a natural intervention that can increase R/S and thereby change well-being. Data will be collected before, during, and after Ramadan to capture fluctuations related to this major event in the Muslim calendar. We will collect R/S and well-being data from a Christian student sample at the same university as a methodological control for potential secular trends in the data, such as the stress related to the end of the semester.

Ramadan

Ramadan, or *sawm* (month of fasting) is a requirement of the Islamic faith. During this sacred month, Muslims cannot eat, drink, smoke, engage in sexual activity or commit other 'acts of pleasure' from sunrise to sunset (Abu-Raiya, 2012). Ramadan is seen as a time to engage in self-mastery of one's physical desires and to concentrate on one's relationship with God. Thus, while reducing hedonic well-being during the day, Ramadan should raise Eudemonic well-being. This is also a time of renewal, with anticipated effects on religiosity and spirituality.

Although Ramadan is a key time in the life of Muslims, we could not find any research that has been conducted to understand whether eudemonic traits of well-being correlate with times of higher spiritual focus in Muslim participants. Steffen (2012) proposes a eudemonic framework to understand the context of religion/spirituality during Ramadan, EWB emphasizes continued meaning and growth that develop over time. Key moderators such as meaning, self-control and, relationship development, which have been found in the religion/spiritual literature, are closely associated with eudemonia and have implications for health as well as R/S (Steffen, 2012). However, most studies that have measured religion/spiritual correlates with health have done so with measures of SWB; measuring traits relating to happiness, affect and satisfaction in life (Koenig, 2008). Steffen (2012) emphasizes that researchers must shift to a eudemonic perspective in measuring religiosity/spirituality and health, instead of just capturing levels of happiness or positive affect.

An important health consideration related to R/S is alcohol consumption. Celen (2014) found that Ramadan was associated with reduced alcohol consumption in Turkey (a majority Muslim country). He looked at observable trends in alcohol production and consumption for 50 months from March 1998-April 2002, finding Ramadan to be the highest significant predictor of low alcohol consumption compared with temperature of the year, price of alcohol and disposable

income. This was a big enough effect that brewery product decreased by 3-4% when the number of days in Ramadan increased by 1.

Feelings of vitality are an important health consideration associated with EWB (Huto and Waterman). Many studies have found higher mood enhancement and lower psychopathological scores in Muslims who engage in Ramadan (Azizi, 2010). Researchers looking at the effects of Ramadan on 313 nurses in Iran, 30% of whom were suffering from mild to severe depression, 34% from symptoms of anxiety and 33% with moderate to extreme stress before Ramadan. Post-Ramadan scores indicated a 10% decrease in stress levels, 4% decrease in anxious scores and 6% decrease in depressive scores (Koushali et al., 2013).

In contrast, to the studies of Azizi et al. (2010) and Koushali et al. (2013), multiple studies have found that negative mood and fatique are associated with Ramadan (Kadri et al., 2000). Nugraha et al. (2017) found that fatigue scores for Muslims in Germany who were fasting during Ramadan were higher than a non-fasting control condition group. Simlarly, Kaaragaglou and Yucecan (2000) found that 84% of respondents felt tired and fatigued, as well as 63% felt sleepy and irritated throughout their day, with half complaining of severe headaches in a survey of 750 Turkish Muslims during the time of Ramadan. Soh et al., (2010) also found that Malaysian men and women cited poor-motivation as the primary reason for their inactivity and lethargy during Ramadan.

Aklandari et al. (2012) posit that disruption to daily routine where socio-religious practices take priority reduces time for individuals to engage in activities they would normally do cause the negative mood and fatigue reported in surveys during Ramadan. Consistent with Aklandari's hypothesis, Waterhouse (2010) found a drastic shift in the body's circadian rhythm due to the altered meal and sleeping schedule associated with fasting periods. Of note, these

negative effects seem to be largely on Hedonic well-being, and prior research did not examine Eudeomonic well-being. It is theoretically possible for SWB to be low while EWB is increasing (REF).

Ramadan and College Students

To the best of our knowledge, the effects of Ramadan has not been explored amongst Muslim college students. Previous research indicates that the time of Ramadan is a spiritually salient time of the year for Muslims globally, where individuals engage in religious practices, community worship, fasting, and religious observance. The Qur'an highlights the role of Ramadan in the lives of Muslims; "O you who believe, fasting is prescribed to you as it was prescribed to those before you, so you may learn self-restraint" (02:183). Hence, Ramadan can be seen as a spiritual intervention where Muslims engage in observance of Islam in a more rigorous and demanding manner to bring themselves closer to God. Abdulati (2002) explains that the role of a Muslim in this life is most importantly to submit to God completely with sincere obedience so that one may achieve peace and well-being. Ramadan is a salient time and commonly observed opportunity to fulfill a critical obligation.

Our current study will explore the role of Islamic religiosity and spirituality on the well-being of ethnically diverse Muslim college students at a major university in the southern part of the United States. In this study, multi-faceted dimensions of Islamic religiosity/spirituality will be assessed along with multiple measures of well-being to better understand the correlates of specific factors of religiosity and well-being in enabling psychological health. College students will be assessed three times: Two-weeks prior to Ramadan, during Ramadan, and two weeks after Ramadan. This study is designed to better understand how 'heightened' levels of religiosity during a spiritually salient time of the year (e.g., Ramadan being Holiest Month of the year for

Muslims) affect overall functioning of Muslim college students. Additionally, Perceived Stress will also be measured as college students are especially at-risk for symptomology relating to stress. This will be amongst the first studies to assess the trends of Muslim mental health at a college setting in the U.S., as well as the first study to examine effects of R/S on mental health and multiple types of well-being during Ramadan. This is important research because observance of Ramadan is a worldwide phenomenon practiced by more than 1.5 billion people on Earth, including hundreds of millions of students.

Significance of this Study and Research Questions

Minimal research has been conducted on Muslim-Americans, despite the fact that they are predicted to become the 2nd largest religious group in the United States by the year 2040 (Pew Research Center, 2018). Growth of this group has not necessarily resulted in better understanding or acceptance. Incidents of hate crimes, prejudice, job discrimination, negative media representation and harassment are a common occurrence in the lives of many Muslim-Americans (Pew Research Center, 2017). Muslim-American college students may be especially stressed due to the burdens placed by university life such as overextended workloads, interpersonal difficulties and time management (Piercall & Kiem, 2007).

Religion is an important value for most Muslim Americans, and may be an important resource for coping with stress. For instance, in the first ever cross-religious comparison of life-changing religious/spiritual experiences in the United States; Gutierrez, Hale and Park (2018) found that Muslim-Americans ($n = 96$, M = 3.04) were more 'religious' than American Jews ($n = 85$, M = 2.38), Catholics ($n = 226$, M = 2.61), Buddhists ($n = 98$, M = 2.43), Hindus ($n = 95$, M=2.78), and Protestants ($n = 259$, M = 2.79) Research has found that Muslims utilize their beliefs regularly to help them cope with stress (Gardener, Krageloh & Henning, 2014). Thus, we

predicted that seasonal variations in Muslim religious observance may differentially affect stress and various types of well-being. Accordingly, the measures in this study--which will be completed before, during, and after Ramadan—will include self-reported religiosity/spirituality, daily stress, academic stress, eudaimonic well-being, and hedonic well-being.

A plausible and feasible control group for this study is Christian students. This group is prevalent at the institution where the study is taking place and will not have any major religious events happening during the study period. Previous research has found minimal differences between Muslim-American and Christian-American students in average college grades, satisfaction with college experience, time spent studying, time spent discussing religion/politics and perceived support from faculty. On the other hand, studies have found demographic differences such that, compared to Christian students, Muslim students more likely to be older, non-U.S. citizens, speak English as a 2nd or 3rd language and represent a greater diversity of racial/ethnic groups (Cole & Ahmadi, 2010). Therefore, in this study demographic variables such as age, gender, academic standing, English fluency, US nativity, and ethnicity will be used as control variables in the regression equations.

Having a non-Muslim control group if important in this study because in the study year Ramadan overlaps with the end of spring semester.   We expect that end of the semester due dates and final exams can impact stress and well-being. The non-Muslim sample of students at the same institution is expected to control for academic or other end-of-the-semester life stressors.

After controlling for demographic differences and end-of-the-semester effects, it is predicted that during Ramadan, Muslim students will report an increase in R/S and eudaimonic well-being.   This is because we expect that Muslim students participating in Ramadan, which

would bring them closer to God and develop their spiritual potentialities, will feel a more profound sense of purpose, enhanced self-discovery, develop their best potentials, have them invest in pursuits of excellence and have more intense involvement in activities. These are the five dimensions of the eudemonic well-being scale used in this study. In comparison to the Christian student group, who will not be undergoing a highly religious/spiritual stimulus like Ramadan, we do not expect an appreciable amount of change on R/S or eudaimonic well-being.

The primary research question in this study is: how does Ramadan affect R/S, well-being, and self-reported health? The variety of measures in the study allow for asking some other unique questions in the study of Muslim students in America. This includes, what aspects of R/S change during Ramadan, what aspects of well-being (i.e., EWB vs. SWB) change during Ramadan, and what specific aspects of health are impacting by Ramadan, including stress and reports of fatigue and physical symptoms.

Hypotheses

The study hypotheses will be tested by a quasi-experimental 2 x 3 mixed ANCOVA design. There between-subjects factor is the two groups (i.e., Muslims and Christians) and the within-subjects factor are the three time periods. Measurement time 1 is before Ramadan and Finals. Measurement time 2 is during Ramadan and finals. Measurement time 3 is after Ramadan and finals. Demographic variables will be used as covariates in the analysis.

1) There will be a group by time interaction demonstrating linear increases in five religiosity subdimension mean scores related to embracing religion from T1 to T3 for the Muslim student group relative to the Christian student group which will have stable mean scores from T1 to T3.

     a.   These linear increases will be reflected for five subdimensions of the PMIR scale including religious obligation, religious universality, religious conversion and positive religious coping.

2) There will be a group by time interaction demonstrating decreases (significant negative slope) in two religiosity subdimension mean scores related to distancing from religion from T1 to T3 for the Muslim student group relative to the Christian student group which will have stable mean scores from T1 to T3 (line with no significant slope).

     a.   The linear decreases will be reflected for two subdimensions of the PMIR scale including religious struggle and religious exclusivism.

3) There will be a group by time interaction demonstrating linear increases in spirituality mean scores from T1 to T3 for the Muslim student group (significant positive slope) relative to the Christian student group which will have stable mean scores from T1 to T3 (line with no significant slope).

4) There will be a group by time interaction demonstrating linear increases in Eudemonic well-being (EWB) mean scores from T1 to T3 for the Muslim student group relative to the Christian student group which will have stable mean scores from T1 to T3.

5) There will be a group by time interaction demonstrating decreases in Subjective well-being (SWB) mean scores from T1 to T2 and increases from T2 to T3 that follow an v shape (i.e., lower during the month of Ramadan) for the Muslim student group relative to the Christian student group which will have stable mean scores from T1 to T3.

6) There will be a group by time interaction showing increases in perceived daily stress mean scores in Muslim students from T1 to T2 and decreases from T2 to T3 (i.e., an inverted v shape with higher scores during Ramadan) relative to Christian students who will have stable mean scores from T1 to T3.

7) Similar to hypothesis 6, there will be an effect of time in the form of an inverted v shape with higher scores during finals (which coincides with Ramadan during the study period) on academic stress mean scores in both Muslim and Christian student groups from T1 to T2 and decreases from T2 to T3. No group differences are expected on academic stress.

8) There will be a group by time interaction showing increases in physical symptoms of stress mean scores in Muslim students from T1 to T2 and decreases from T2 to T3 (i.e., an inverted v shape with higher scores during Ramadan) relative to Christian students who will have stable mean scores from T1 to T3.

    a. Eight subdimensions of physical symptoms of stress will reflect these fluctuations including anger/irritability, fatigue, lack of interest/energy/motivation, nervousness/anxiety, headaches, depression/sadness, upset stomach/indigestion and muscular tension.

Because of the rigors of Ramadan, including daily fasting and major changes in daily routines, students observing Ramadan are expected to report higher perceived daily stress scores relative to baseline and the Christian students. Similarly, because Ramadan has been found to be correlated with negative mood states (Kadri et al., 2000), we expect a reduction in hedonic well-being for Muslim students during Ramadan relative to baseline and compared to Christian students during Ramadan, at measurement time 3, which is after completing Ramadan, Muslim

students are expected to have an increase in hedonic well-being and a decrease in daily stress

relative to time 2, which is during Ramadan. However, we predict that during the time Muslim

students will have higher indexes of Perceived Stress and lower indexes of Subjective Well-

Being, in comparison to the Christian student group at time 2. Finally, because measurement

time 1 is before the final exam period, time 2 is during finals, and time 3 is after finals, we

expect both the Muslim and Christian students to report significant changes in academic stress

during time 2 and a reduction in academic stress during time 3. Lastly, we expect an increase

from time 1 to time 2 in physical symptoms of stress for the Muslim student group as previous

research has found higher fatigue for Muslims in comparison to Non-Muslims during Ramadan

(citation) and a decrease from time 1 to time 3 once Ramadan has finished.

Commented [SB1]: This is hypothesis level writing. You can move some of this to the following section, perhaps as a follow-up explained each hypothesis.

Method

Participants

Participants were 164 college students from a university with over 45,000 students in the

Southern part of the United States. Approximately 82 Muslim students were recruited from

contact with various organizations, including Muslim Student Association and United Muslim

Relief Organization, flyer, and other recruitment procedures (e.g., word of mouth). The

university in which the study occurred in is ranked consistently as the one of the most diverse

universities in the country. Accordingly, consideration was made to adequately cover the

diversity of Muslim participants in the from the university including ethnicity, gender, sect of

Islam and language.

Recruiting methods included word-of-mouth, social media, speeches during various

meetings and Friday prayer (*jummah)* and setting up connections with Muslim and Christian

youth leaders in the local area. Participants were asked to provide a valid email, secondary email and phone contact. A brief description of the study was provided which included information regarding confidentiality, informed consent, right to opt out of the study, and importance of the study on college student mental health. Muslim student group was left blind to their being a comparison group and did not know that their scores were being compared to a Christian student group. Lastly, information was also provided on a $100 gift card that could be won by one participant if they completed all three surveys spread across three months.

Christian students (n=82) were recruited in a similar manner as Muslims, with most coming from various denominational Christian student organizations. Importantly, the Christian student group was left blind to the Muslim student group and provided with information in regards to the aim of the study being to determine the 'effects of religious/spirituality on overall college student well-being' with no mention of Ramadan or Muslim mental health. Although, the 3 survey time points coincide with the month of Ramadan; this information was left out for the Christian student group, instead informing the participants of the necessity for measuring R/S across multiple time points (from April to June) to better account for fluctuations of R/S across a length of time.

The participants in this study came from a university situated in the one of the most diverse cities in the United States (NCES, 2018). In the final analysis, there were 84 self-identified Muslim-American college students and 83 self-identified Christian college students who participated in the study. The demographic information is presented for both student groups in Tables 1-5 below.

Table 1. *Demographic data for Muslim and Christian college students; percentage of sample size from different university standings.*

University Standing	Muslim college student frequency	Muslim college student percentage	Christian college student frequency	Christian college student percentage
Freshman	18	21.4%	31	37.3%
Sophomore	19	22.6%	24	28.9%
Junior	17	20.2%	20	24.1%
Senior	18	21.4%	7	8.4%
Post-Baccalaureate	3	3.6%	0	0%
Master's Graduate Student	3	3.6%	0	0%
Doctoral Graduate Student	6	7.1%	1	1.2%
Total	84	100%	83	100%

Table 1 indicates that the majority of students in both Muslim and Christian groups were Freshmen or Sophomore (Muslim students – 44% & Christian students – 66.2%). Muslim student group also had a much higher percentage of higher education students (n = 12) in comparison to Christian students (n=1). Age differences have been noted in accounting for differences in R/S and well-being profiles, future research may want to look specifically at these trends in older-aged students. Both our student populations were close in relative age with the mean age for the Muslim student group being 21.7 years and the Christian student group being 20.8 years

Table 2. *Demographic data for Muslim and Christian college students; percentage of sample size of different genders.*

Gender Choices	Muslim college student frequency	Muslim college student percentage	Christian college student frequency	Christian college student percentage
Male	39	46.4%	17	20.5%
Female	45	53.6%	65	78.3%
Prefer not to say	0	0%	1	1.2%
Total	84	100%	83	100%

Table 2 indicates that there was a much larger percentage of Female Christian students (78.3%) in comparison to the Muslim student group, which had a much more equal percentage between male (46.4%) and female students (53.6%). Research has found that Christian females are generally more religious/spiritual than males on certain dimensions such as private religious activity and that these differences do not hold for Muslims as males are shown to be more religious (at least in Islamic majority countries) (Lee & Zhang, 2018). These findings have never been replicated on Muslim-American populations; future studies can more concretely parcel out how R/S and well-being profiles differ for female/male Muslim-Americans.

Table 3. *Demographic data for Muslim and Christian college students; percentage of sample size of different race/ethnicities.*

Race/Ethnicity selection	Muslim college student frequency	Muslim college student percentage	Christian college student frequency	Christian college student percentage
Caucasian	3	3.6%	20	24.1%
African/African-American	4	4.8%	19	22.9%
Hispanic/Latino	3	3.6%	35	42.2%
Asian (East Asian)	18	21.4%	9	10.8%
South Asian	56	66.7%	0	0%
Arab/Middle-Eastern	21	25%	3	3.6%
Native-American/Indigenous	6	7.1%	0	0%
Other/Mixed/Prefer not to say				
Total	84	100%	83	100%

Table 3 indicates that the largest ethnic percentage of Christian students were Latino (42.2%), followed by African-American (22.9%); whereas the largest percentage of Muslim students were South Asian (66.7%), followed by Arab/Middle-Eastern (25%). African-American Muslims account for the largest racial/ethnic category of Muslim-Americans; a low percentage (n = 4) in the current study may account for lower rates of participation in student organization. Caucasians make-up the largest percentage of Christians in the U.S., with most research in R/S being used

on White Christian populations (citation). The current study had a very large percentage of

Latino Christian students (n = 35) which can account for some novel differences in the findings.

Table 4. *Demographic data for Muslim and Christian college students; percentage of sample size from various countries of origin.*

Country of origin selection	Muslim college student frequency	Muslim college student percentage	Christian college student frequency	Christian college student percentage
Naturalized citizen	24	28.6%	12	14.5%
International student	7	8.3%	5	6.0%
Born in the U.S.	52	61.9%	66	79.5%
Total	83	98.8%*	83	100%

*1 student's demographic data for this choice was missing.

Table 4 indicates that the majority of both Christian (79.5%) and Muslim students (61.9%) were

born in the U.S. with a notable percentage of Muslim students reporting as naturalized citizens

(28.6%). Although the majority of Muslim-Americans are immigrants (Pew Research Center,

2017), the current study had about an equal number of international students in the Muslim group

(n = 7) and the Christian group (n = 5) with a much higher number of naturalized citizens in the

Muslim group (n = 24) as compared to the Christian group (n = 12). Future studies may want to

look specifically at how trends of R/S and well-being differ for Muslim students who are

relatively new to the U.S., as compared to naturalized citizens and those born in the U.S.

Previous research has found that that Muslim international students were more religious then their domestic Muslim counterparts in New Zealand (Chai et al., 2012).

Table 5. *Demographic data for Muslim college students; identification of different sects of Islam.*

Sect of Islam selection	Muslim college student frequency	Muslim college student percentage
Sunni (Malaki, Shafi, Hanbali, Hanafi)	51	60.7%
Shia (Ja'fari, Zaidi)	20	23.8%
Sufi	4	4.8%
Ismaili	3	3.6%
Ahmadi	2	2.4%
Non-Denominational/Just Muslim	3	3.6%
Total	83	98.8%*

Table 5 indicates that the majority of Muslim students belonged to the Sunni sect of Islam (60.7%) followed by the Shia sect (23.8%). Most R/S research has only used heterogenous groupings of participants, there is zero research looking at comparative profiles of psychological health in intra-religious groups in the Muslim community. Future studies can compare how Orthodox groups such as the Sunni sect which accounts for 80-85% of Muslims worldwide differ in R/S and well-being profiles as compared to minority sects such as Shia, Ahamdi, Zaidi or Ismaili sects.

*1 student's demographic data for this choice was missing.

Table 6. *Demographic data for Christian college students; identification of different denominations of Christianity.*

Denomination of Christianity selection	Christian college student frequency	Christian college student percentage
Catholic	35	42.2%
Baptist	16	19.3%
Methodist/Wesleyan	6	7.2%
Lutheran	1	1.2%
Presbyterian	1	1.2%
Pentecostal/Charismatic	1	1.2%
Episcopalian/Anglican	4	4.8%
Evangelical	2	2.4%

Churches of Christ	2	2.4%
Non-Denominational/Other	15	18.1%
Total	83	100%

Table 6 indicates that the majority of Christian students were Catholic (42.2%), followed by Baptist (19.3%). The next largest Christian category chosen was non-denominational/other (18.1%). The most recent Gallup survey (Newport, 2017) conducted on 126,965 adults in the U.S. found that Christians make-up about 75% of Americans with 49% identifying as Protestant, 23% as Catholic and 2% as Mormon. A little more than one third (37%) of Americans in the same survey were reported as being 'highly religious' based on self-reports of church attendance and importance of religion in their daily lives.

Religious duty questions from the PMIR were asked to Muslim participants for a better understanding of likelihood in participating in Ramadan. "How often do you pray" question found that the majority of Muslim students prayed all of the 5 daily prayers (65.4%) with 19% reporting 'several times a week.' "How often do you fast" question found that the majority of Muslim students fasted the entire month of Ramadan (85.4%) with 39.3% indicating that they also observed additional days of fasts as well. The last question "Except in prayers, how often do

you read or listen to the Holy Qur'an?" found that 22.6% did so 'about once or twice a week',

31% did so 'a few times a month' and 25% did so 'few times a year.'

Design

  The study hypotheses were tested by a quasi-experimental 2 x 3 mixed ANCOVA design.

There between-subjects factor is the two groups (i.e., Muslims and Christians) and the within-

subjects factor are the three time periods. Measurement time 1 is before Ramadan and Finals.

Measurement time 2 is during Ramadan and finals. Measurement time 3 is after Ramadan and

finals. Statistical analyses procedures included a repeated measures ANCOVA through SPSS.

Mean scores were derived from each outcome variable and created as three separate mean scores

to reflect the three time periods (i.e., Pre-Ramadan, Ramadan and Post-Ramadan). Thus, a 3-

level within-subjects factor was created so that each of the 3 means for the 19 outcome variables

could be included. Religion (i.e., Muslim or Christian) was used as the between-subjects factor

and six covariates were also included in the analysis: Gender, academic standing, country of

origin, English fluency and ethnicity. The indicator to determine the effect of Ramadan was the

group by time interaction. Statistical program SPSS was used for all data analysis purposes.

  First survey was sent via Qualtrics through Muslim students' primary and secondary

emails two weeks prior to the start of Ramadan (T1). The initial baseline survey (T1) had

students report their demographic data including gender, age, college standing (freshmen,

sophomore, junior, senior, postbaccalaureate, graduate student, etc.), country of origin ('if they

were from another country' an additional option asked 'how long they had been in the U.S?'),

sect of Islam (Shia, Sunni, Sufi, Ahmadi, Ismaili, Other) and level of religiosity were reported.

Open-ended questions also ascertained how many days participants 'intended' to fast and what

their primary motivation was in participating during Ramadan ('to get closer to God,' 'to become a better Muslim', etc.).

A similar baseline survey (i.e., T1) was sent via Qualtrics to the Christian student group with questions indicating students gender, age, college standing (freshmen, sophomore, junior, senior, postbaccalaureate, graduate student, etc.), country of origin ('if they were from another country' an additional option asked 'how long they had been in the U.S?'), and sect of Christianity they belonged to (Methodist, Baptist, Episcopalian, Catholic, Protestant, Eastern Orthodox, Anglican, & Non-Denominational). Items were reformatted from the PMIR scale (normed and meant for use on Muslim populations) to reflect a Christian worldview, thus an example item such as "I read the Holy Qur'an because I would feel guilty if I did not" was changed to "I read the Holy Bible because I would feel guilty if I did not."

A second survey was sent out during the last week of Ramadan (T2). This is an especially spiritual time of the year for Muslims, as various Islamic sects consider the 21st, 23rd, or 27th of Ramadan to be the 'Night of Power' (*Laylat al-Qadr)*, the night in which the Qur'an was first revealed to the Prophet Muhammad. This night is explicitly mentioned in the Qur'an: "The Night of Power is better than a thousand months. Therein come down the angels and the Spirit by Allah's permission, on every errand; Peace! This until the rise of dawn!" (*Qur'an* 97:1-5). Muslims engage in various practices through these nights such as a longer prayer which extends throughout the night to attain nearness to God. Other items on the second survey were the same as the baseline survey, removing the demographic questions and motivation in fasting open-ended response.

The final survey was sent two weeks after Ramadan had concluded (T3). This survey repeated previous measures, plus additional questions asking 'how many days participants had

fasted' and whether participants 'met the same goal they had answered before Ramadan had

started.' Excel sheets were created to track the responses of the students so that those who did

not reply could be sent a text or sent a secondary email by a Research Assistant, who was not

aware of the student's religion or the aims of the study.

Measures

Stress

      Perceived Stress. The Perceived Stress Scale (PSS) assesses the level of perceived stress

experienced by individuals in relation to their daily lives over the past month (Cohen, Kamarck,

& Mermelstein, 1983). Cohen et al., (1983) found a .84, .85 and .86 Cronbach's Alpha on three

samples: 332 freshmen college students from the University of Oregon (Mean Age – 19); 114

from a single psychology classroom (Mean Age - 20.75); and 64 adults recruited for a smoking

cessation study (Mean Age – 38.4). The PSS has been used previously on a Muslim student

population with good reliability. For example, a Cronbach coefficient of .85 and test-retest

reliability of .85 (after several days) was found in a sample of 588 medical students in Egypt and

Saudi Arabia (El-Gilany, Amr, & Hammad, 2008). Similarly, Gardener et al., (2013) found a

Cronbach's Alpha of .85 using this scale on 114 Muslim university students in New Zealand.

Questions from the 4-item scale are posed on a five-point scale (0 = *never,* 4 = *very often*); a few

sample questions are "In the last month, how often have you felt that you were unable to control

the important things in your life?", "In the last month, how often have you found that you could

not cope with all the things that you had to do?" and "In that last month, how often have you felt

difficulties were piling up so high that you could not overcome them?" These items are summed,

and the total score on the PSS was used in the analyses.

Academic Stress. Three questions were asked to both student groups to more accurately capture the unique sources of stress that students may have. Questions were as follows, "I am worrying a great deal about the effect this semester's grades will have on my future,'' ''I am spending a lot of time thinking about how this semester's grades could negatively affect my educational and career goals,'' and ''I find myself very concerned about the grades I am likely to receive this semester.'' Students answered on a seven-point scale (1 = *strongly disagree*, 7 = *strongly agree*), MacGeorge et al. (2005) found adequate reliability (α = .90) in using these questions on 739 college students in two medium sized Eastern universities. The mean of these three items was used in the analysis.

Physical Stress Scale. Items from the Physical Symptoms of Stress scale were adopted from the American Psychological Association's "Impact of Stress" survey. The survey was polled amongst 1,226 adults along with 1,221 people living with chronic illnesses in 8 major cities in the United States. 2011 survey found that Americans reported irritability/anger (42%) as the number one symptom of physical stress along with lack of interest, motivation or energy (35%), headaches (32%), upset stomachs (24%) and change in appetite (17%). Previous research has correlated periods of intense fasting such as Ramadan with fatigue, headaches and low mood (Nughra et al., 2017) along with periods of high general stress (as may be the case during Finals week) which may also exacerbate physical symptoms of stress. Each item was scored individually (i.e., 8 separate subdimensions of stress); means were derived from the student groups to reflect fluctuations across the 3 time periods.

The current study sought to conceptualize student stress through a multi-dimensional framework by capturing academic stress, perceived daily stress and physical symptoms of stress dimensions including irritability/anger, fatigue, lack of interest/motivation/energy,

nervousness/anxiety, headaches, feeling depressed/sad, feeling as though one could cry, upset stomach/indigestion and muscular tension.

Religiosity/Spirituality. Abu Raiya, Pargament, Mahoney and Stein (2008) developed the Psychological Measure of Islamic Religiousness (PMIR) scale to identify domains of Islam most closely linked to physical and mental health. In-depth analysis of 25 Muslim-American and Israeli-Muslim interviews drew out psychologically relevant measures using the same interview protocol used by Tarakewshwar, Pargament and Mahoney (2003) for measures of Hindu beliefs and practices. Similarly, Piedmont (2001), in a validation study for the Spiritual Transcendence Scale (STS), encouraged researchers to take a multi-dimensional approach to understanding psychological phenomena such as spirituality.

Scales that were used from the PMIR for the purposes of the current study were the Islamic Duty, Obligation and Exclusivism Subscale ("How often do you pray?", "How often do you fast?" which participants answered on a continuum from 0 = Never, 5 = Most of the time, "I read the Holy Qur'an because I would feel guilty if I did not" and "It is more important to be good person than to believe in Allah and the right religion" which was reverse scored). Islamic Ethical Principles and Universality Subscale ("One of my major sources of pride is being a Muslim" which participants scored from 1= Strongly Disagree to 5= Strongly Agree), Islamic Religious Conversion Subscale ("In my life, I have changed from a non-religious person to a religious person" answered on a No-Yes scale, if the participant answers 'Yes' they are posed a few more questions such as 'Becoming more involved in Islam was a turning point in my life' which participants answered on a continuum from 1= Strongly Disagree to 5= Strongly Agree), Islamic Positive Religious Coping and Identification subscale ("When I face a problem in life, I look for a stronger connection with Allah"), Islamic Religious Struggle Subscale ("I find myself

doubting the existence of Allah"). The PMIR scale also asked about participants level of

spirituality ("How do you describe your spirituality" which was answered from 1= Very Low to

5= Very High). The mean of items on these scales were used in the analysis.

Abu-Raiya et al., (2008) found consistent alpha levels on all subscales with an alpha of

.96 on the 14-item Islamic Ethical Principles and Universality subscale, an alpha of .77 on the

12-item Islamic Duty, Obligation and Exclusivism subscale (due to the lower alpha score; 5

questions were used from this subscale), an alpha of .90 on the 6-item Islamic Religious Struggle

subscale, an alpha of .88 on the 14-item on the Islamic Positive Religious Coping and

Identification subscale and an alpha of .89 on the 6-item Islamic Religious Conversion subscale.

Christian Version of the PMIR. The PMIR scales were reformatted for the Christian

student group. Any phrases which used Islamic-specific terminology such as *Allah* or *Qur'an*

were rephrased. Guidance on rewording was provided by two local Christian leaders. For

example, the statement "one of major sources of pride is being a Muslim" from the Islamic

Ethical Principles and Universality subscale was reformatted to "one of my major sources of

pride is being Christian." Other examples of changes include, "I read the Holy Qur'an because I

would feel guilty if I did not" being reformatted to "I read the Holy Bible because I would feel

guilty if I did not." Similarly, the statement "it is more important to be a good person than to

believe in Allah and the right religion" from the Islamic Duty, Obligation and Exclusivism

subscale was reformatted to "It is more important to be a good person than to believe in God and

the right religion" (this item being reverse scored). "Becoming more involved in Islam was a

turning point in my life" (if the participant answered 1 = Yes to "In my life, I have changed from

a non-religious person to a religious person", they were prompted with this question from the

Islamic Religious Conversion subscale was reformatted to "Becoming more involved in

Christianity was a turning point in my life." Each item was scored individually (i.e., 7 separate

subdimensions of religiosity). Means were derived from the student groups to reflect fluctuations

across the 3 time periods.

Finally, a single question was posed from the PMIR scale to ascertain spiritual levels of

the participants. The question posed was 'How do you describe your spirituality?' on a 5-point

likert scale from 1= Very low to 5= Very high. Before answering the item; a differentiation was

made for the participants between religiosity and spirituality with spirituality being an

'individual or experiential commitment to God' (McIntosh, Poulin, Silver &Holman, 2011) and

religion being the organizational structure, ideals, values and beliefs of Islam or Christianity. The

mean of this item was used for both student groups in the analysis across three points in time.

Eudemonic Well-Being. The 21-item Waterman's Questionnaire for Eudemonic Well-Being

(QEWB; Waterman, 2010) was used to assess Psychological well-being based in both student

groups. The 21-item scale explores six-inter-related categories: self-discovery, perceived

development of one's best potentials, a sense of purpose and meaning in life, investment of

significant effort in pursuit of excellence, intense involvement in activities and enjoyment of

activities as personally expressive. The QEWB is scored on a 5-point Likert scale from 1=

Strongly Disagree to 5 = Strongly Agree. Example questions include "I believe I have discovered

who I really am", "I can say that I have found my purpose in life" and "As yet, I've not figured

out what to do with my life" which was reverse scored. Waterman et al., (2010) found a

Cronbach's alpha coefficient of .86 on a sample of 1,728 college students across nine universities

in the United States participants who used the QEWB and a .85 Cronbach's alpha coefficient on

a larger second sample consisting of 5,606 college students across fourteen universities

(Waterman et al., 2010). The mean of the 21-items was used for both student groups across the 3 time periods.

      Affect. Mroczek and Kolarz's Measure of Affect scale (1998) was used to capture positive and negative affect dimensions of both student groups. Positive affect questions included "During the past 30 days how much of the time did you feel…?' with students responding to various emotive states such as cheerful, satisfied, full of life and calm/peaceful. Negative affect questions included "During the past 30 days how much of the time did you feel…" with students responding to various emotive states such as nervous, hopeless and worthless. Mroczek and Kolarz (1998) found a Cronbach's Alpha of .91 on the 6-item positive affect dimension and a Cronbach's Alpha of .87 on the 6-item negative affect dimension. Additionally a Cronbach's alpha of .86 was found using the same scale on 300 Muslim university students in Iran (Joshanloo, 2011).

      The *Satisfaction With Life Scale* (Diener et al. 1985) was used to assess global life satisfaction. This scale is a widely used measure of life satisfaction, consisting of five items. Each item is rated on a 7-point scale ranging from strongly disagree (1) to strongly agree (7) Example items include "I am satisfied with my life" and "If I could live my life over, I would change almost nothing." Diener et al., (1985) found a Cronbach's alpha of .87 and two-month test-retest correlation of .82 on an initial sample of 176 undergraduates at the University of Illinois (for Cronbach's alpha) and a sub-sample of 76 students from the same cohort for the re-administration. A second sample of 163 undergraduate students was used to demonstrate consistency amongst the five-items as measured by item-total correlations (.81, .63, .61, .75 and .66).

Subjective well-being. Most studies assessing subjective or 'hedonic' well-being have defined this construct as both positive over negative affect, called 'affect balance' plus life satisfaction (Diener et al., 1984). Through this hedonic understanding of well-being an individual can be categorized as having high SWB if they demonstrate more frequent positive affect over negative affect in their daily experiences and report that their life is satisfying. In this study, subjective well-being was computed from the Measure of Affect positive and negative affect scales, plus the Satisfaction with Life scale. First each of these scales was standardized into z-score units. Then positive affect and life satisfaction z-scores were added together, and negative affect z-score was subtracted from this total.

Control variables. Demographic variables will also be entered in the data analyses as co-variates; gender, age, ethnicity, academic standing (freshmen, sophomore, junior, senior, post-baccalaureate, graduate student, etc.), country of origin (naturalized citizen, international student and born in the U.S.') with a subsequent question (depending on what the respondents clicked on) asking how long participants had been in the U.S. (1-2 months, 3-6 months, 6-12 months, 1-3 years, 3-5 years, and over 5 years) and what their level of English fluency was (not fluent at all, somewhat fluent, moderately fluent and highly fluent)

Data Analysis

The study is a quasi-experimental, repeated measures mixed ANCOVA design. The within subject independent variable is time (i.e., Pre-Ramadan, Ramadan and Post-Ramadan) and the between subjects condition is religious affiliation (i.e., students belonging to Muslim group or Christian group). The dependent, or outcome variables, which will be assessed are religiosity (several subdimensions including religious obligation, exclusivism, universality,

religious coping, religious struggle and religious conversion), spirituality, well-being (both SWB and EWB), perceived daily stress, academic stress, physical symptoms of stress including anger/irritability, fatigue, lack of interest/motivation/energy, headaches, depression/sadness, muscular tension, nervousness/anxiety, and upset stomach/indigestion. Covariates will also be included in the data analyses to capture individual differences between the Muslim and Christian students' group and to control for these when examining the effects on outcome variables.

G-Power with an alpha level of .05 to find a medium-small effect of ($f^2 = .10$) was used to determine the sample size of 164 was needed to have 80% power. A mixed ANCOVA design with a Group x Time interaction was utilized to test the statistical significance of hypotheses 1 to 8, with graphs and follow-up tests to examine the predicted and observed pattern of results. Mixed ANCOVA assumptions that will be checked, prior to data analyses, will be determining whether significant outliers are biasing the results, using Shaprio-Wilk test of normality and Q-Q plots to check for multivariate normality, using Levene's test to check for homogeneity of variance, and Mauchly's test of Sphericity to determine whether the sphericity assumption holds for the within-subjects factor.

SPSS will be used after checking for mixed ANOVA assumptions to determine whether there is a significant group x time interaction between the Muslim and Christian student groups for the trends in the outcome variables at the three different time points (T1, T2, T3). Different trends in the slope will be assessed for varying hypotheses. For hypotheses 1-3 (R/S & Eudemonic well-being), a linear increase is hypothesized for the Muslim student group across T1-T3, whereas a flat slope is hypothesized for the Christian student group. For hypotheses 4-6 and hypotheses 8 (Hedonic, Daily Stress, Physical Symptoms of Stress), a quadratic trend in the shape of an inverted "v" is expected for the Muslim student group but not for the Christian

student group. For hypotheses 7 (Academic Stress), the same quadratic trend in the shape of an inverted V is expected for both Muslim and Christian student groups.

In the ANCOVAs, if a statistically significant interaction is detected tests of within-subjects effects will be utilized to look at the simple effects across the two groups by doing a repeated-measures ANCOVA for the Muslim and Christian group separately. If a statistically significant interaction is not detected, we will look at the tests of within-subjects effects output tables to interpret the main effects of time for all outcome variables. Also, the between-subjects effects output tables can be examined to see if there were any Christian and Muslim mean score differences between the groups. If either main effect is statistically significant, relevant SPSS statistics will be interpreted from post-hoc tests in the pairwise comparisons table after controlling for the familywise Type-1 error rate.

Results

Statistical analyses procedures included a repeated measures ANCOVA through SPSS. Mean scores were derived from each outcome variable and created as three separate mean scores to reflect the three time periods (i.e., Pre-Ramadan, Ramadan and Post-Ramadan). Thus, a 3-level within-subjects factor was created so that each of the 3 means for the 19 outcome variables could be included. Religion (i.e., Muslim or Christian) was used as the between-subjects factor and six covariates were also included in the analysis: Gender, academic standing, country of origin, English fluency and ethnicity. The indicator to determine the effect of Ramadan was the group by time interaction.

SPSS generated marginal means from the ANCOVA. These were graphed for each

variable along with 95% confidence intervals in Excel. Visual inspection of these graphs was

used to determine whether changes in slopes reflected hypothesized trends. To further aid in

interpretation, Cohen's d was computed between the two religious groups for each time period

for each variable. Furthermore, ETA squared values for the interaction term were computed and

interpreted, when patterns on the graph appeared to match hypothesis. The overall interpretation

of results is presented in Table 1 above. Results for each of the nineteen outcome variables are

explained in detail below with corresponding hypothesis, assumed trendlines, statistical analyses,

graphs and summaries.

Eudemonic Well-Being

Hypothesis 1 was that there will be a group by time interaction demonstrating linear

increases in Eudemonic well-being mean scores from T1 to T3 for the Muslim student group

relative to the Christian student group which will have stable mean scores from T1 to T3.

Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been

violated, X^2 (2) = 1.640, p = .440. After controlling for covariates, a repeated measures

ANCOVA found no significant group by time interactions [F(2, 300) = .357, p = .551]. Also, the

main effect for time was not significant [F (2, 300) = .498, p = .608] and the main effect for

religion was found to not be significant, F (1, 150) = .037 p = .848). The effect size comparing

Muslim and Christian students was small at all three time points, Pre-Ramadan (*d* = .143), during

Ramadan (*d* = -.038) and Post-Ramadan (*d* = .080).

The results of the ANOVA are consistent with visual inspection of the the pattern of

means and 95% confidence intervals shown in Figure 1. Taken together these findings indicate

that Muslim college students and Christian college students do not significantly differ in their

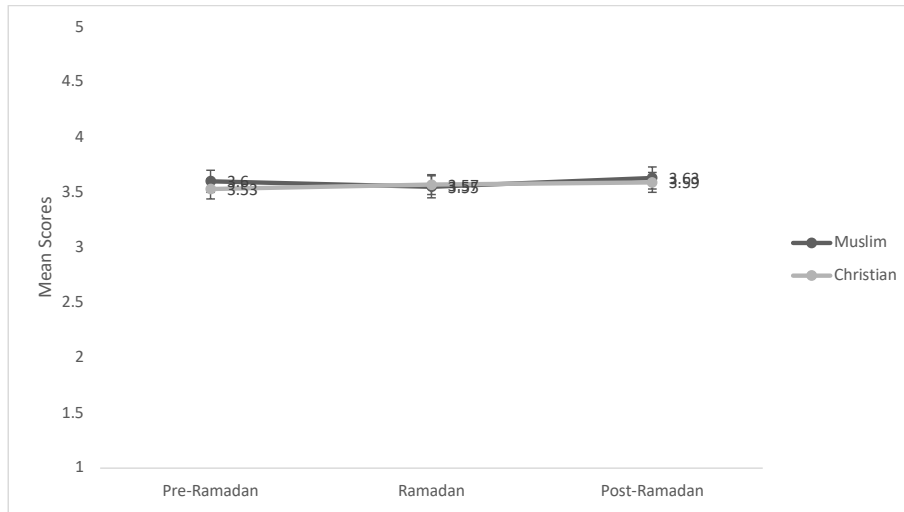eudemonic profiles at each time point.

Figure 1. Mean scores of self-reported eudaimonic scores across Ramadan. Waterman's scale of well-being (QEWB) is rated from (1) strongly disagree to (5) strongly agree. 21 total item mean scores were derived for both student groups. Muslim students did not have significantly higher mean scores across all 3 time points (3.63, 3.59, 3.68) in comparison to Christian students (3.5, 3.53, 3.55). Error bars reflect 95% confidence intervals. There was no time interaction disconfirming the assumed hypothesis.

Subjective Well-Being

The second hypothesis was that there will be a group by time interaction demonstrating

decreases in Subjective well-being mean scores from T1 to T2 and increases from T2 to T3 for

the Muslim student group with a quadratic trend (i.e., a "v" shape) relative to the Christian

student group which will have stable mean scores (i.e., a flat line) from T1 to T3.

Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been

violated, $X^2 (2) = 2.979$, $p = .225$. After controlling for covariates, a repeated measures

ANCOVA found that there was no significant group by time interaction for SWB mean scores [F

(2, 300) = 1.619, p = .200]. A main effect was not found for time [F (2, 300) = .353, p = .703], or

religion, F (1, 150) = .627, p = .430). The effect size comparing Muslim and Christian students

was medium with Muslims higher than Christians Pre-Ramadan (*d* = .470), very small with

Muslims lower than Christians during Ramadan (*d* = -.042) and on the medium side of small

with Muslims higher than Christians Post-Ramadan (*d* = .352). Although the ANOVA results

suggest there are no differences, the effect size data and visual inspection of the patterns of

means on the graph are consistent with the notion that Muslim students had a decrease in SWB

during Ramadan, relative to before and after Ramadan (i.e., the v shaped line). Moreover, this

trend for Muslim students ran counter to the control group. Nevertheless, the partial eta-square

for the group by time interaction as only .011, indicating in the context of all of the variables,

this group by time interaction was small and probably not practically or theoretically meaningful.
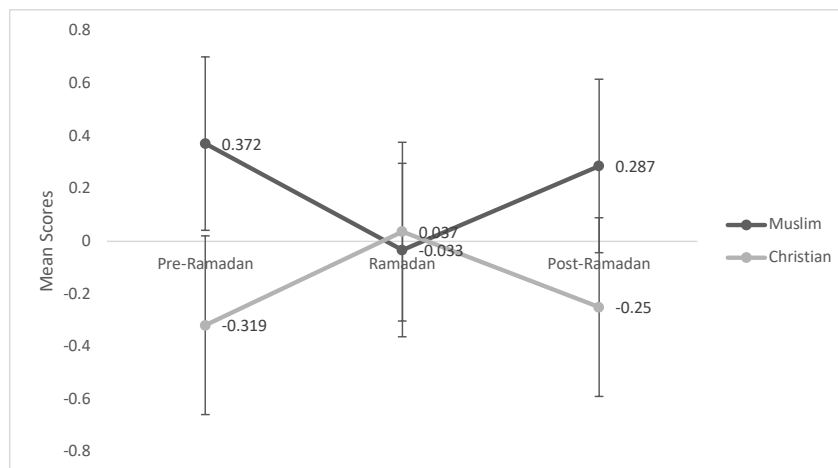
Figure 2. Mean scores of self-reported SWB scores across Ramadan. To calculate the SWB
cumulated score; z-scores were derived from Mroczek and Kolarz Positive/Negative Affect
Scale (1998) and Diener's Life Satisfaction Scale (1985). Positive Affect scores were added with
Life Satisfaction scores and the Negative Affect scores were subtracted from the sum. All items
were rated from (1) to (5). Muslim students did not have significantly higher mean scores across
all 3 time points (0.372, -0.033, 0.287) in comparison to Christian students (-0.319, 0.037, -0.25).

Error bars reflect 95% confidence intervals. There was no time interaction disconfirming the assumed hypothesis.

Spirituality

The third hypothesis was that there would be a group by time interaction demonstrating linear increases in spirituality mean scores from T1 to T3 for the Muslim student group relative to the Christian student group which will have stable mean scores from T1 to T3 (i.e., a flat line with zero slope).

Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been violated, X^2 (2) = 2.870, p = .238. After controlling for covariates, a repeated measures ANCOVA found that there was no significant group by time interactions for spirituality mean scores [F (2, 306) = 1.266, p = .283]. A main effect was not significant for religion, F (1, 153) = 6.30, p = .069) or time [F (2, 306) = .039, p = .962]. Visual inspection of the means and 95% confidence intervals in Figure 3, indicate that all variation in the means is within the 95% confidence intervals. This is consistent with failing to find a significant effect of time or a group by time interaction (i.e., two trend lines with no significant slopes or differences in slopes). Based on visual inspection of the means in Figure 3, there does appear to be a separation of the two groups during Ramadan, with Muslims reporting higher spirituality. This is consistent with variations in effect sizes (Cohen's d) where the effect size for Pre-Ramadan was found to be medium (*d* = .475) with a large effect size during Ramadan (*d* = .874) and a small effect size Post-Ramadan (*d* = .283). Nevertheless, the ANCOVA results indicate that Muslim college students did not have statistically significant higher self-reported spirituality scores as a function of their religious identity or as a function of time, and this is consistent with two of the three confidence intervals overlapping in Figure 3.
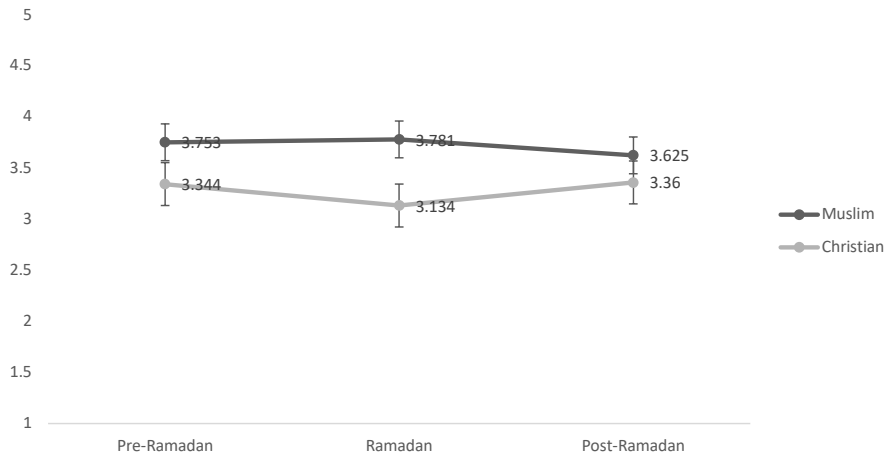
Figure 3. Mean scores of self-reported spirituality across Ramadan. PMIR spirituality scale is rated from (1) very low to (5) very high. Muslim students did not have significantly higher mean scores across all 3 time points (3.753, 3.78, 3.63) in comparison to Christian students (3.34, 3.13, 3.36). Error bars reflect 95% confidence intervals. There was no time interaction disconfirming the assumed hypothesis

Religiosity

The next set of hypotheses were based on the Psychological Measure of Islamic Religiosity by Abu-Raiya et al. (2008) captures a number of dimensions related to one's religious worldview. The current study focused on the Religious Universality, Religious Conversion, Positive Religious Coping, Religious Struggle, Religious Duty, Obligation & Exclusivism subscales. All items were re-formatted for the Christian student population using language pertinent to the Christian faith (e.g., 'Bible' instead of 'Qur'an' or 'church' instead of 'mosque').

Religious Universality was measured with the item "One of my major sources of pride is being a Muslim (or Christian)." Hypothesis 4 was that there will be a group by time interaction

demonstrating linear increases in religious universality mean scores from T1 to T3 for the Muslim student group relative to the Christian student group which will have stable mean scores from T1 to T3. After controlling for covariates, a repeated measures ANCOVA found that there was no significant group by time interaction for religious universality mean scores [F (1, 153) = .358, p = .551]. A main effect was not significant for time [F (1, 152) = .286, p = .594]. There was a significant for religion, F (1, 152) = 12.758 p = .000). Visual inspection of the means and 95% confidence intervals in Figure 4, indicates there is minimal change in slopes across the time periods. This is consistent with failing to find a significant effect of time or a group by time interaction (i.e., two trend lines with no significant slopes or differences in slopes). In Figure 4, there does appear to be a large separation between the two groups at all three points in time, with Muslims reporting higher religious universality scores. This is consistent with the significant main effect for religion in the ANCOVA. Similarly, effect sizes (Cohen's d) are stable with large effects Pre-Ramadan was found to be large (d = 1.21) as well as Post-Ramadan (d = 1.25). These results indicate that Muslim college students are statistically significant in higher religious universality scores as a function of their religious identity, and this did not seem to covary with Ramadan.

* - Only two surveys were disseminated for this religious variable (Pre-Ramadan and Post-Ramadan), hence sphericity was assumed.
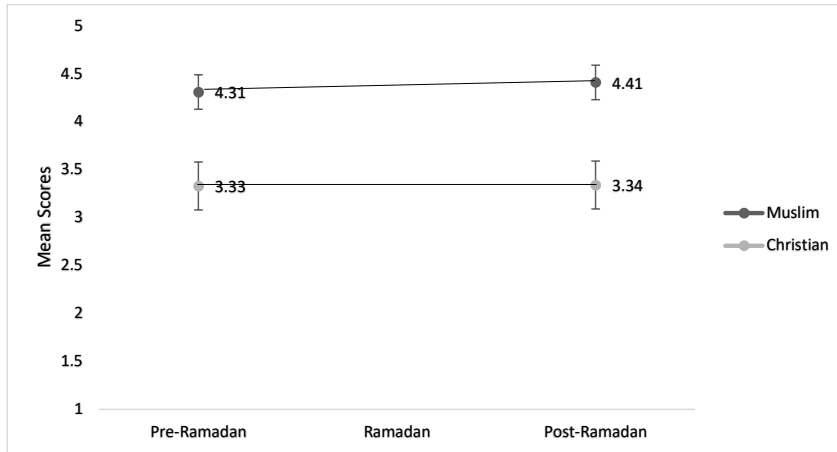
Figure 4. Means of self-reported PMIR religious universality scores across Ramadan. PMIR conversion scale is rated from (1) strongly disagree to (5) strongly agree. Muslim students did have significantly higher mean scores across both time points (4.31, 4.41) in comparison to Christian students (3.33, 3.34). Error bars reflect 95% confidence intervals. There was no time interaction disconfirming the assumed hypothesis.

Hypothesis 5: There will be a group by time interaction demonstrating linear increases in religious conversion mean scores from T1 to T3 for the Muslim student group relative to the Christian student group which will have stable mean scores from T1 to T3. *Religious Conversion* was measured with multiple items using a series of questions starting with "In my life, I have changed from a non-religious person to a religious person. " If participants answered yes to this question, the following question was asked "Becoming more involved in Islam (or Christianity) was a turning point in my life." If participants answered no, the follow-up question was not asked. 32 Muslim participants (38% of sample) and 20 Christian participants (24% of sample) answered 'yes' to the 1st question.*

Mauchly's Test of Sphericity indicated that the assumption of sphericity had been violated, X^2 (2) = 12.131, p = .002. Uncorrected ANCOVA did not generate any main effects for religion, thus, a repeated measures ANOVA using the corrected Greenhouse-Geisser formula was run instead. There group by time interaction for religious conversion mean scores was not significant [F (2, 100) = 1.409, p = .249. A main effect for time was non-significant for time, F (2, 100) = .359, p =.699, or religion, F (1, 50) = 2.667, p = .145). Although statistically significant results were not found in the ANCOVA; the pattern of means shown in Figure 5 is consistent with the hypothesis. Visual inspection of the means and 95% confidence intervals in Figure 5, indicate group at the Post-Ramadan time point but no group differences at the Pre-Ramadan or Ramadan time points (within the 95% confidence intervals). In Figure 5, the trend line for the Muslim student group appears to have a slight linear increase. Additionally, there is minimal change from Pre-Ramadan to Post-Ramadan for the Christian student group which also meets the assumed hypothesis (flat line trend). This is consistent with variations in effect sizes (Cohen's d) where effect size for Pre-Ramadan was found to be small (d = .105), during Ramadan (d = .385) and a large effect size Post-Ramadan (d = .792). Although trend supports the hypotheses, it is noteworthy that the partial eta-square for the group by time interaction as only .055, indicating in the context of all of the variables, this group by time interaction was small, not significant, and probably not practically or theoretically meaningful.
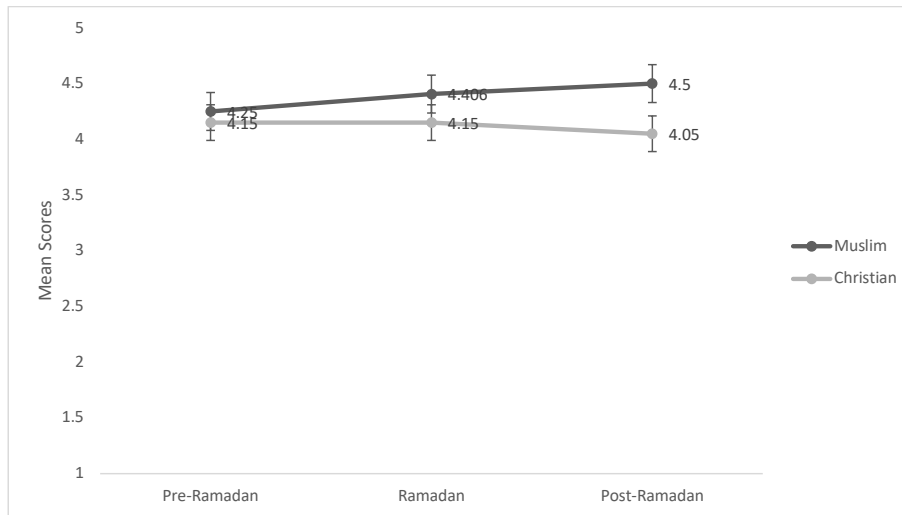
Figure 5. Means of self-reported PMIR religious conversion scores across Ramadan. PMIR conversion scale is rated from (1) strongly disagree to (5) strongly agree. Muslim students did not have significantly higher mean scores across all 3 time points (4.25, 4.406, 4.50) in comparison to Christian students (4.15, 4.15, 4.05). Error bars reflect 95% confidence intervals. There was no time interaction disconfirming the assumed hypothesis.

Hypothesis 6: There will be a group by time interaction demonstrating linear increases in religious coping mean scores from T1 to T3 for the Muslim student group relative to the Christian student group which will have stable mean scores from T1 to T3. *Positive Religious Coping* was measured with the item "When I face a problem in life, I look for a stronger connection with Allah (or God)." Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been violated, X^2 (2) = 2.058, p = .357. After controlling for covariates, a repeated measures ANCOVA found that there was no significant group by time interaction for positive religious coping mean scores [F (2, 302) = .075, p = .927]. A main effect was not significant for time [F (2, 302) = .136, p = .873] or religion, F (1, 151) = 1.285, p = .259). Visual inspection of the means and 95% confidence intervals in Figure 6, indicate that all variation in

the means is within the 95% confidence intervals. This is consistent with failing to find a

significant effect of time or a group by time interaction (i.e., two trend lines with no significant

slopes or differences in slopes). This is also consistent with variations in effect sizes between

religious groups (Cohen's d) where the effect size was found to be small to medium range: Pre-

Ramadan (d = .443), during Ramadan (d = .355) and Post-Ramadan (d = .311). These results

indicate that Muslim college students do not have statistically significant higher positive

religious coping scores than Christian students as a function of their religious identity or

Ramadan, and did not change during Ramadan.
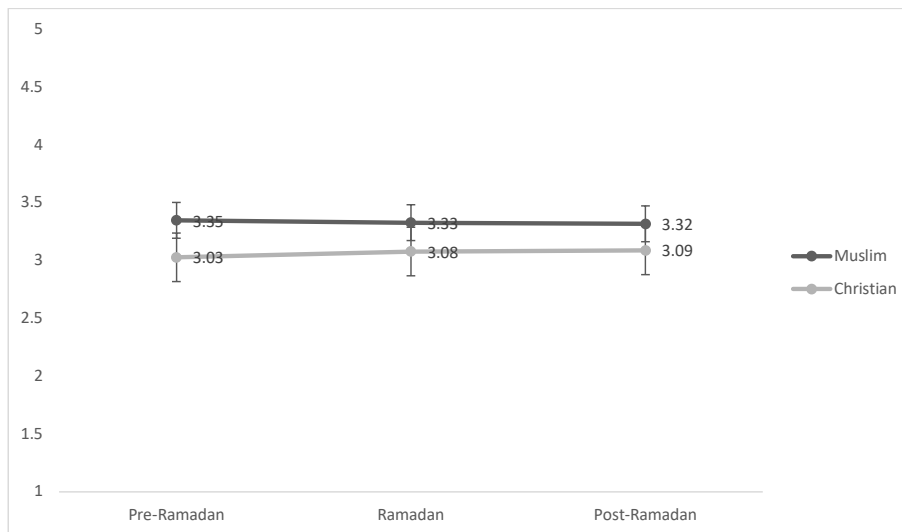
Figure 6. Means of self-reported PMIR positive religious coping scores across Ramadan. PMIR religious coping scale is rated from (1) I do not do this at all to (5) I do this all the time. Muslim students did not have significantly higher mean scores across all 3 time points (3.35, 3.33, 3.32) in comparison to Christian students (3.03, 3.09, 3.09). Error bars reflect 95% confidence intervals. There was no time interaction disconfirming the assumed hypothesis.

Hypothesis 7: There will be a group by time interaction demonstrating linear decreases in religious struggle mean scores from T1 to T3 for the Muslim student group relative to the Christian student group which will have stable mean scores from T1 to T3. *Religious Struggle* was measured with the item "I find myself doubting the existence of Allah (or God)." Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been violated, $X^2 (2) = 2.966$, $p = .277$. After controlling for covariates, a repeated measures ANCOVA found that there was no significant group by time interaction for religious struggle mean scores [$F (2, 302) = .089$, $p = .915$]. The main effect for time was not significant [$F (2, 302) = .270$, $p = .764$]. The main effect for religion approached significance at the $p < .05$ level, $F (1, 151) = 3.722$, $p = .056$). Visual inspection of the means and 95% confidence intervals in Figure 7, indicate that all within group variation was within the 95% confidence intervals, which suggests minimal change over time. This is consistent with failing to find a significant effect of time or a group by time interaction (i.e., two trend lines with no significant slopes or differences in slopes). In Figure 7, there does appear to be a separation of the two groups during Ramadan and Post-Ramadan, with Christians reporting higher religious struggle scores, with means for Christians and Muslims falling outside of 95% confidence intervals. This is consistent with variations in effect sizes (Cohen's d) where the difference between Muslims and Christians was found to be medium Pre-Ramadan ($d = -.536$), during Ramadan ($d = -.591$), and Post-Ramadan ($d = -.581$). These results indicate that, compared to the Muslim students in our sample, the Christian students had higher religious struggle mean scores a function of their religious identity. However, ANCOVA did not detect a significant main effect for religious group. With a larger sample, there may have been a significant group effect with Muslims less likely to report religious struggles. This variable did not seem to be impacted by Ramadan.
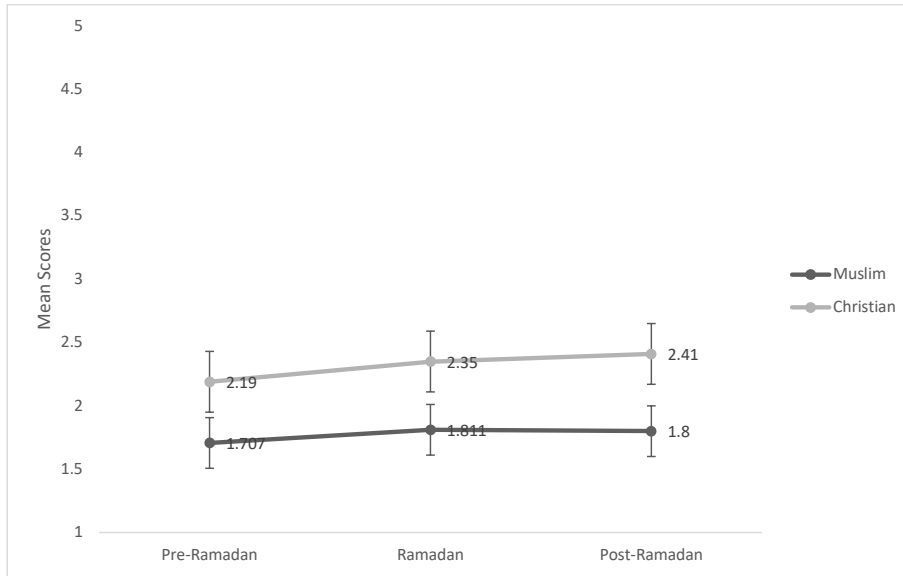
Figure 7. Means of self-reported PMIR religious struggle scores across Ramadan. PMIR religious coping scale is rated from (1) Never to (5) Very Often. Christian students (2.19, 2.35, 2.41) and Muslim students did not differ significantly across all 3 time points (1.707, 1.81, 1.80). Error bars reflect 95% confidence intervals. There was no time interaction disconfirming the assumed hypothesis.

Hypothesis 8: There will be a group by time interaction demonstrating linear decreases in religious exclusivism mean scores from T1 to T3 for the Muslim student group relative to the Christian student group which will have stable mean scores from T1 to T3. *Religious Exclusivism* was measured using the item "It is more important to be a good person than to believe in Allah (or God) and the right religion". Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been violated, $X^2 (2) = 1.057$, p = .590. After controlling for covariates, a repeated measures ANCOVA found that there was not significant group by time interaction for religious exclusivism mean scores [$F (2, 300) = .696$, p = .498]. A main effect was

found to be significant for time [$F_{(2, 300)} = 3.753$, $p = .025$]. Although a main effect was not

found to be significant for religion, $F_{(1, 150)} = 1.375$, $p = .243$). Visual inspection of the means

and 95% confidence intervals in Figure 8, indicate that all variation in the means is within the

95% confidence intervals. This is consistent with failing to find a significant effect of a group by

time interaction (i.e., two trend lines with no significant slopes or differences in slopes). In

Figure 8, there does appear to be a separation of the two groups during the Pre-Ramadan and

Post-Ramadan time points, with Muslims reporting lower religious exclusivism scores; this was

supported by the significant main effect for the time variable. This is consistent with variations in

effect sizes (Cohen's d) where the effect size was found to be medium Pre-Ramadan ($d = -.432$),

small during Ramadan ($d = -.146$) and medium Post-Ramadan ($d = -.40$). These results indicate

that Muslim college students had statistically significant lower religious exclusivism mean scores

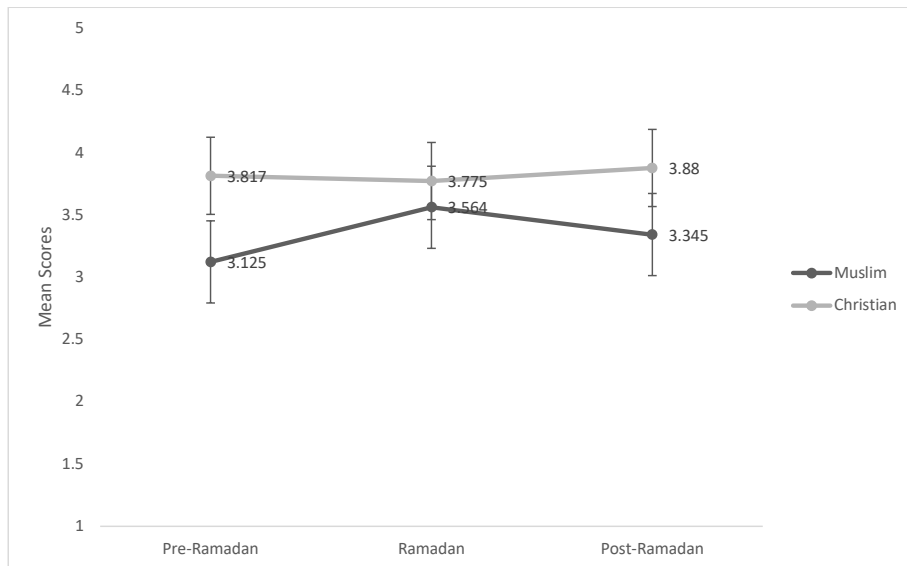than Christian students as a function of time, but not religious identity or Ramadan.

Figure 8. Means of self-reported PMIR religious exclusivism scores across Ramadan. PMIR religious exclusivism is rated from (1) Strongly Disagree to (6) Strongly Agree. Muslim students had significantly lower mean scores across all 3 time points (3.125, 3.564, 3.345) in comparison to Christian students (3.817, 3.775, 3.88) as a function of Ramadan. Error bars reflect 95% confidence intervals. There was no time interaction disconfirming the assumed hypothesis.

Hypothesis 9: There will be a group by time interaction demonstrating linear increases in religious obligation mean scores from T1 to T3 for the Muslim student group relative to the Christian student group which will have stable mean scores from T1 to T3. *Religious Obligation* was measured using the item "I read the Holy Qur'an (or Holy Bible) because I would feel guilty if I did not." Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been violated, $X^2 (2) = 1.494$, p = .474. After controlling for covariates, a repeated measures ANCOVA found that there was no significant group by time interaction for religious obligation mean scores [$F (2, 302) = .897$, p = .409]. The partial eta-square for the group by time interaction as only .010, indicating in the context of all of the variables, this group by time interaction was small and probably not practically or theoretically meaningful. A main effect was not significant for time [$F (2, 302) = 2.025$, p = .134]; however, there was a significant main effect for religion, $F (1, 151) = 7.381$, p = .007). Visual inspection of the means and 95% confidence intervals in Figure 9, indicate a trend for the two groups converging over time. Conversely, the variations in effect sizes (Cohen's d) show a slight widening of differences between the Muslim and Christian groups over time with medium to large differences pre-Ramadan (*d* = .673), during Ramadan (*d* = .648) and Post-Ramadan (*d* = .751). Taken together, these results indicate that Muslim college students had statistically significant higher religious obligation mean scores across time compared to Christian students. The partial eta-square for the religion main variable was .060

indicating a 6% variance due to one's religious group. This was not the hypothesized pattern of
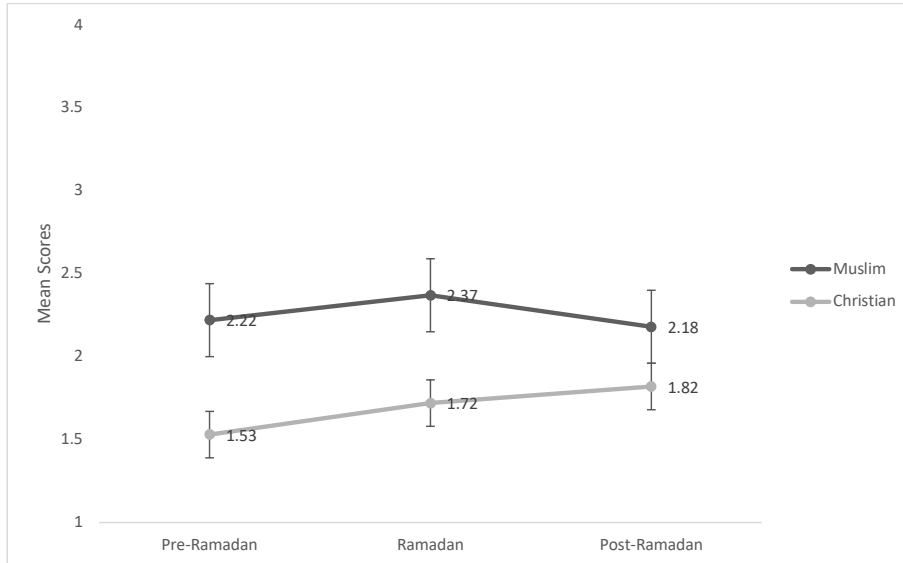
results.

Figure 9. Means of self-reported PMIR religious obligation scores across Ramadan. PMIR religious obligation scores are rated from (1) Not at all to (4) very true. Muslim students had significantly higher mean scores across all 3 time points (2.22, 2.37, 2.18) in comparison to Christian students (1.53, 1.72, 1.82). Error bars reflect 95% confidence intervals. There was no time interaction disconfirming the assumed hypothesis.

Physical Stress

The next set of hypotheses were based on items from the Physical Symptoms of Stress

scale were adopted from the American Psychological Association's "Impact of Stress" survey.

The scale captures a number of dimensions related to one's physical stress index and

functioning. The current study assessed irritability/anger, fatigue, lack of

interest/motivation/energy, nervousness/anxiety, headaches, feeling depressed/sad, feeling as though one could cry, upset stomach/indigestion and muscular tension.

Hypothesis 10: There will be a group by time interaction showing increases in physical symptoms of stress mean scores in Muslim students from T1 to T2 and decreases from T2 to T3 (inverted v shape) relative to Christian students who will have stable mean scores from T1 to T3 (flat line trend). These were evaluated using subscale mean scores.

Physical Stress – Irritability/Anger.   Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been violated, X^2 (2) = 1.362, p = .506. After controlling for covariates, a repeated measures ANCOVA found that there was no significant group by time interaction for physical stress mean scores [F (2, 302) = .959, p = .384]. A main effect was not significant for time [F (2, 302) = .239, p = .788] or religion, F (1, 151) = .256, p = .614). Visual inspection of the means and 95% confidence intervals in Figure 10, indicate that all variation in the means is within the 95% confidence intervals for the Muslim group, but there is a drop in the Christian group and separation between the groups during Ramadan. The visual inspection results are somewhat consistent with variations in effect sizes (Cohen's d) where the effect size was found to be small with Muslims lower than Christians pre-Ramadan (*d* = -.163), medium small with Muslims higher than Christians during Ramadan (*d* = .33) and small with Muslims higher than Christians post-Ramadan (*d* = .173). Taken together, these results show some support for the hypothesis that that physical symptoms of stress scores for irritability/anger would be higher for Muslim students than Christian students during Ramadan. However, the groups did not differ significantly across the 3 time conditions and there was not group by time interaction, so the hypothesis is only slightly supported.
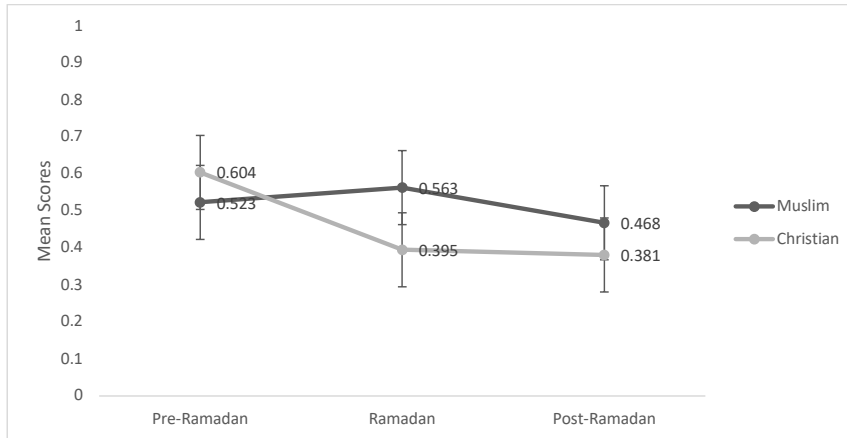
Figure 10. Means of self-reported irritability/anger scores across Ramadan. Physical symptoms of stress scores are rated from (0) No to (1) Yes. Muslim students did not have statistically significant different mean scores across all 3 time points (.523, .563, .468) in comparison to Christian students (.604, .395, .381). Error bars reflect 95% confidence intervals. There was no time interaction disconfirming the assumed hypothesis.

Physical Stress – Fatigue

Hypothesis 6: There will be a group by time interaction showing increases in physical symptoms of fatigue mean scores in Muslim students from T1 to T2 and decreases from T2 to T3 (inverted v shape) relative to Christian students who will have stable mean scores from T1 to T3 (flat line trend).

Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been violated, $X^2 (2) = 2.470$, $p = .291$. After controlling for covariates, a repeated measures ANCOVA found that there was no significant group by time interaction for physical stress mean scores [$F (2, 302) = .655$, $p = .518$]. Main effects were not significant for time [$F (2, 302) = .311$, $p = .733$] or

religion, $F (1, 151) = .008$, $p = .931$). Visual inspection of the means and 95% confidence

intervals in Figure 11, indicate that all variation in the means for the Muslim group is within the

95% confidence intervals, which was not consistent with the assumed hypothesis (inverted v

shape). Additionally, in Figure 11 there is also a trend toward a linear decrease in Christian

fatigue mean scores from Pre-Ramadan to Post-Ramadan which was not consistent with the

assumed hypothesis (i.e. a flat trend line). These results are consistent with variations in effect

sizes (Cohen's d) where the The effect size was found to be small and higher for Christians Pre-

Ramadan ($d = -.197$), very small and slightly lower for Christians during Ramadan ($d = .042$)

and small and lower for Christians Post-Ramadan ($d = .215$). Taken together, these results

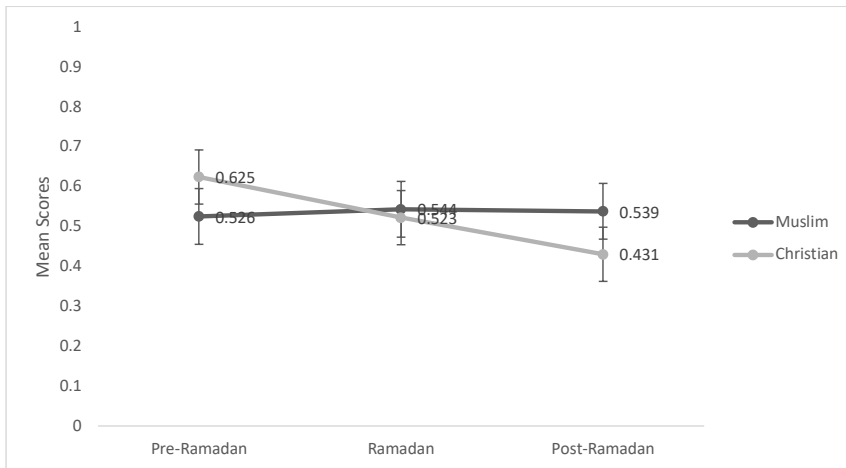indicate that physical symptoms of fatigue did not follow the hypothesized trends.

Figure 11. Means of self-reported fatigue scores across Ramadan. Physical symptoms of stress scores are rated from (0) No to (1) Yes. Muslim students did not have statistically significant different mean scores across all 3 time points (0.526, 0.544, 0.539) in comparison to Christian students (0.625, 0.523, 0. 431). Error bars reflect 95% confidence intervals. There was a time interaction confirming the assumed hypothesis.

Physical Stress – Lack of Interest, Motivation or Energy

Hypothesis 7: There will be a group by time interaction showing increases in physical symptoms of lack of interest, motivation or energy mean scores in Muslim students from T1 to T2 and decreases from T2 to T3 (inverted v shape) relative to Christian students who will have stable mean scores from T1 to T3 (flat line trend).

Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been violated, X^2 (2) = .700, p = .705. After controlling for covariates, a repeated measures ANCOVA found that there was no significant group by time interaction for physical stress mean scores [F (2, 302) = .507, p = .603]. A main effect was found to be significant for time [F (2, 302) = 3.568, p = .029], and approached significance for religion, F (1, 151) = 2.982, p = .086). Visual inspection of the means and 95% confidence intervals in Figure 12, indicate separation of means at the Pre-Ramadan time point, and no difference between Christians and Muslims during or after Ramadan. In Figure 12, there appears to be a slight linear decrease from Pre-Ramadan to Post-Ramadan for the Muslim student group which was not consistent with the assumed hypothesis (inverted v shape). Additionally, in Figure 12 there is also a noted decrease in Christian fatigue mean scores from Pre-Ramadan to Ramadan which was not consistent with the assumed hypothesis (flat trend line). These trends in Figure 12 are consistent with variations in effect sizes (Cohen's d) where the difference between Muslims and Christians was found to be medium Pre-Ramadan (-.579), small during Ramadan (-.195) and post-Ramadan (-0.338). These results do not provide any support for the hypothesized trend in lack of interest, motivation, or energy. There was a significant group effect, with Muslims reporting more of this physical symptom than Christians.
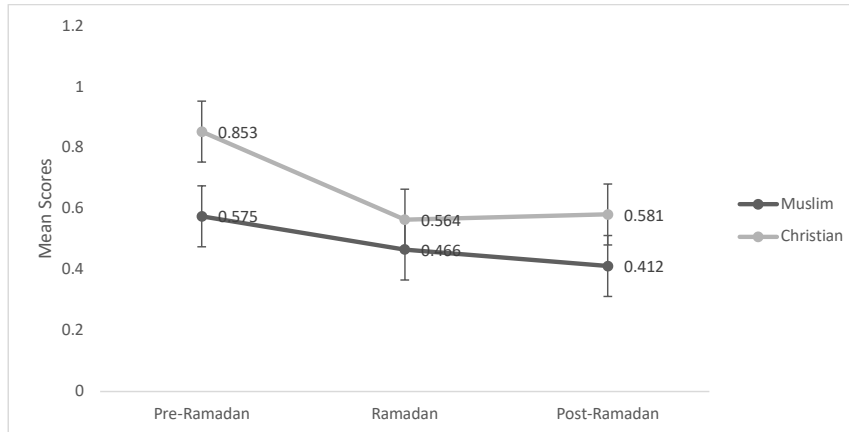
Figure 12. Means of self-reported lack of interest, motivation or energy scores across Ramadan. Physical symptoms of stress scores are rated from (0) No to (1) Yes. Muslim students had statistically significant different mean scores across all 3 time points (0.853, 0.564, 0.581) in comparison to Christian students (0.575, 0.466, 0.412). Error bars reflect 95% confidence intervals. There was not a time interaction disconfirming the assumed hypothesis.

Physical Stress – Nervous/Anxious

Hypothesis 13: There will be a group by time interaction showing increases in physical symptoms of nervousness/anxiety mean scores in Muslim students from T1 to T2 and decreases from T2 to T3 (inverted v shape) relative to Christian students who will have stable mean scores from T1 to T3 (flat line trend).

Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been violated, X^2 (2) = 2.420, p = .298. After controlling for covariates, a repeated measures ANCOVA found that there was no significant group by time interaction for physical stress mean scores [F (2, 302) = .376, p = .687]. A main effect was not significant for time [F (2, 302) = .895, p = .410] or

religion, [F (1, 151) = 1.524, p = .219]. Visual inspection of the means and 95% confidence

intervals in Figure 13, indicate that all variation in the means is within the 95% confidence

intervals for the Muslim group (i.e., a flat line). In Figure 13, there is a noted decrease in

Christian fatigue mean scores from Ramadan to Post-Ramadan which was not consistent with the

assumed hypothesis (flat trend line). These results are consistent with variations in effect sizes

(Cohen's d) where the effect size was found to be medium Pre-Ramadan (*d* = -.338), during

Ramadan (*d* = -.391) and small Post-Ramadan (*d* = -.095). Taken together, these results provide
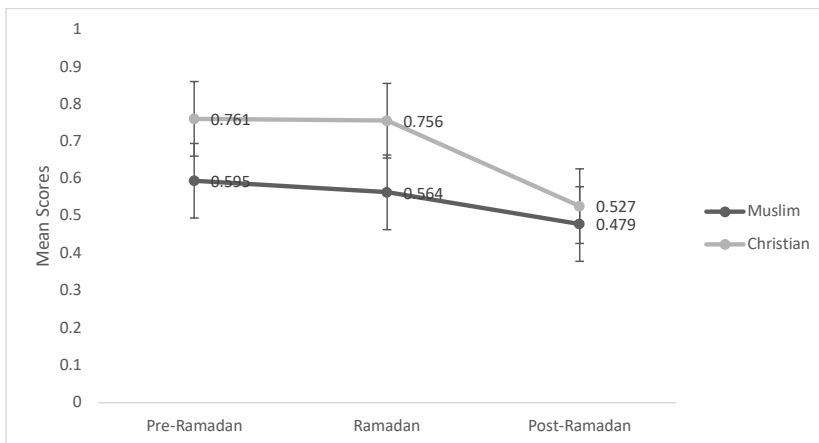
not support for hypothesis 13.

Figure 13. Means of self-reported nervousness and anxiety scores across Ramadan. Physical
symptoms of stress scores are rated from (0) No to (1) Yes. Muslim students did not differ
significantly in mean scores across all 3 time points (0.595, 0. 564, 0.479) in comparison to
Christian students (0.761, 0.756, 0.527). Error bars reflect 95% confidence intervals. There was
not a time interaction disconfirming the assumed hypothesis.

Physical Stress – Headaches

Hypothesis 14: There will be a group by time interaction showing increases in physical

symptoms of headache mean scores in Muslim students from T1 to T2 and decreases from T2 to

T3 (inverted v shape) relative to Christian students who will have stable mean scores from T1 to

T3 (flat line trend).

Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been violated,

X^2 (2) = .197, p = .906. After controlling for covariates, a repeated measures ANCOVA found

that there was not significant group by time interaction for physical stress mean scores for

headaches [F (2, 302) = .966, p = .382]. A main effect was not significant for time [F (2, 302) =

.268, p = .765]. Although, a main effect was significant for religion, F (1, 151) = 6.794, p = .010.

These results indicate that physical symptoms of stress scores for headaches differed

significantly across the 3 time conditions for both Muslim and Christian student groups as a

function of religious identity but not Ramadan. Nevertheless, the partial eta-square for the group

by time interaction was only .005, indicating in the context of all of the variables, this group by

time interaction was small and probably not practically or theoretically meaningful. The partial

eta-square for the religion main variable was .047 indicating a 4.7% variance due to one's

religious group. Visual inspection of the means and 95% confidence intervals in Figure 14,

indicate variation in mean scores at the Pre-Ramadan and Ramadan time points for the Muslim

group (inverted v) and Christians (flat line) somewhat consistent with the hypothesis. These

results are consistent with variations in effect sizes (Cohen's d) where the effect size was found

to be large Pre-Ramadan (d = .642), even larger during Ramadan (d = .751) and small Post-

Ramadan (d = .261). Taken together, these results provide some support for hypothesis 14, but

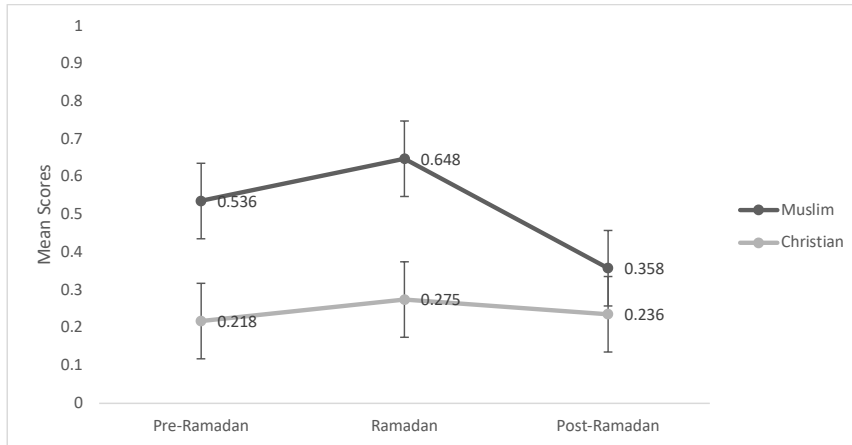probably not enough to be practically or theoretically meaningful.

Figure 14. Means of self-reported headache scores across Ramadan. Physical symptoms of stress scores are rated from (0) No to (1) Yes. Muslim students did differ significantly in mean scores across all 3 time points (0.536, 0.648, 0.358) in comparison to Christian students (0.218, 0.275, 0.236). Error bars reflect 95% confidence intervals. There was not a time interaction disconfirming the assumed hypothesis.

Physical Stress – Depressed/Sad

Hypothesis 15: There will be a group by time interaction showing increases in physical

symptoms of depression/sadness mean scores in Muslim students from T1 to T2 and decreases

from T2 to T3 (inverted v shape) relative to Christian students who will have stable mean scores

from T1 to T3 (flat line trend).

Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been violated,

X^2 (2) = .659, p = .719. After controlling for covariates, a repeated measures ANOVA found that

physical stress mean scores for depression/sadness did not differ significantly across Pre-

Ramadan, during Ramadan and post-Ramadan between Christian and Muslim college students [F

(2, 302) = .1.595, p = .205]. A main effect was significant for time [F (2, 302) = 3.414, p = .034].

A main effect was not significant for religion, $F(1, 151) = 2.064$, $p = .153$). Visual inspection of the means and 95% confidence intervals in Figure 13, indicate that the groups separated over time, with Muslims showing relatively increasing levels of sadness over time.   This is not consistent with the assumed hypothesis (inverted v shape). Additionally, in Figure 15 there is also a noted linear decrease in Christian headache mean scores from Ramadan to Post-Ramadan which was not consistent with the assumed hypothesis (flat trend line). The pattern in effect sizes (Cohen's d) where the effect size was found to be near zero Pre-Ramadan ($d = .015$), small during Ramadan ($d = .287$) and on the medium side of large at Post-Ramadan ($d = .667$). These results indicate that physical symptoms of depression/sadness got worse for the Muslim student group in comparison to the Christian student group as a function of time. Nevertheless, the partial eta-square for the group by time interaction was only .014, indicating in the context of all of the variables, this group by time interaction was small and probably not practically or theoretically meaningful. The partial eta-square for the time main effect was .020 indicating a 2% variance due to time. Taken together, these results refute hypothesis 15.
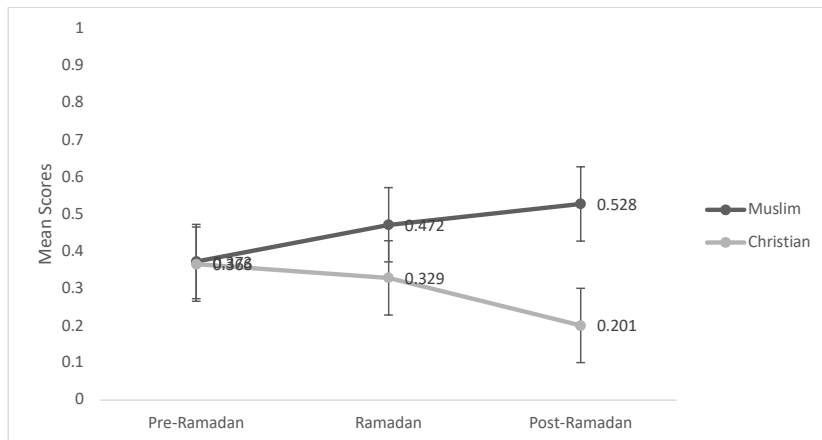
Figure 15. Means of self-reported depression/sadness scores across Ramadan. Physical symptoms of stress scores are rated from (0) No to (1) Yes. Muslim students differed significantly in mean scores across all 3 time points (0.373, 0.472, 0.528) in comparison to Christian students (0.366, 0.329, 0.201).. Error bars reflect 95% confidence intervals. There was not a time interaction disconfirming the assumed hypothesis.

Physical Stress – Upset Stomach/Indigestion

Hypothesis 16: There will be a group by time interaction showing increases in physical

symptoms of upset stomach/indigestion mean scores in Muslim students from T1 to T2 and

decreases from T2 to T3 (inverted v shape) relative to Christian students who will have stable

mean scores from T1 to T3 (flat line trend).

Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been violated,

X^2 (2) = .053, p = .974. After controlling for covariates, a repeated measures ANOVA found that

there was a significant group by time interaction for physical stress mean scores for upset

stomach/indigestion [F (2, 302) = .4.901, p = .008]. A main effect was not found to be significant

for time [F (2, 302) = .154, p = .857]. A main effect was not found to be significant for religion,

F (1, 151) = .004, p = .948). Visual inspection of the means and 95% confidence intervals in

Figure 16, indicate variation in mean scores somewhat consistent with the hypothesis for Muslim

students, and consistent with a significant group by time interaction (i.e., two trend lines with

significant slopes changes). In Figure 16, there does appear to be an increase from Pre-Ramadan

to Ramadan and a decrease from Ramadan to Post-Ramadan for the Muslim student group which

was consistent with the assumed hypothesis (inverted v shape). Although, in Figure 16 there also

was a notable linear decrease from Ramadan to Post-Ramadan for the Christian student group

which was not consistent with the assumed hypothesis (flat trend line). These results are

consistent with variations in effect sizes (Cohen's d) where the effect size was found to be

medium Pre-Ramadan (d = -.539) with Christians higher then Muslims, medium during

Ramadan (d = .593) with Muslims higher than Christians, and very small Post-Ramadan (d =

.0425), with Christians slightly higher then Muslims. These results indicate that physical

symptoms of upset stomach/indigestion differed significantly for the Muslim student group in

comparison to the Christian student group as a function of Ramadan across the student groups.

This is consistent with the hypothesized trend, although the Christians were expected to have a

stable trend. Thus, the hypothesis is partially supported.
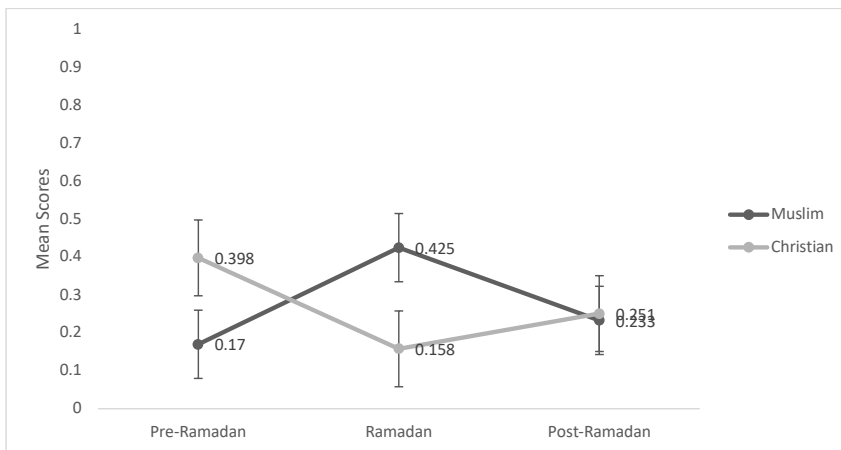
Figure 16. Means of self-reported upset stomach/indigestion scores across Ramadan. Physical
symptoms of stress scores are rated from (0) No to (1) Yes. Muslim students did differed
significantly in mean scores across all 3 time points (0.17, 0.425, 0.233) in comparison to
Christian students (0.398, 0.158, 0.251). Error bars reflect 95% confidence intervals. There was
not a time interaction disconfirming the assumed hypothesis.

Physical Stress – Muscular Tension

Hypothesis: There will be a group by time interaction showing increases in physical symptoms of muscular tension mean scores in Muslim students from T1 to T2 and decreases from T2 to T3 (inverted v shape) relative to Christian students who will have stable mean scores from T1 to T3 (flat line trend).

Mauchly's Test of Sphericity indicated that the assumption of sphericity had been violated, X^2 (2) = 6.845, p = .033. After controlling for covariates, a repeated measures ANOVA with corrected Greenhouse-Geisser formula found that there was not significant group by time interaction for physical stress mean scores for muscular tension [F (2, 302) = 2.088, p = .128]. A main effect was not found to be significant for time [F (2, 302) = .840, p = .433] or religion, F (1, 151) = 3.823, p = .052). Visual inspection of the means and 95% confidence intervals in Figure 17, shows Muslims lower pre and during Ramada, and the two groups about the same after Ramadan. Although there was a difference at the Ramadan time point when looking at the graph visually, ANCOVA results did not find significant effects of time or a group by time interaction (i.e., two trend lines with no significant slopes or differences in slopes). In Figure 17, there is a notable decrease from Ramadan to Post-Ramadan for the Muslim student group but minimal change from Pre-Ramadan to Ramadan which was not consistent with the assumed hypothesis (inverted v shape). Additionally, in Figure 17 there is also a noted linear increase in Christian muscular tension mean scores from Ramadan to Post-Ramadan which was not consistent with the assumed hypothesis (flat trend line). These results are consistent with variations in effect sizes (Cohen's d) where the effect size was found to be medium with Muslims lower than Christians at Pre-Ramadan (*d* = -.521), very large during Ramadan with Muslims continuing to be lower (*d* = -1.04) and very small at Post-Ramadan (*d* = -.0153), with Muslims slightly lower.

Taken together, these results indicate that physical symptoms of muscular tension were higher

for Christians before and during Ramadan, but not after. However, the pattern of results was not

consistent with hypothesis 17, and the partial eta-square for the group by time interaction was

only .010, indicating in the context of all of the variables, this group by time interaction was

small and probably not practically or theoretically meaningful. Taken together, these results

refute hypothesis 17

Figure 17. Means of self-reported muscular tension scores across Ramadan. Physical symptoms of stress scores are rated from (0) No to (1) Yes. Muslim students did not differ significantly in mean scores across all 3 time points (0.93, 0.41, 0.137) in comparison to Christian students (0.294, 0.321, 0.142). Error bars reflect 95% confidence intervals. There was not a time interaction disconfirming the assumed hypothesis.

Academic Stress

Hypothesis: There will be a main effect of time on increases in academic stress mean scores in

both Muslim and Christian student groups from T1 to T2 and decreases from T2 to T3 (inverted

v shape). No group differences are expected on academic stress.

Mauchly's Test of Sphericity indicated that the assumption of sphericity had been violated, X^2 (2) = 17.867, p < .001. After controlling for covariates, a repeated measures ANCOVA with corrected Greenhouse-Geisser formula found that there was a significant group by time interaction for mean scores for academic stress [F (2, 300) = 4.113, p = .021]. A main effect was not found to be significant for time [F (2, 300) = 2.412, p = .097]. Although, a main effect was found to be significant for religion, F (1, 1450) = 6.071, p = .015). Visual inspection of the means and 95% confidence intervals in Figure 18, indicate a slight decrease from Pre-Ramadan to Ramadan and a notable decrease from Ramadan to Post-Ramadan for the Muslim student group which was not consistent with the assumed hypothesis (inverted v shape). Additionally, in Figure 18 there also was a notable linear increase from Ramadan to Post-Ramadan for the Christian student group which was not consistent with the assumed hypothesis (inverted v shape). These results are consistent with variations in effect sizes (Cohen's d) where the effect size was found to be small Pre-Ramadan (*d* = -.195), medium during Ramadan (*d* = -.415) and large at Post-Ramadan (*d* = -1.102). These results indicate that academic stress scores differed significantly for the Muslim student group in comparison to the Christian student group as a function of religious identity over time. Nevertheless, the partial eta-square for the group by time interaction was only .016, indicating in the context of all of the variables, this group by time interaction was small and probably not practically or theoretically meaningful. Taken together the results do not support hypothesis 18.
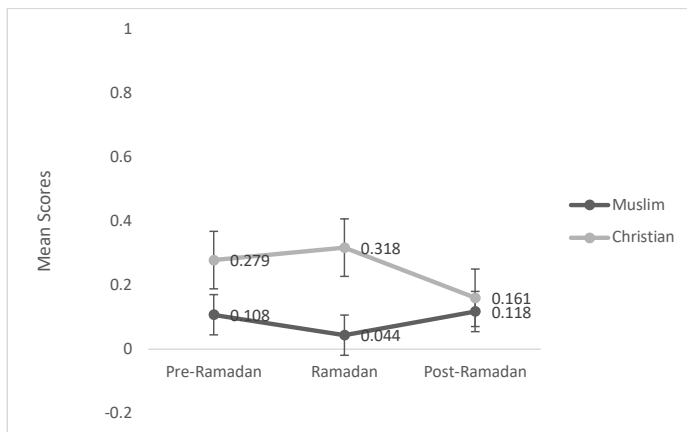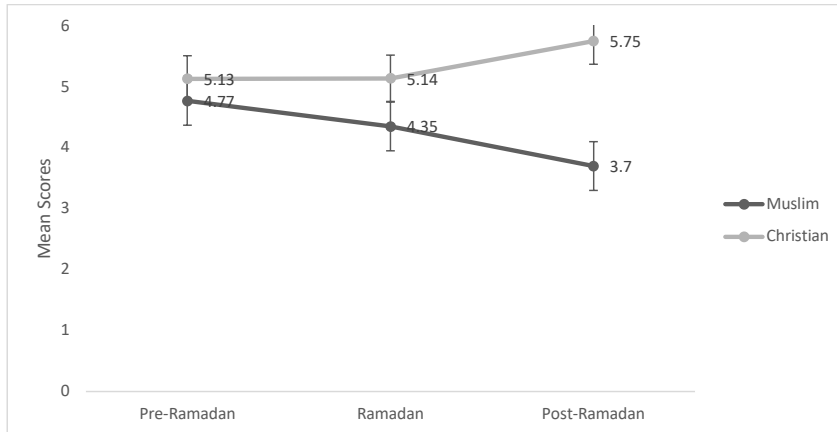
Figure 18. Means of self-reported academic stress scores across Ramadan. Academic stress scores are rated from (1) Strongly Disagree to (6) Strongly Agree. Muslim students differed significantly in mean scores across all 3 time points (4.77, 4.35, 3.70) in comparison to Christian students (5.13, 5.14, 5.75). Error bars reflect 95% confidence intervals. There was a time interaction but the assumed linear trend did not match the hypothesis.

Perceived Daily Stress

Hypothesis 19: There will be a group by time interaction showing increases in perceived daily stress mean scores in Muslim students from T1 to T2 and decreases from T2 to T3 (inverted v shape) relative to Christian students who will have stable mean scores from T1 to T3 (flat line trend).

Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been violated, X^2 (2) = 1.407, p = .595. After controlling for covariates,a repeated measures ANOVA found that there was not significant group by time interaction for perceived daily stress mean scores [F (2, 300) = .925, p = .397]. A main effect was not found to be significant for time [F (2, 300) = .984, p = .375] or religion, F (1, 150) = .101, p = .751). Visual inspection of the means and 95% confidence intervals in Figure 19, indicate that all variation in the means is within the 95%

confidence intervals. This is consistent with failing to find a significant effect of time or a group by time interaction (i.e., two trend lines with no significant slopes or differences in slopes). In Figure 19, there does appear to be a slight decrease from Ramadan to Post-Ramadan but minimal change from Pre-Ramadan to Ramadan for the Muslim student group which was not consistent with the assumed hypothesis (inverted v shape). Conversely, in Figure 19 there is minimal variation in means amongst the Christian daily stress mean scores from Ramadan to Post-Ramadan which was consistent with the assumed hypothesis (flat trend line). These results are consistent with variations in effect sizes (Cohen's d) where the effect size was found to be small Pre-Ramadan ($d = -.060$), small during Ramadan ($d = .218$) and medium at Post-Ramadan ($d = -.371$). These results indicate that perceived daily stress scores did not differ significantly across the 3 time conditions for both Muslim and Christian student groups, as a function of religious identity or Ramadan. Hypothesis 19 is not supported.

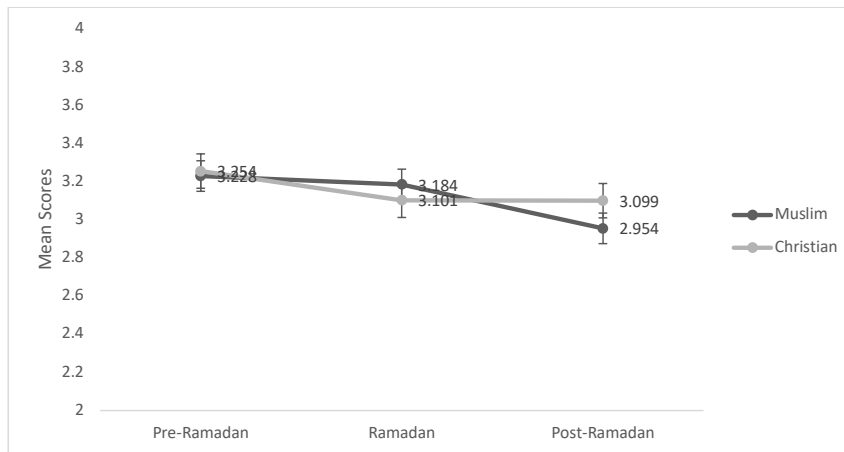*Figure 19.* Means of self-reported perceived daily stress scores across Ramadan. Perceived daily stress scores are rated from (1) Never to (4) Often. Muslim students did not differ significantly in mean scores across all 3 time points (3.228, 3.184, 2.954) in comparison to Christian students (3.254, 3.101, 3.099). Error bars reflect 95% confidence intervals. There was not a time interaction disconfirming the assumed hypothesis.

Discussion

Table 7. Summary of Results

Measures	ANCOVA	Graphs	Cohen's d	Summary	Trendlines
1, Eudemonic Well-being	Group X time p =.551 Time NS p = .608 Group NS p = .848	Figure 1. No differences for group or time	Pre (d = .143) Ram (d = -.038) Post (d = .080)	No support for hypotheses	No significant fluctuations
2. Subjective W-B	Group X time p =.200 Time NS p = .703 Group NS p =.430	Figure 2. Muslims higher before and after Ramadan, no difference during Ramadan.	Pre (d =.47) Ram (d = -.04) Post (d = .35).	Slight support for hypothesis.	trendlines matched hypothesis but non-significant results (V-shape trend for Muslim students)
Spirituality	Group X time p = .283	Figure 3. No differences	Pre (d = .475) Ram (d = .874) Post (d = .283)	No support for hypothesis	No significant fluctuations

	Time NS p = .962 Group NS p = .069	for group or time			
Religious Universality	Group X time p = .551 Time NS p = .594 Group NS p = .000	Figure 4. No group x time interaction, main effect for religion; Muslim students more religiously universal due to identity	Pre (d = 1.21) Post (d = 1.25)	No support for hypotheses	No significant fluctuations; Muslim students higher on Pre and Post.
Religious Conversion	Group x time p = .249 Time NS p = .669 Group NS p = .145	Figure 5. Slight increase for Muslim students, non-significant	Pre (d = .105) Ram (d = .385) Post (d = .792).	No support for hypothesis	Muslim group trendline increased slightly from Pre to Post
Positive Religious Coping	Group x time p = .927	Figure 6. No differences	Pre (d = .536), Ram (d = .591) Post (d = .581	No support for hypothesis	No significant fluctuations

	Time NS p = .873 Group NS p = .259	for group or time			
Religious Struggle	Group x time p = .915 Time NS p = .764 Group NS p = .056	Figure 7. Christian students have higher scores, non-significant	Pre- (d = -.536) Ram (d = -.591) Post (d = -.581)	No support for hypothesis	Christian group trendline slightly increased from Pre to Post
Religious Exclusivism	Group x time p = .498 Time NS p = .025 Group NS p = .243	Figure 8. No group x time effect, main effect for time suggesting Muslim students have lower scores as function of time	Pre (d = -.432) Ram (d = -.146) Post (d = -.40	No support for hypothesis	Muslim group had slight inverted v shape trend (did not match hypothesized trendline)

Religious Obligation	Group x time p = .409 Time NS p = .134 Religion NS p = .007	Figure 9. No group x time effect, main effect for religion; Muslim students more religiously obligated due to religious identity	Pre (d = .673), Ram (d = .648) Post (d = .751)	No support for Hypotheses:	Muslim group trend slightly decreased at Post (did not match hypothesized trendline)
Physical Stress – Irritability/Anger	Group x time p = .384 Time NS p = .788 Group NS p = .614	Figure 10. No differences for group or time	Pre (d = -.163) Ram (d = .33) Post (d = .173)	No support for hypothesis	Christian group trend had large decrease from Pre to During Ramadan (did not match hypothesized trendline)
Physical Stress – Fatigue	Group x time p = .518 Time NS p = .733	Figure 11. No differences for group or time	Pre (d = -.197) Ram (d = .042) Post (d = .215)	No support for hypothesis	Christian group trend had notable decrease from Pre to Post (did not

	Group NS p = .931				match hypothesized trendline)
Physical Stress – Lack of interest, motivation or energy	Group x time p = .603 Time NS p = .029 Group NS p = .086	Figure 12. No group x time effect, main effect for time; Two groups differed significantly as function of time (Christian students had higher scores)	Pre (d = -.579) Ram (d = -.195) Post (d = -.338).	No support for hypotheses	Muslim group trend decreased from Pre to Post (did not match inverted v trend), Christian group trend had large decrease from Pre to During (did not match hypothesized trend)
Physical Stress – Nervous/Anxious	Group x time p = .687 Time NS p = .410 Group NS p = .219	Figure 13. No group x time effect, both groups decreased from Ram to Post	Pre (d = -.338) Ram (d = -.391) Post (d = -.095)	No support for hypothesis	Both group trends had notable decreases from During to Post (did not match hypothesized

					trendline for either)
Physical Stress – Headaches	Group x time p = .382 Time NS p = .765 Group NS p = .010	Figure 14. No group x time effect, main effect for religion; Muslim students significantly higher in number of headaches (big decrease after Ramadan)	Pre (d = .642) Ram (d = .751) Post (d = .261)	No support for hypotheses	Muslim group trend matched hypotheses (inverted v trend) and Christian group matched hypotheses as well (stable mean score)
Physical Stress – Depressed/Sad	Group x time p = .205 Time NS p = .034 Group NS p = .153	Figure 15. No group x time effect, main effect for time; Two groups differed	Pre (d = .015) Ram (d = .287) Post (d = .667)	No support for hypotheses	Muslim group trend increased from Pre to Post (did not match inverted v shape), Christian group trend decreased

		significantly as function of time (Muslim students increased throughout)			from During to Post (did not match hypothesized trendline)
Physical Stress – Upset stomach/indigestion	Group x time p = .008 Time NS p = .857 Group NS p = .948	Figure 16. Group x time interaction	Pre (d = -.539) Ram (d = .593) Post (d = -.0425)	Supports hypotheses. Two groups differed significantly as function of Ramadan	Muslim group trend matched hypotheses (inverted v shape), Christian group had notable decrease from Pre to During (did not match hypotheses)
Physical Stress – Muscular tension	Group x time p = .128 Time NS p = .433 Group NS p = .052	Figure 17. No differences for group or time; Christian students had larger scores;	Pre (d = -.521) Ram (d = -1.04) Post (d = -.0153)	No support for hypothesis	Christian group trend had notable decrease from During to Post, Muslim group trend had slight increase from

		decreased from Ram to Post.			During to Post (did not match hypotheses)
Academic Stress	Group x time p = .021 Time NS p = .097 Group NS p = .015	Figure 18. Group x time interaction & main effect for religion; Two groups differed significantly as function of Ramadan and religious identity	Pre = (d = -.195) Ram = (d = -.415) Post = (d = -1.102)	Did not support hypothesis	Muslim group trend matched hypotheses (decrease from Pre to Post), Christian group trend increased from During to Post (did not match hypotheses)
Perceived Daily Stress	Group x time p = .397 Time NS p = .375 Group NS p = .751	Figure 19. No differences for group or time.	Pre = (d = -.060) Ram = (d = .218) Post (d = -.371)	No support for hypothesis	No significant fluctuations

Statistically Significant Findings

This study was designed to see if there were specified trends in variables experienced by college students during Ramadan. These trends for Muslim students were compared with Christian students, who served as controls, as they were not expected to be affected by Ramadan. A total of 19 comparisons were made, testing for religious group by time interactions. Of these 19 hypotheses, only 1 variable followed the hypothesized trends (see Table 7). This suggests that the time of Ramadan was not sufficient to produce major fluctuations in self-reported well-being, religiosity, spirituality or stress amongst Muslim college students. Despite the lack of support for the hypothesized pattern of results, there are some novel findings, including some main effects of religion, that inform the study of spirituality/religiosity and student health and well-being.

As outlined in Table 7; there were there was one statistically significant group by time interaction which matched the hypothesis (upset stomach/indigestion), another statistically significant group by time interaction which did not match the hypotheses (academic stress), four statistically significant main effects for religion (religious universality, religious obligation, headaches, academic stress) and three statistically significant main effects for time (religious exclusivism, lack of interest, motivation or energy and depression/sadness).

Of the two variables where there were predicted trends and group by time interaction, these were relatively unimportant variables. These were stomach indigestion and academic stress. The hypotheses predicted changes in major outcomes like well-being, spirituality, and mental health during Ramadan. Taken together, these findings suggest that most of the specific hypotheses and the general concept behind it were wrong.

Group by Time Interactions

Upset Stomach/Indigestion

Previous research has highlighted the detrimental effects of Ramadan on higher levels of negative mood states, higher fatigue, higher lethargy/inactivity and excessive sleepiness (Nughra et al., 2017; Soh et al., 2010). This is the first research study to also find statistically significant results for another dimension of physical stress; upset stomach/indigestion. As highlighted in Figure 16 and Table 7, Muslim students began with a low baseline score of upset stomach/indigestion (0.17) increased significantly during Ramadan (0.425) and returned to lower scores after Ramadan was finished, matching Christian students (Muslim students - 0.233, Christian students – 0.251) suggesting the fluctuation was due to Ramadan. One of the main facets of Ramadan is heightened periods of fasting from sunrise to sunset (average of 16 hours according to AlJazeera.com, 2020), thus periods of upset stomach or indigestion can be expected.

Although there may be short-term discomforts from intense fasting, there are many clear physical benefits to fasting on the renewal of stem cells, the immune system, oxidant system, genome organization, chromatin remodeling, modulation of metabolic pathways and growth of insulin-growth factors and other related proteins and enzymes; some of which may aid in cancer growth control (Braggazi et al., 2016). Future studies should more concretely assess for longitudinal health outcomes in relation to Ramadan, beyond self-reports, as this may suggest that despite acute levels of physical stress, the long-term benefits may actually be improving Muslims physical health.

Academic Stress

As noted in Figure 18 and Table 7; Christian students had an increase in academic stress scores post-Ramadan (i.e., a month after Spring semester had ended into the summer) as compared to Muslim students who had a significant decrease post-Ramadan. The researchers did not rule-out for whether certain cohorts of students were taking summer classes so this significant result is potentially confounded. As noted in the participants section and Table 1, a larger percentage of Christian students were Freshmen or Sophomore (66.2%) as compared to Muslim students (44%) who had a more stratified sample across university standings (i.e., more freshmen or sophomore take summer classes as compared to seniors).

Main Effect by Group and Time

Religiosity (Religious Universality, Religious Obligation & Religious Exclusivism)

Although the key hypothesis related to well-being and mental health were not met; the study still has several noteworthy findings. Firstly, Muslim students are generally more religious than their Christian counterparts, even when situated in the same country. Although previous findings have found higher levels of religiosity in Muslim students (Abdel-Khalek & Lester, 2007; Chai et al., 2012), these studies compared religious students across different countries. For example, Chai et al, (2012) compared international Asian students to domestic and European international students in New Zealand finding that Muslim international students were even more religious then their domestic Muslim counterparts. The current study had a much larger percentage of native-born Muslim students (61.9%) in comparison to international students (8.3%) yet still found statistically significant higher religious scores. Notably, Muslim students rated themselves as being more religiously proud of their identities almost a standard deviation

and a half ($d = 1.55$) more than their Christian counterparts at baseline, this trend continued Post-Ramadan ($d = 1.28$). This can be attributed to the majority of Christian students being recruited as part of extra credit assignments, whereas the majority of Muslim students were recruited from religious student organizations which may further explain this result.

Another important finding for this study in relation to the general field of R/S are the discrepant findings across both student groups for different variables related to one's religious worldview. For example, Muslim students were significantly different in being more religiously universal (being proud of their religious identities) and being more religiously obligated (feeling that reading the Qur'an was something they had to do as Muslims) as a function of their religious identities and being more religiously exclusive (believing that being a Muslim is more important than 'being a good person') as a function of time then their Christian counterparts. But Christian and Muslim students did not differ in their religious conversion ("I have gone from being a non-religious person to a religious person"), using religious to cope with life circumstances (positive religious coping) and religious struggle (doubting the existence of God). Baier (2013) in a comparison between 14,994 Christian adolescents (mean age – 15.3) and 1,551 Muslim adolescents (mean age – 15.6) in Germany found that Muslim students were significantly more religious (Mean – 0.91) then Christians (Mean - -0.07). Although many previous studies have found higher religiosity in comparing Muslims to Christians; this study is amongst the first to more concretely parse out and compare subdimensions of one's religious worldview between the two religious' groups. More so, the two groups were very similar in age and nationality making comparisons more plausible than cross cultural research which may be confounded by extraneous variables. Importantly, researchers did not assess for whether students belonged to a religious organization which may indicate a selection bias hindering the results. Primary

researcher did coordinate and volunteer more actively from Muslim student organizations as compared to Christian student organizations.

Physical Symptoms of Stress (Headaches, Upset Stomach/Indigestion & Lack of Interest, Motivation or Energy)

The results for physical symptoms of stress were mixed as compared to previous studies; the current study had Muslim college students reporting significantly higher physical symptoms of stress scores in the self-reported headaches, depression/sadness and upset stomach/indigestion domains for the Muslim students. Christian students reported significantly higher lack of interest, motivation or energy as a function of time and had statistically significant academic stress scores across Ramadan. Previous findings have found that Ramadan is correlated with negative mood and mental states (Kadri et al., 2000) and with higher levels of fatigue (Nughra et al., 2017). Kaaragaglou and Yucecan (2000) also reported that 84% of Muslims reported tiredness/fatigue, 63% with excessive sleepiness and 50% with severe headaches amongst 750 Turkish Muslims. Soh et al. (2010) also found higher rates of inactivity and lethargy amongst Malaysian Muslims during Ramadan, with the majority citing 'poor motivation' as their rationale.

The current study also found that Muslims were statistically significant in higher depression/sadness scores as a function of their religious identity in comparison to Christian students. It is worth noting that self-reported depression/sadness increased slightly from Ramadan to post-Ramadan for the Muslim student group which may have important mental health implications. Since no previous studies have tested the effects of fasting amongst a college student group (particularly during an intense time of the school year such as is the case during Finals Week), these results are unique in better parceling out the potential detrimental effects of

Ramadan on students' physical symptoms of stress. Higher depression/sadness levels can be attributed to sources of discrimination, prejudice and other biases which have been noted in previous research on anti-Muslim sentiments in the United States (Shammas, 2017; Ali, 2014; Rippy & Newman, 2006). Although, it is important to note that a majority of the Christian student group were primarily students of color (42.2% were Hispanic and 22.9% were African-American with only 24.1% being Caucasian) who face discrimination, prejudice and systematic bias as well (Duncan, 2005; Hwang & Goto, 2008). Future research should more concretely parcel out stress related to wider societal and systematic patterns related to being a person of color and/or cultural minority. Furthermore, patterns of resilience, coping and community response to discrimination and trauma should also be assessed so as not to paint any one group as solely victims.

Depression/Sadness

This was a confusing finding due to mixed results suggesting that Muslim students had lower or at least equal perceived daily stress scores, much lower academic stress scores and higher subjective well-being scores (at Pre and Post) yet also had elevated depression/sadness scores as compared to Christian students. Two plausible hypotheses may be posed as to this differential finding. Firstly, the role of sadness is emphasized and even encouraged in the Holy Qur'an, for example numerous passages call adherents to cry so they may have 'soft hearts' ("When the verses of the Most Merciful were recited to them, they fell in prostration and wept" 19:58). Bauer (2017) indicates that voluntary crying and sadness are emphasized in the Islamic tradition as it is the ultimate expression of humility towards God or the Divine. Although sadness is conceptualized in the 'negative affect' category (with the PANAS itemizing 'how often have you felt sad?' towards that), it may be the case that Ramadan served to elevate sadness levels for

Muslims which further increased their devotion or 'soft heartedness'. Future research should more aptly monitor for construct validity issues related to cultural, spiritual and communal definitions of Western-laden terms such as 'wellness', 'happiness', 'positive/negative affect', etc.

Secondly, there is considerable research on how depression is conceptualized amongst Muslim communities, as compared to Western secular communities. Walpole et al., (2013) state that amongst Muslims, depression is often seen as an external phenomenon (consisting of a supernatural component, lack of spiritual devotion, God's will, etc.) in contrast to Westerners who attribute it largely to internal deficits or causes. There is also research that depression may not be completely stigmatizing and can be seen in certain communities as a sign of one's depth, thoughtfulness and humility (Walpole et al., 2013). Due to this metaphysical and communal understanding of mental health illness, Muslims often endorse a combination of medical and religious/spiritual practices for improved health as they are viewed as having intrinsic healing properties. Towards this, Walpole et al., (2013) synthesizing a systematic review (n = 25 studies) on effective interventions on Muslim patients strongly encourage collaboration with religious leaders, as without it, a secular professional may misdiagnose these external causes as pathology or more severe illness. Due to the lack of research on Muslim-Americans, trends of mental health and conceptualizations of mental health, future research should more concretely operationalize what these terms signify for Muslim-Americans (anxiety, depression, mental illness). Of the 25 studies included in the Walpole et al., (2013) review, only 3 were from the U.S. with one being conducted on Afghan immigrants, and the two others being case reports with a total of only 5 participants.

Lack of Findings

The hypotheses which were not confirmed were surprising as previous research has highlighted the role of higher religious and spiritual involvement in improved well-being (Joshanloo, 2011) and lower stress (Schubmehl et al, 2009). Consequently, it can be assumed that a period of intense religious and spiritual involvement such as Ramadan would produce notable time interactions to increase well-being across a 3 month span in a sample of highly-religious Muslim college students. A number of hypothesis may be posited as to why none of the assumed time interactions were found; firstly, Muslim-American college students are doing generally better than what would be assumed according to prior research. Our study found that Muslim-American college students were generally happier, had better positive affect, higher life satisfaction, lower academic stress, lower fatigue and higher motivation/interest than their Christian college student counterparts. Although a few key outcome variables were not statistically significant; Muslim-Americans scored higher in almost every key domain (or lower depending on the outcome) than their Christian peers except for the physical symptom of stress 'depression/sadness' category. For example Muslim students had higher self-reported levels of positive affect across all 3 time points in comparison to Christian students and higher self-reported levels of life satisfaction as well. On the SWB trend line; Muslim students met the SWB score of Christian students during Ramadan but returned to higher scores Post-Ramadan.

Subjective Well-Being

Secondly, as shown in Figure 2, the SWB well-being scores met the predicted pattern assumed in the hypothesis, although the results were not statistically significant. The results may be indicative of a Type II error because the effect size was small (ETA - .011), a much larger

sample size is needed to detect a significant effect. If significant, this pattern would indicate that Muslim students had generally higher SWB scores at baseline than Christian students, had a noted decrease during Ramadan (met the lower scores of the Christian students) and returned to their baseline scores Post-Ramadan. This is consistent with the assumed hypothesis in which Muslim students may have been experiencing negative affect or lower life satisfaction as a consequence of fasting (which is correlated with fatigue, headache and other physical symptoms of stress) during Ramadan. During this same time, the Christian students showed the opposite pattern, suggesting a possible deafferentation on this variable. Because this was not statistically significant, further speculation about this effect should be reserved pending finding a significant group by time interaction for subjective well-being in future studies. Finally, given that a small effect was found; this may not be a practically meaningful variable that is impacted by Ramadan.

The discrepant profiles of the Muslim students are important to note here as they showed a non-significant trend to score higher on SWB (positive affect & life satisfaction) but also as significant main effect for scoring higher on the depression/sadness item on the physical symptom of stress index. This profile of students who score high on psychopathological symptoms but are also high on well-being measures was previously found by Greenspoon and Saskllofske, (2001). In the Dual Factor Model of mental health, this group is called "symptomatic but content" (Suldo et al., 2008); studies of students have found that students in the symptomatic but content group perform better than the "troubled group" (i.e, high symotoms and low well-being) but not as well as the "complete mental" health group (i.e., low symptoms and high well-being) on variables such as health satisfaction, GPA, academic self-perceptions, social support, perceived physical health, identity development and less peer victimization (Suldo et al., 2008; Suldo et al., 2016). Muslim-American college students, although reporting

higher depression/sadness scores may be protected from developing worse functioning by higher SWB profiles, which might be a result of their religion. The relationship of the DFM model and spirituality warrants further investigation, particularly across distinct religious groups.

Eudaimonic Well-Being

When interpreting the lack of support for the hypothesis that eudaimonic well-being would increase for Muslim students relative to Christian students during Ramadan, it may be worth considering that young persons may be less prone to report changes in EWB than older persons. The mean age for both student groups (Muslim student group – 21.7 years and Christian student group – 20.8 years) was relatively old for college students, but the modal age was pretty young and the mean ages were young when considering adults. Previous research has correlated higher eudeimonic profiles with older aged adults. Pasupathi (2001) found that older adults were better able to find meaning through reviews of personal experience, Bauer et al., (2005) notes that mid-life and older adults tend to be less focused on extrinsically motivated concerns such as self-image, social status and appearances in comparison to adolescents and young adults, and more focused on personally meaningful activities and relationships and Vitterso (2018) corroborates that younger adults tend to be more focused on concerns, whereas older adults tend to be more focused on generativity. This may indicate that our sample of younger religious college students may still be 'seeking' their daimon which is conceptualized as finding one's moral and virtuous self (Vitterso, 2010). Future studies investigating effects of Ramadan on well-being could benefit from looking at students from a broader age range to reflect eudaimonic profiles consistent with previous research. Questions from the QEWB such as "I believe I have discovered who I really am" and "I can say that I have found my purpose in life" may not have

generated higher scores, particularly because the majority of students were freshmen or

sophomore (54.5%). Furthermore, eudemonic well-being was highly correlated with spirituality

suggesting a bivariate relationship which may suggest a lack of findings can be attributable to

low eudemonic profiles amongst college students which in turn predict lower levels of

spirituality and vice-versa.

Spirituality

Importantly, Christian and Muslim students demonstrated stable mean scores for

spirituality across the 3-month time period. Although; research varies in whether spirituality

exists as a component of religiosity or as a separate dimension of individual differences (Magyar

& Murray, 2005), our results indicate that although religion and spirituality have some

convergence; the two are inherently distinct constructs that measure different dimensions of

one's faith. We can also extrapolate that lower than expected spirituality scores may be

indicative of lower than expected eudaimonic profiles in the Muslim student group, as the two

have been strongly linked in research (Vitterso, 2010). Pargament (1997) indicates that

spirituality is deeply tied to human purpose and serves as a higher-order framework that provides

meaning to one's goals and life. Bivariate correlation results found that in the current study

spirituality and eudaimonia had a .333 correlation at Time 1, .366 at Time 2 and .347 at Time 3

with significant values (p = .000) for all time periods. This suggests that, similar to previous

research, in our study; stable spirituality scores were correlated with stable eudemonic profiles in

both student groups across the time periods. Joshanloo (2011) found significant bivariate

correlations between R/S and well-being (both eudaimonic and subjective) in 292 Muslim

Iranian students, finding a stronger correlation between spirituality (.450) and eudaimonia then

religion and eudaimonia (.256).

Possible Confounding Variables

Time

      It is also worth noting that the data collection for Time 1 (Pre-Ramadan & Finals Week)

occurred during the week of Easter. The higher than expected well-being scores for the Christian

student group may have occurred in part as a result of Easter. The Easter Triduum consisting of

Good Friday, Holy Saturday and Easter Sunday is marked by a time of higher religious/spiritual

involvement including worship services, parades, Easter Vigils and Easter egg hunts (Loue et al.,

2017). Studies have found that Christians rate these holidays, as well as the accompanying rituals

as of being significance to them and holding particular importance to their identities (Meske et

al., 1994). Furthermore; religious holiday rituals are associated with higher levels of satisfaction

(Loue et al., 2017). Future studies should more aptly monitor for fluctuations of R/S profiles for

any major religious holidays. Researchers for the current study did not assess for Christian well-

being scores prior to the Easter holidays, it can be hypothesized that the scores increased over

this time and remained stable. The time period that this study was conducted may have been

producing history threat to validity due to Easter and possibly Finals.

Demographics

      Another key finding that may possibly explain these results were the higher rate of

Latino/African-American students in the Christian sample. Previous religious/spiritual studies on

Christian college students have consistently found that African-American and Hispanic students

are more religious than White students (Park & Millora, 2010). Although a substantial amount of

research in the social sciences is conducted on white participants (citation) ,this heavy sampling

of white students may not account for the mental health profile of students of color (i.e., African

American and Latino) who have greater levels of unmet mental health needs in comparison to

white students (Lipson et al., 2018). Although the Muslim-American student make-up was also

diverse and eclectic, the sample was mostly Southasian and Arab and very little research has

been done on the trends of mental health amongst these two racial/ethnic categories in the

current Muslim-American sample. Future studies should further address the needs of South-

Asian or Arab-American students particularly with respect to the effects of R/S on mental health

and well-being.

       Acculturation…

       Researchers failed to account for potential acculturative effects which may have

attenuated certain outcome variables. Previous research conducted on Christian populations in

the U.S. has overwhelmingly used Caucasian populations (citation), whereas the current study

had only the 3rd largest demographic of Caucasians behind African-Americans and Latin college

students. Acculturation is defined as a process of psychological change resulting from contact

with other groups, such as Latin students having to adopt cultural norms related to being a

successful university student (independence, self-reliance) through 'receiving-culture

acquisition', as well as 'heritage-culture retention' which implies to become more

'individualistic' as a function of prospering in the U.S., certain cultural ideals such as family and

communal obligations must be shifted in priority, or even abandoned (Castillo et al., 2015).

Acculturative stress has also been noted amongst African-Americans who experience difficulties

adapting to Eurocentric values, as they rely on their own cultural ideals, values and belief

systems (De La Rosa et al., 2000). Research has found that both 'cultural acquisition' and

'cultural retention' are associated with family conflict, risk for depression, and acculturative

stress (Castillo et al., 2015). Although this is further delineated by gender with men accounting

for a larger variance in depressive symptomology in relation to acculturation (27.9%) than

women (10.9%) suggesting that Latin men may experience more acculturative stress due to their

bicultural identities and as males shifting in gender socialization (Castillo et al., 2015). Similar

acculturative links with mental health have been found with Arab and South Asian populations,

although a more robust model suggests that other factors such as religion, discrimination

experiences, age at migration, and ethnic/dominant society immersion may moderate the

relationship (Awad., 2010; Aprahamian et al., 2011). The largest percentage in both Muslim and

Christian student groups reported 'being born in the U.S.', however it can be surmised through

population data, a majority of both student groups were either 2nd or 3rd generation immigrants.

Discrepant findings related to Muslim students having higher depression/sadness scores even

after Ramadan or Christian students having lower reported positive affect and life satisfaction

scores may be partially explained by acculturation. Future research should parcel out what

components of one's bicultural identities related to ethnic/cultural affiliation and religious

affiliation are linked with protective factors and risk factors.

        Collectivism…

        It is important to note that the largest categories for our ethnic representations across

Muslim and Christian groups were Hispanic, Arab and South-Asian. Although, there is

controversy in heterogeneously labeling any one culture as being entirely individualistic or

collectivistic (as individuals in Eastern or Western contexts can choose to conform or rebel to

sociocultural norms), Cohen et al., (2016) posits that religions can influence the cultural

development of people groups synthesizing religious and cultural norms. In our case, prior research has found that Hispanic groups largely self-report collectivistic ideals such as familismo, comunidad and respeto. Another term 'tu eres mi otro you' (You are my other self) also captures collective identity as being rooted in responsibility for community, such as valuing elders (Castellanos & Gloria, 2016). Furthermore, our largest Christian demographic was also Catholic who endorse collectivistic aspects of religion such as tradition, community and social interaction (as opposed to religion being a 'personal relationship with God' as many Protestants endorse) (Cohen et al., 2016). Ahmad (2011) similarly identifies Quranic and Islamic discourses as being aligned with collectivistic ideals of shared responsibility and viewing humanity as one shared brother or sisterhood. Arab and South Asian populations similarly endorse collectivistic ideals, similar to Latin populations, viewing their private lives and emotional dependence as being inextricably linked to institutions such as their clan, religious affiliation and family (Buda & El-Sayed-Elkhouly, 1998). Being that our population were largely born in the U.S., but identified as Hispanic, Arab or South-Asian; it can be surmised that our student cohort were either 1st, 2nd or 3rd generation immigrants. Future research may want to account for what values these discrete clusters of students endorse in relation to their bicultural identities and religious worldviews and tailor assessment tools to match those culturally salient constructs. For example, Saroglou and Munoz-Garcia (2008) found that religious people in largely religious countries endorse values such as tradition and conformity and do not endorse values such as self-direction and hedonism. There is minimal research on what values bicultural individuals who were largely raised in a secular country but with affiliation with their country of origin may endorse in relation to their religious/cultural identity.

Another consideration is immigration status. A small percentage of both student groups were foreign-born or recently immigrated (Muslim students – 8.3%, Christian students – 6.0%). In the introduction, it was expected based on prior research that a higher percentage of the Muslim-American student pool would be international students. For instance, in previous research which has found that a substantial percentage (58%) of Muslim-Americans are immigrants (Pew Research Center, 2017).   Owing to factors such as social network disruption and acculturative stress, international students and recently immigrated populations are more significantly at-risk to develop mental health symptomology than their natural-born peers (Yu, Chen & Li, 2014). In this comparison of Muslim and Christian students, however, the anticipated disparity in immigration status was not evident, which could have diminished the expected contrast in mental health and well-being.

Psychometric Limitations

Religiosity/Spirituality

Moving away from sampling considerations, a possible reason for the dearth of anticipated group by time interactions was limitations of the instruments and scales for religious/spiritual populations. Although the PMIR is amongst the only psychometrically valid instruments that has been standardized and validated on a Muslim-American population; it has never been validated on a Christian-American population, and had to be modified by the researcher to have appropriate content for Christians. This modification and lack of testing with Christians which can possibly confound results. More so, the PMIR only included a single item in regards to spirituality ("how important is spirituality in your life?") which may not have been understood by either religious populations who largely contextualize spirituality in relation to a

sense of closeness with God such as a Muslim reporting 'feeling a vivid connection with Allah during prayer' (Westbrook et al., 2018). Future research should address spirituality using a multi-dimensional tool with attention to culturally sensitive language, particularly for groups who practice spirituality within a religious context.

Secondly, the PMIR was never intended for a repeated measures design and thus there is a significant confounding as to whether the current study was assessing trait or state aspects of student R/S. Westbrook et al., (2018) in developing the Trait Sources of Spirituality Scale (TSSS) indicate that assessing for trends of religious and spiritual growth, in relation to discrete experiences with the sacred, both in secular and religious spaces provides a more robust understanding of R/S. For example, a Christian may fluctuate in his or her experiences with the sacred across time, connecting with both secular sources (nature, art, etc.) and religious sources (prayer, communal worship, etc.). Future research should use measurement tools with time-specific indexes when accounting for R/S experiences such as "when engaging in Ramadan… do you feel closer to Allah?"

Well-Being

A number of the other instruments used may not also have been appropriate for a repeated measures design. For example, much of the theoretical assumptions which underlie the current approach to well-being do not account for state vs. trait discrepancies. Our study which sought to measure trends of well-being across a 3-month span produced consistently steady mean scores for both student groups. Schimmack et al., (2009) indicates that empirical studies which purport to measure well-being must account for variance across trait, state and error measurements in their measures. Well-being scores amongst both student populations may be reflective of trait variance indicating that the measurements were capturing stable components of

student's well-being profiles, these were reflected in the relatively stable mean scores across all 3 time points. For example; Waterman's Scale of Well-Being (QEWB) which was used for Eudaimonic well-being in the current study assessed for discriminant validity with Big-Five personality traits finding a modest correlation (r scores ranged from .20 to .28) (Waterman et al., 2010).

The subjective well-being measurements used for the current study did not assess for state or trait variance which may have confounded the results. Schimmack et al., (2009) assessed SWB scores over a 6-week period finding that single-item indicators of well-being had a reliability efficiency of about 60%, when respondents were answering for the first time. Lastly, the overwhelming majority of R/S research has used SWB tools focused on happiness and life satisfaction (Steffen, 2012). The current study is amongst the first to assess for both EWB and SWB profiles amongst two distinct religious student groups across a highly religious time span and consequently many of the hypothesis assumed did not come as a result of prior research, but rather theoretical models which have correlated R/S with higher EWB and SWB in religious populations (Joshanloo, 2011).

Assessing Important Variables for Non-Mainstream Populations

Lastly, it is important to note of the lack of culturally-sensitive instruments in measuring well-being across religious/spiritual populations. For example, Wong et al., (2015) strongly criticizes the Positive Psychology movement in failing to adequately capture ideals such as relational wholeness, transcendence and spirituality in the current conceptualization of well-being. Nelson (2016) corroborates that a wider paradigm is needed that can account for ideals

such as eternal life or dependence on God, along with other constructs which make-up what it means to live 'well' for Christian populations. Similarly, Misra (2009) in a critique of Positive Psychology from a Hindu perspective, posits that the current individualistic framework of well-being cannot account for aspects related to transcendent concepts such as relation to the cosmos or spiritual well-being. The current researchers emphatically agree with the philosophical shift which must be undergone in the field of positive psychology research to better account for well-being profiles of religious/spiritual populations. For example; most of the questions that were asked on the QEWB are in relation to an individualistic conceptualization of well-being (all of the questions are in relation to 'I' such as "I believe I know what I was meant to do in life") which may not conform to a more pluralistic and communal understanding of wellness, as is understood in the Islamic tradition.

Erylimaz and Kula (2018) indicate that 'being active in the social affairs of the *Ummah* (Muslim community)' and fulfilling one's social obligations are pivotal conditions in understanding happiness in the Muslim traditions. Secondly, the majority of students in the Muslim-American student group were Arab or South-Asian; two cultures which are strongly collectivistic (Buda & El-Sayed-Elkhouly, 1998) and the largest student group in the Christian student group were Latino which are also strongly collectivistic (Arevalo, So & McNaughton-Cassill., 2015). Future research should seek to broaden how well-being is conceptualized by including broader measures which are culturally-sensitive and address salient factors related to one's R/S worldview (i.e., items which are currently lacking in modern well-being assessments such as transcendence, inner harmony, call to a higher purpose, etc.,).

These findings are important as they denote that a wider paradigm is needed for understanding the multi-dimensional functioning of how one uses their religion. R/S studies have often been critiqued for using single assessment items such as rate of church attendance as a function for religious identity (Piedmont & Wilkins, 2019); this study is amongst the first to explore religiosity amongst several subscales, particularly amongst a religious college student population. Future research should continue in measuring for variance amongst numerous subdimensions.

Procedural Limitations

Selection bias

One validity issue in drawing from the Christian and Muslim samples was a noted selection bias. Although we did not ascertain whether students belonged to or were affiliated with a religious organization, most of the Muslim participants were recruited from the local Muslim Student Association (MSA) during weekly congregational prayers. Although, some of the Christian students were also recruited from various Christian student organizations, a substantial number of Christian students were recruited from classrooms as part of an extra credit initiative. Attendance at religious services and participation has been correlated with increased religiosity (Loue et al., 2017), so it can be surmised that the statistically significant findings for some of the religious variables are confounded by a selection bias. Since the current study utilized a volunteer approach in which only students who wanted to participate did so; religious main effects and interactions should be interpreted cautiously. Future studies should use a universal sampling approach to more accurately select religious students who may not be affiliated with a religious institution but still consider themselves to be religious.

Another facet of sampling bias results from underrepresentation of certain subgroups of the target population. For example; the current study had a very low percentage of graduate students (8.3%), Christian males (20.5%), international students (14.3%), and non-Catholic and non-Baptist students (38.7%). The Muslim student group also had a very low percentage of African-Americans (4.8%), even though they represent the largest racial category of Muslim-Americans (Pew Research Center, 2016). Owing to this, the current study sought to control for academic standing, gender, ethnicity, and international student status. Future studies should compare between-group and within-group effects on cultural and individually salient variables such as ethnicity gender, academic standing and international student status (i.e., how do African-American Muslim college students and Arab-American Muslim college students compare in R/S, well-being and stress?). Prior research has found that Muslim international students in New Zealand used religious coping methods more frequently than their domestic Muslim counterparts (Gardener et al., 2014).

Berk (1983) indicates that the potential for selection bias is higher when working with a nonrandom selection of a population; since we could not 'assign' students to participate in Ramadan or not, results should be weighed with these considerations in mind. This is further exacerbated by a noted demographic difference between the Muslim and Christian students which makes drawing comparisons between the two groups even more challenging. Future studies can control for these effects through a universal sampling approach (selecting from a non-volunteer sample), although demographics may skew more towards Christian students as they make-up the larger percentage of U.S. population (70.6% identify as Christian in the U.S. compared to 0.9% of Muslims; Pew Research Center, 2018).

History effect

      Another potential confound to validity in the current study is history, which refers to intervening events that may have potentially influenced the outcome variables (Christ, 2007). For example; the current study did not control for Easter and its possible effects on Christian R/S and well-being. Since the study was a repeated measures design across a 3-month time span, there may have been threats to history that were not controlled for. Another example is the statistically significant group by time interaction for academic stress in which the Christian students had much higher scores than Muslim students. This may have been due to a higher percentage of Christian students taking summer classes in comparison to Muslim students (researchers did not control for this and assumed an equal number of students would be taking summer classes from both student groups). Although Christ (2007) notes that history effects can be reduced if data is collected concurrently (less time in between measures); the present study gave a one-week window for both student groups to complete the surveys online which may indicate large discrepancies in data collection between students. Close proximity of Ramadan to Finals may also have muddled the effects of stress; although attempts to control for this were made by including Academic Stress questions (MacGeorge et al., 2005), the statistically significant group by time interaction of academic stress was unexpected and may indicate a need to include more robust and multi-dimensional assessments for student stress (financial, social, discrimination, etc.). Future studies should monitor the impact of Ramadan longitudinally as the fluctuations of Muslim R/S and well-being may be different at various points of the year (because the Islamic calendar is based on the lunar cycle, Ramadan moves back 9-12 days every year). Conversely, Christian R/S should also be assessed *across* notable times of the year such as Easter or Christmas for a more complete understanding of Christian religiosity/spirituality and well-being.

Self-report bias

Lastly, the current study collected surveys entirely through self-reports which may confounded validity due to self-presentation, social desirability and threat of disclosure on part of participants (Krumpal, 2013). Social desirability refers to truthfully reporting behaviors which clearly violate social or cultural norms (Kurmpal, 2013). For example, a question from the PMIR such as "I doubt the existence of God"; religious students may present their answers in a positive manner in regard to such a question due cultural denial of socially undesirable traits and behaviors. Threat of disclosure refers to participant concerns about possible iatrogenic effects from their answers such as family being upset or prosecution/ostracization (Krumpal, 2013). Lastly, intrusiveness refers to certain questions which may perceived as private or taboo within a culture including questions concerning health status (Krumpal, 2013). The current study asked extensively about physical symptoms of health; students may have seen these questions as 'intrusive' and chosen not to answer truthfully. Future studies should use measures to assess for overly positive responding and self-presentation bias.

Construct validity

Although there is clear research on converging and discrepant dimensions of religion and spirituality with religion being operationalized as an individual involvement in an organized community that emphasizes doctrine, adherence to a moral code and traditions from an institution and spirituality as a subjective, mystical and holistic codification of values/beliefs and behaviors (Garfield, Isacco & Sahker, 2013). There is unclear research on how mainstream and non-normative populations operationalize these terms. Future studies should seek to assess for

whether these theoretical differences are understood and implemented by the lay religious person. In our study, although there were fluctuations in some of the religious variables; spiritualty remained consistent which may indicate a lack of understanding on what was meant by this term. Secondly, a single-item for spirituality was used; previous researchers have espoused that a multi-dimensional approach to abstract constructs such as spirituality be employed (Piedmont, 2001). Future studies can use multi-faceted spiritual scales such as the Spiritual Transcendence Scale (STS) (Piedmont, 2001) or the Intrinsic Spirituality Scale (ISS) (Hodge, 2003).

External validity

The current study recruited Muslim and Christian students from a single campus located in the Southern United States so results may not be generalizable to other Muslim or Christian populations in the U.S. Houston has also been rated as the most diverse city in America with the University of Houston routinely falling within the top 10 most diverse campuses in the nation (NCES, 2018), so student life and culture may not reflect the profiles of religious minorities living in more heterogeneous locations. More specifically, a larger percentage of Asian-Americans and Arab-Americans are located in the southwest areas of Houston (Alief, Sugarland, Richmond). Future studies can control for this by asking about environmental characteristics of where the participants live such as using the General Community Satisfaction Scale (GCSS) (Vreugdenhil & Rigby 1987) which ascertains community facilities, recreation, local administrative resources, employment level and quality of housing. Future studies can also assess for well-being profiles of Muslim-Americans living in various areas (higher percentage of community resources vs. lower percentage) to determine the impact of environmental stress

factors. Lastly, future studies can expand research on religious student populations by more aptly

parceling out mechanisms of action used to cope with the demands of being a student.

Implications

In a content analysis of 4,534 articles from nine prestigious school psychology journals;

Parker et al., (2020) found that 17 or 0.4% met the criteria as being related to R/S issues. This is

contrasted with previous content analyses on diversity issues related to race, ethnicity and/or SES

status which account for 9-16.9% of school psychology journal articles. This has dire

implications as research suggests that nearly 3 in 4 college students in the U.S. consider

themselves to be 'spiritual' with more than half (54%) identifying themselves as 'religious

(Higher Education Institute, 2011). More so, previous research has well established religion as an

influential and pervasive resource in the development of adolescents (King & Furrow, 2008).

Numerous research studies have found that enhancement of religious values contribute to

prosocial behaviors in adolescents including academic and social competencies, better coping

skills, higher levels of personal restraint, school engagement, clearer sense of personal meaning,

positive self-concept, altruistic behaviors such as volunteering and community service, amongst

many other positive health behaviors (King & Furrow, 2008). Furthermore, religiosity variables

are consistently associated with reduced risk behaviors including smoking, alcohol use, truancy,

sexual activity, drug usage and depression (Sinha, Cnaan & Gelles, 2007). Thirdly from a

multicultural perspective; most minority populations self-report being religious (Taylor et al.,

1996) and thus school psychologists should more aptly monitor, assess and utilize their students'

religious worldviews for better case conceptualization and treatment. All in all, the current study

builds along the line of previous research that promotion of religious and spiritual values amongst adolescents is a critical component of their development.

Although, we are conscientious of the fact that schools serve to promote secular values; psychologists are also mandated by the APA code to "recognize the importance of multicultural sensitivity/responsiveness, knowledge, and understanding about ethnically and racially different individuals" (APA, 2000). Principle E further specifies "that psychologists have an ethical responsibility to consider religious issues as an aspect of multicultural diversity along with gender, race and others" (APA, 2009). Furthermore, research has found that psychologists may hold explicit and implicit biases against client religiosity (Ruff, 2008); discrepancies exist between mainstream psychologists and the general public with only 35% of APA selected psychologists surveyed (n = 258) agreeing with a statement that 'their approach to life is based on their religion' in comparison to 75% of the general public (Delaney et al., 2007). This also has real world clinical implications as Saunders, Miller and Bright (2010) indicate that clients report wanting to have open discussions on R/S issues, yet only 30% of psychologists report addressing this issue with about 50% reporting not discussing it at all in a randomly selected list of 1,000 APA psychologists. Although there is limited research on whether these same trends exist for school psychologists; it can be surmised that owing to the 1st amendment and a critical lack of general training in R/S competencies in most psychology graduate programs (Vogel et al., 2013), the topic of religion and how it can possibly benefit students is hardly being brought up in our schools.

The current study highlights the critical role of assessing for R/S, well-being and stress in Muslim-American student populations. Specifically, fluctuations of religiosity across time may demonstrate a need for more coordinated efforts in different parts of the year. The current study

found statistically significant effects for headaches, upset stomach and depression/sadness (with a notable decrease in SWB as well) during Ramadan for the Muslim student cohort; educational institutions may want to monitor for elevated symptomology in these specific students (Tier 2 approach) during specific religiously involved times of the year to determine whether additional resources and interventions may need to be provided. For example; school psychologists working in a school with a large Muslim student body may want to work closely with religious leaders to determine whether any accommodations may need to be placed (i.e., waiting until Ramadan is over for students to take a mentally taxing 2-3 hour exam or providing an alternative to physical education courses).

There currently exists scarce research on this non-mainstream population even though a high number of Muslim-Americans are entering academia and the workforce with about 3 in 10 U.S. Muslims having college or postgraduate degrees, the equivalent to the share among U.S. adults as a whole (31%) (Pew Research Center, 2016). Muslims in the U.S. are also estimated to become the 2nd largest religious group, behind Christians, by 2040 (Pew Research Center, 2018). Although, many of the assumed group by time interactions were not found; the study did find significant main effects for religion in many key domains of religiosity, even after controlling for demographic information, with Muslim students being more statistically significant in religious universality and religious obligation. Previous research has also highlighted Muslims being a much more religious group than Christians, who are the majority of the U.S. population (Pew Research Center, 2018). More so, non-White students such as Arab, other Muslim (South-Asian), African-American and Hispanic students are much more likely to face discrimination due to religious identity than White students (Parker et al., 2020). School psychologists who are working with Muslim or other religiously involved students should

routinely assess for religiosity as it is a critical component in their cultural worldviews and can be utilized as an effective protective factor as well.

Multiple clinical models show that physical, mental, social and spiritual dimensions of health are linked and their co-dependence leads most fully towards flourishment (Cloninger et al., 2015). Research shows that individuals from western, industrialized nations tend to have materialistic attitudes towards 'living a good life' that place higher emphasis on attainment of money, possessions, fame and 'keeping up appearances' and conversely that aspects of transcendence and spirituality are devalued in these secularized nations as well (Cloninger & Zohar, 2011). Keshvarzi and Haque (2013) indicate that differences in culture/religious values are a prominent barrier in Muslims seeking mental health services. A key consideration in working with Muslim clients is utilizing an integrated approach that combines religious/spiritual aspects with mainstream psychological modalities (Keshvarzi & Haque, 2013). Although many psychology training programs emphasize 'multiculturalism'; there isn't nearly enough consideration in practically and meaningfully integrating cultural components to provide efficacious care. School psychologists who are working with highly religious students should practice an interdisciplinary approach with routine consultation and collaboration with religious or spiritual leaders.

Lastly, the intersection of school psychology and religion has major implications when considering that 10% of all US students are enrolled in private schools with private schools accounting for 25% of all US schools (National Center for Education Statistics, 2017). Enrollment in Catholic (38%), nonsectarian (21.8%) and conservative Christian (13.8%) schools make-up the largest percentage of private schools with private Islamic schools (*madressas*) falling the lowest (0.8%). Although a full scope of arguments for and against private schools are

outside of the purview of the current study; families with the economic means to move away from public schooling routinely do so, opting for privately run religious or secular schools (Egalite & Wolfe, 2016). Although the standards for 'good education' are disputed in private schools with skeptics citing a traditional public school test score advantage (Egalite & Wolfe, 2016) and advocates citing research that finds private school students are twice as likely to obtain higher education degrees (National Center for Education Statistics, 2012). What is hardly researched are the well-being and mental health trends of students enrolled in privately run religious schools. Another area with hardly any focus is what type of services school psychologists who work in privately run religious schools are providing. In fact there is zero research to date on either area which has troublesome implications for the 4,497,282 students enrolled in religious private schools (National Center for Education Statistics, 2017).

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