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Social Engagement and Health: a Structural Equation Modelling Analysis of Downstream Links to Health Outcomes Among White-collar Professionals

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SOCIAL ENGAGEMENT AND HEALTH: A STRUCTURAL EQUATION MODELLING ANALYSIS OF DOWNSTREAM LINKS TO HEALTH OUTCOMES AMONG WHITE-COLLAR PROFESSIONALS

by

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ABSTRACT

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High level of social engagement has been associated with improved health outcomes. Its capacity to influence one's health has led to the conception of Berkman's social relationship model which hypothesizes that health is impacted by social relationship through a series of causal processes that begin at the macro-social level (upstream factors) to micro-psychobiological processes (downstream factors). Social engagement can be defined as the enactment of potential ties in real life activity but the mechanisms through which these ties impact health are scarcely investigated. Furthermore, existing evidences on these mechanisms or mediators are flawed and questionable. Studies have also shown that social engagement level among white-collar professionals are gradually fading given the damaging factors they experience at work. Nonetheless, social engagement has never been considered as a predictor of health status for these professionals despite its correlation with health. Using Berkman's model as the guiding framework, the study sought to: a) investigate the relationship between social engagement and health among white-collar professionals, b) evaluate the influence of their job strain, working hours, age, race, education, and income on social engagement level, (c) assess the associations of social engagement with the model's behavioral and psychological variables, and (d) determine which of these variables mediate the link between social engagement and health.

The current study emphasized on white-collar professionals in Malaysia as the country's diverse background provided unique opportunities for assessing social engagement from the perspective of different work and cultural ethics as well as religious beliefs following its multi-ethnic, multi-cultural, and multi-religious society. A two-phase recruitment approach was employed. First, participants were invited for a cognitive interview to pretest the instruments. Comments from n=9 participants were reviewed to revise the 14 instruments used in the survey. Second, recruitment for survey research was conducted through paper and web invitations yielding a final sample of n=200. Data were analyzed with Mplus using confirmatory factor analyses and structural equation modelling techniques. The study showed that social engagement correlated positively with health. It was also found that age and race predicted the social engagement level of the Malaysian professionals. Additionally, social engagement exhibited significant associations with some of the behavioral and psychological variables tested in the model which include diet, help seeking, self-efficacy, self-esteem, coping effectiveness, depression, and purpose in life. Of these, only depression was found to mediate the association between social engagement and health. The results provide empirical support for several key areas in the social engagement literature and could be used to inform future formative research of behavioral interventions.

To

my parents and parents-in-law,

my children,

and especially my wife

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CHAPTER I

INTRODUCTION

Problem statement

Social engagement impacts many aspects of people's lives, one of which involves the attainment and maintenance of good health. Defined as the enactment of potential ties in real life activity (Berkman, Glass, Brissette, & Seeman, 2000), high level of social engagement has been shown to be associated with better health and health outcomes across a number of studies (Bassuk, Glass, & Berkman, 1999; Berkman & Syme, 1979; Bygren, Konlaan, & Johansson, 1996; Glass, Mendes De Leon, Marottoli, & Berkman, 1999; James S. House, Robbins, & Metzner, 1982; Kaplan et al., 1988; Mendes de Leon, 2003; Seeman & Kaplan, 1987; Wang, 2002). Realizing the potential of social engagement in shaping one's health, a model illustrating the cascading causal processes by which it affects health was introduced by Berkman and colleagues at the turn of the century (Berkman et al., 2000). Several pathways were specified in the model and those of "downstream factors" (i.e. behavioral and psychological pathways) which linked social engagement to health were the focus of this research (Figure 1). Previous empirical research investigating these pathways were conducted in isolation at best (i.e. one pathway/variable per analysis) with low to ambiguous statistical power due to unreported reliability and validity of the instruments used and/or conservative method of mediation testing (Sheldon Cohen, Doyle, Skoner, Rabin, & Gwaltney, 1997; Crittenden et al., 2014; Kenny, 2016; MacKinnon, Warsi, & Dwyer, 1995). The current study emphasized on a sample of white-collar professionals following the growing evidence of declining social engagement activities among high strain workers (Karasek, 1997; Karasek, 1976; Lindström, 2004; Lindström & The Malmö Shoulder-Neck Study Group, 2006), and the fact that social engagement has only scarcely been

investigated as a factor in predicting the health status of these workers or any other workers in general.

Background

Research exploring the importance of social relationships for health began when Durkheim's *Suicide* established the understanding of how social integration and cohesion influence mortality (Durkheim, 1951). His work demonstrated how "social fact", a social phenomenon that puts external constraint on individuals, elucidated the patterning of suicide given its capacity to deregulate social control and social norms. In other words, the suicidal cases reported were triggered by the depletion of society's capacity for integration. Since then, studies

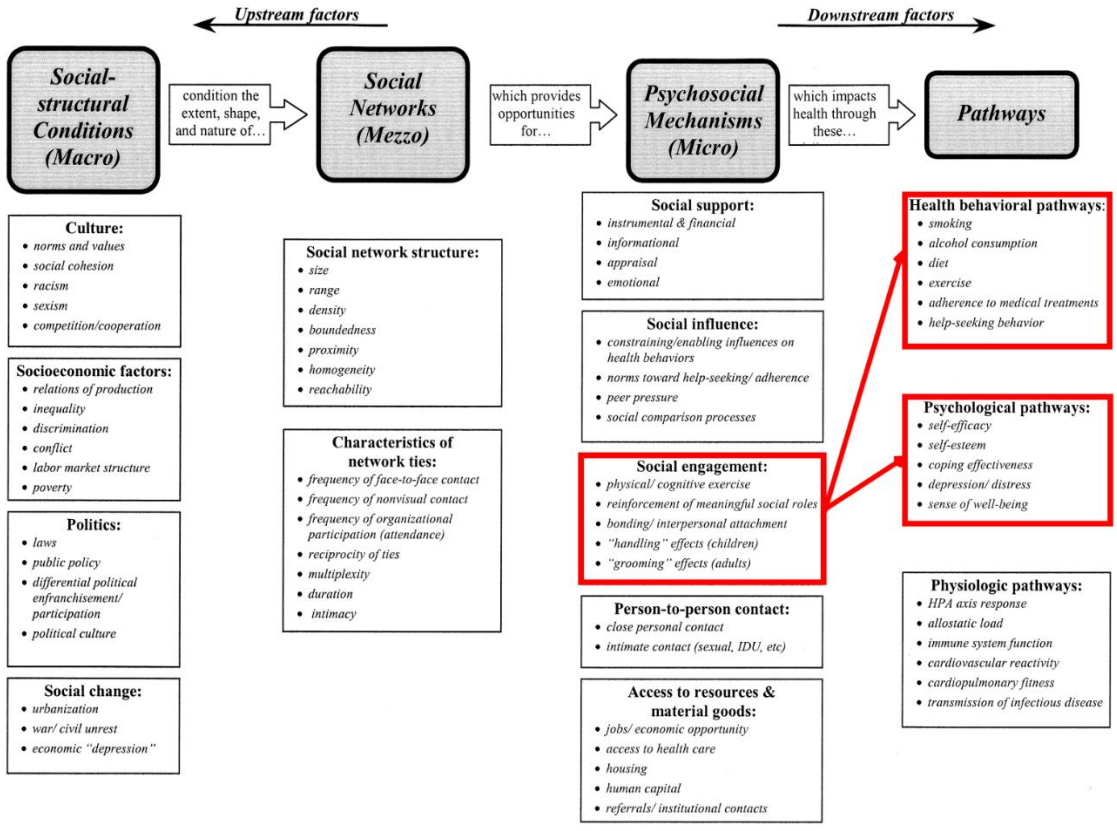


Figure 1: Berkman's conceptual model of social relationships

exploring the influence of social relationships have grown tremendously and these studies have used diverse measures to quantify social relationships ranging from network size or composition (Cheng, Leung, & Chan, 2014; Marquez, Elder, & Arredondo, 2014) and social integration (Crittenden et al., 2014) to quality of social interactions (Chang, Wray, & Lin, 2014; Sneed & Cohen, 2014; Sorkin, Mavandadi, & Rook, 2014) and social engagement (Bath & Deeg, 2005).

A meta-analytic review of studies on the association between social relationships and mortality concluded that the influence of social relationships was comparable with quitting smoking and exceeded other well-known risk factors such as obesity, alcohol consumption and physical inactivity (Holt-Lunstad, Smith, & Layton, 2010). Social relationships have also been positively associated with cardiovascular disease (Barth et al., 2010; Berkman, Leo-Summers, & Horwitz, 1992; Orth-Gomer, Rosengren, & Wilhelmsen, 1993) cancer (Ell, Nishimoto, Mediansky, Mantell, & Hamovitch, 1992; Pinquart & Duberstein, 2010), and infectious disease (Lee & Rotheram-Borus, 2001).

With respect to social engagement, empirical data have established the impact it has on various aspects of people's lives one of which pertains to the attainment and maintenance of good health. For example, Seeman et al. (1987) demonstrated that in a community-based sample of individuals aged between 35 and 70+, those aged 60 and over who were not socially engaged – as measured by non-membership in church groups – were more likely to experience increased in all-cause mortality compared to those who belong to a church after adjusting for age, sex, race and baseline health status. Likewise, Everard et al.(2000) showed that maintenance of social activities (i.e. travelling, entertaining, attending parties and attending church) was associated with good physical health functioning after controlling for age, gender, marital status, income, instrumental activities, high- and low-demand leisure activities, and social support.

Similarly, Mendes de Leon et al. (2003) observed strong positive associations between social engagement and activities of daily living, mobility and physical functioning among older adults when adjusting for age, gender, race and physical activity. It has also been reported that men and women who were socially disengaged show higher prevalence and odds of smoking, drinking, and physical inactivity in contrast to their counterparts (Berkman & Syme, 1979; Cohen, Doyle, Skoner, Rabin, & Gwaltney, 1997). These findings demonstrated that variations in one's level of social engagement affect health and health-related behaviors.

The causal relationship between social engagement and health can be hypothetically explained by either the psychosocial stress theory (Selye, 1946; Syme, 1989), the diffusion of innovations theory (Rogers, 1983), or the social capital theory (Coleman, 1990; Putnam, 1993). These theories nonetheless fell short of underlining the process by which social engagement impacts health. Alternatively, Berkman's social relationship model (Figure 1) considered multiple constructs as potential mediators for social engagement and health, while acknowledging several socio-structural forces related to the labor markets, economic pressures and organizational relations. Conceptually, the model illustrates the connectivity of these constructs through detailed pathways and provides compartmentalized frameworks of upstream and downstream factors (see *Chapter II: Theoretical model of social relationships*).

The application of the model in this research is deemed relevant given its methodological focus on mediation analysis of the social engagement and health relationship while recognizing the harmful socio-structural factors faced by white-collar professionals. One of those factors that has received considerable attention and continue to plague this population is job strain – which has been reported to negatively impact social engagement (Lindström, 2004; Lindström & The Malmö Shoulder-Neck Study Group, 2006). Yet the impact of social engagement or

disengagement on white-collar professionals' general health remains to be seen. Social relationship studies of this population thus far has mainly looked at the role of social support in attenuating adverse work conditions (Davis & Heaney, 2000; Schnall, Landsbergis, & Baker, 1994; Undén, 1996; Vahtera, 2000). Even then, results have been mixed as the availability of social support may also encourage illness behavior and increase in sick leaves (Stansfeld, Rael, Head, Shipley, & Marmot, 1997). Furthermore, behavioral and psychological processes of social engagement have not been fully explicated given the dearth of mediation research on the topic.

The current study focused specifically on the white-collar professionals in Malaysia as the country's multi-ethnic, multi-cultural, and multi-faith society with a diversity of languages (Ayudurai, Yahaya, & Zainuddin, 2002; Rowley & Abdul-Rahman, 2008a, 2008b) provide unique opportunities for assessing social engagement from the perspective of different work and cultural ethics as well as religious beliefs. Malaysia is a former British colony with a population of 31.7 million people and racial composition comprising of ethnic Bumiputra/Malay (68.6%), Chinese (23.4%), Indians (7.0%) and other numerous ethnic groups (1.0%) (Department of Statistics Malaysia, 2016). Islam and Bahasa Malaysia is the official religion and language of the country respectively (*Federal Constitution*, 2010). The Malays are by law Muslims and the Chinese are mostly Buddhist while the Indians are largely Hindus. A very small percentage of Malaysian refer themselves as 'Eurasians' (European + Asians) as they are descendants of Portuguese, Dutch and British colonizers from the 16th century (Rowley & Abdul-Rahman, 2008b). These Eurasians as well as indigenous ethnic groups in Sabah and Sarawak are mainly Christians (Rowley & Abdul-Rahman, 2008b). Religion is central to the lives of the people of Malaysia and generally deemed to be an integral component of the Malaysian society.

The study also extended previous correlational studies of social engagement with health, which signified an early attempt of establishing the importance of social engagement in the public health domain by addressing a question of critical importance: What are the *mechanisms* by which social engagement impacts health outcomes?

Significance of research

Examining the association of social engagement with health in a white-collar sample will pave new directions in promoting the population's wellbeing. Past research had only concentrated on social support and despite all that is known about the benefits of social engagement, its effects on professionals have never been explored. This study contributed to the body of knowledge by extending the literature of social engagement to a new population. The study also assessed variables or constructs responsible for mediating the link between social engagement and health. Such examination was instrumental in resolving theoretical contentions in the field and was particularly useful when developing a conceptual model that best fits the population under study. Existing evidence on social engagement's "downstream" pathways in the Berkman model have been disappointing since assessment has been focusing on just one level of analysis and one variable at a time using conservative techniques and questionable instruments (Cohen et al., 1997; Crittenden et al., 2014; Kenny, 2016; MacKinnon et al., 1995). In this study, the structural equation modeling (SEM) technique was used and has allowed for a comprehensive test of a theoretically-sound chain of events via overall model fit and individual pathways. An analysis of this magnitude has assisted in elucidating which pathways or mediators may be the most and least responsible for the relation between social engagement and health.

Purpose of the study

The objectives of this study were (a) to investigate the relationship between social engagement and health among the white-collars, (b) to evaluate the influence of job stress/strain and selected covariates (i.e. age, race, education, income) on white-collar professionals' social engagement level (c) to examine the association of social engagement with downstream pathways and, (d) to assess the mediating factors linking social engagement to health. The hypothesized model is illustrated in Figure 2 while its analytical structure is presented in Appendix A.

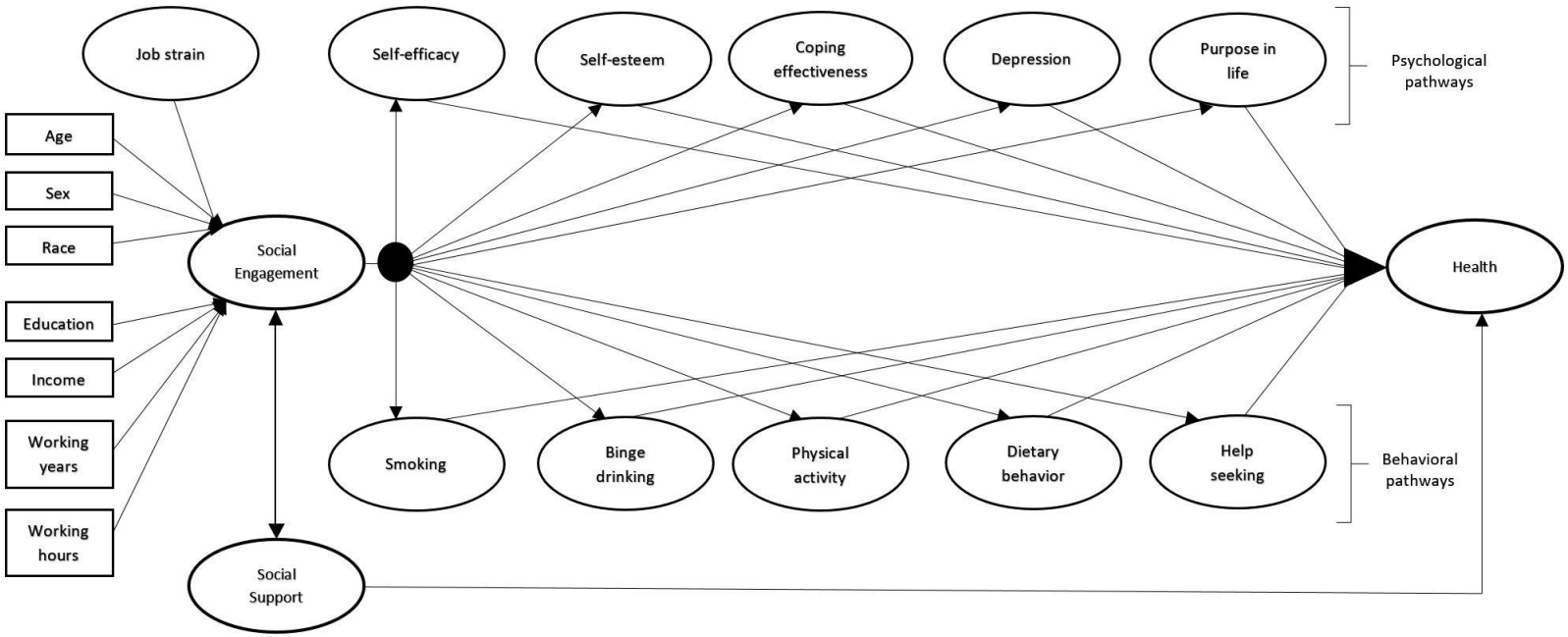


Figure 2: Hypothesized Model for the Associations Between Social Engagement, Health, Behavioral, and Psychological Variables

CHAPTER II

LITERATURE REVIEW

The following chapter provides background in several areas relevant to the current study beginning with an overview of theoretical model of social relationships. The review then discussed conceptual issues surrounding the social engagement construct given that a universally accepted definition for the term has not yet been agreed upon at this point. Assessment of the multiple definitions of social engagement in the literature was undertaken and subsequently clarified and contrasted with the following terms: social networks, social support, and social integration. This is followed by a critical examination of the behavioral and psychological pathways mediating the association. The chapter concluded with a brief coverage of previous studies documenting white-collars' job-related stress and how it affects their social engagement level.

Theoretical model of social relationships

A seminal assessment on the state of social relationships literature by Berkman et al. (2000) concluded with the introduction of a rather holistic conceptual model that took into consideration the multilevel phenomena (Figure 1). The model hypothesizes that health is impacted by social relationships through a series of causal processes that begin at the macro-social level (upstream factors) to micro-psychobiological processes (downstream factors). Upstream factors include distal mechanisms such as socio-cultural and environmental conditions. Downstream factors on the other hand impact individual health through five aspects. First, health is influenced by the provision of *social support*, including emotional, instrumental, appraisal, and informational support. Second, social relationships shape health through *social influence*, where shared norms regarding health behaviors alter health outcomes. Third, relationships modify

health by promoting *social engagement* through contact with friends, family, and participation in social functions which in turn provide a sense of value, belonging, and attachment. Fourth, health is preserved by controlling exposure to infectious disease agents spread via *person-to-person contact*. Fifth, social relationships can provide *access to material resources* that have a direct impact on health (i.e. membership in organizations that provide access to health care). For ease of reading, this section will henceforth refer social relationships as the umbrella term for all socio-related phrases which include social network, social support, social integration, and social engagement/participation.

The model separates itself from the others (Heaney & Israel, 2008; Uchino, 2006) by acknowledging contextual features involved in a relationship and highlights multiple psychosocial mechanisms through which health is affected. The proposition that there are a myriad of pathways linking social relationships to health is corroborated by Holt-Lunstad et al. (2010) in which they found the association between the two variables became even stronger when multidimensional assessments of social relationships (e.g. social support, social integration/engagement, and social isolation) were used simultaneously. In this study, emphasis will be given on the social engagement aspect of Berkman et al.'s model as it has been shown to impact health/mortality more consistently than the well-researched construct of social support (Holt-Lunstad et al., 2010) or other psychosocial mechanisms. Regrettably, a universally accepted definition for social engagement has not yet been agreed upon at this point leading to inconsistent operationalization of the term in the literature.

Apart from the definition proposed by Berkman and colleagues (2000), there have been many other interpretations of social engagement suggested prior and after the publication of their seminal work. For example, Zunzunegui et al. (2004) viewed social engagement as a measure of

community involvement by assessing one's involvement in "neighborhood groups, religious organizations, or non-governmental organizations". Others have expanded the definition by examining frequency of contacts with friends and families along with membership of groups and organizations (Bowling & Browne, 1991; Seeman, Bruce, & McAvay, 1996; Unger, McAvay, Bruce, Berkman, & Seeman, 1999). There are also studies that consider social participation (i.e. taking part in social activities) (Bygren et al., 1996; Glass et al., 1999; Morgan et al., 1987a) and social support (Everard et al., 2000) as social engagement. Even though these definitions oftentimes operate simultaneously, the mechanisms by which each of them impact health is different (Cohen, 1988; Cohen, Gottlieb, & Underwood, 2000; Lakey & Cohen, 2000). In the next section I will review conceptual issues surrounding the social engagement construct by clarifying and contrasting it with other constructs of social relationships.

Conceptual issues of social engagement

Berkman et al.'s (2000) interpretation of engagement centered on the idea of one's ability to enact potential roles through social ties. Instances such as getting together with friends, attending social functions, participating in occupational or social roles, group recreation, and church attendance are some of the activities that one can practice to be socially engaged. Through these activities, meaningful social roles such as parental, familial, occupational, and community roles are defined and reinforced, which in turn, provides a sense of value, belonging, and attachment. The consequences of participation in a meaningful social context/relationships or having a high degree of "connectedness" in a society eventually gives purpose to an individual's life and that part of social engagement has been hypothesized to be a powerful predictor of health (Berkman et al., 2000). For example, parent-child relationships provide an avenue for individuals to embrace their parental roles which not only evoke the sense of

authority and leadership – i.e. a sense that someone is counting on you – but they are also expected to conform to what others have done correctly in the past when it comes to raising children. The feelings of not wanting to let their children down compel parents to provide the best care possible but this can only be done if they themselves stay healthy.

Nevertheless, assessment of social engagement has not been consistent and the measures used in the past often investigate overlapping or related constructs when they are theoretically different. Studies that estimate engagement through network size and frequency of contacts (Bowling & Browne, 1991; Seeman et al., 1996; Unger et al., 1999) for example could have examined social network or structural support instead. These measures alone are insufficient to fully grasp the notion of social engagement because unlike social network and structural support, increase in social ties or degree of communication does not necessarily lead to better health outcomes from the engagement perspective (Rook, 1997). It appears that Berkman et al.'s (2000) version of social engagement seems to overlap with some, if not all features of social networks, social support, or social integration. The following discussion is an attempt to clarify this confusion by reviewing several concepts and theories suggested for each of these other constructs.

Social network. Social networks can be viewed as a complex chain of social relationships surrounding an individual and the characteristics tie to these connections (Fischer, 1982; Fischer et al., 1977; Laumann, 1973; Mitchell, 1969). Often an individual's social networks are distinguished by the frequency of contact one has with someone in a span of time and the duration of acquaintance to that person. They could also be identified by the number of transactions or support flowing through the social ties (i.e. multiplexity) (Borgatti, Mehra, Brass, & Labianca, 2009) or the direction of relationships (one-way versus two-way) (Christakis &

Fowler, 2007). Conversely, network characteristics cover several aspects of network features including, but not limited to, range or size (i.e. number of network members), density (i.e. the extent to which network members are connected to each other), and homogeneity (i.e. the extent to which network members are alike). These elements have been used by researchers to develop measures of social network to test the relationships between network and health outcome (Hirsch, 1979, 1980; Stokes, 1985), although assessing social network in its entirety is nearly an impossible feat. Hirsch's Social Network List (Hirsch, 1979) for instance, asks respondents to document up to 20 significant others they have been in contact with at least once every 2 weeks. While this may cover all social connections, the likelihood of respondents to recall them in a single sitting is highly unlikely (Brewer, 2000).

Two hypotheses have been proposed as to how social networks influence health. According to the "strength of weak ties" hypothesis health behavior itself is seen as a single contagion such as disease or information (Granovetter, 1973; Watts, 1999; Watts & Strogatz, 1998). Weak ties in this context refer to interactions that tend to be less personal and formal in nature and attachment to groups spawned by these ties is bounded by the members' shared interest. Examples include work place associates and religious congregation. Network in this sense can be viewed as either restricting or promoting exposure to health behaviors where only a single contact with an "infected" individual is required to transmit the behavior (Centola & Macy, 2007). Nonetheless, behaviors acquired through weak ties are usually short-lived and never actually graduate to become a daily habit (Centola, 2010; Centola & Macy, 2007). The second hypothesis in contrast posits that behavior is a complex contagion in which multiple reinforcements, often imparted by ones' "strong ties", are needed before they can be convinced

to adopt a behavior (Centola & Macy, 2007). In other words, a behavior needs to be the practicing norm of the family or group for it to be espoused by network members.

The reason for past studies to equate measure of social network with social engagement may rest on the "complex contagion" hypothesis where both affect health by means of one's conformity to the behavior of the larger crowd. What separates the two constructs however is the fact that social engagement accounts for strong (i.e. close and meaningful relationships) and weak ties simultaneously while studies of social network mostly consider just the former. Even though the proposition of "strength of weak ties" was intended to explicate the process of the more superficial and distant network, scholars recently have only been interested in examining familial and personal ties when estimating the number and frequency of contacts. In lieu of this trend it is possible that weak ties are now being viewed as part of a different construct altogether. It would be interesting to see if the weak ties can be operationalized within measures of social engagement.

Social support. Social support refers to the provision of tangible (i.e. material) and intangible (i.e. psychological) resources aimed at improving health. To date, the literatures have highlighted two broad categories of social support, namely functional and structural support. Functional support refers to the quality of support given or received through network of social ties. It deals with the subjective aspect of how relationships are perceived and experienced and the functions that are provided in this exchange (e.g., informational, instrumental, or emotional supports) (Cohen & Wills, 1985; Uchino, 2004). Structural support on the contrary is known as the quantity feature of the support network and often measured by number of ties one possess and frequency of contacts with network members (Cohen & Wills, 1985).

Three theoretical perspectives have emerged in social support research elucidating possible pathways for support to modify health. The most influential perspective – *the stress and coping perspective* – proposes that social support impacts health by safeguarding people from the adverse effects of stress through either the supportive actions of others (i.e. received support such as advice, reassurance) or the belief that support is available (i.e. perceived support) (Cohen & Wills, 1985). The support received are thought to enhance coping performance while perceived support alter the appraisals of the situation to be less stressful (Cohen & Wills, 1985; Thoits, 1986; Wethington & Kessler, 1986) and attenuate maladaptive emotional, physiological, and behavioral responses (Wills & Cleary, 1996). However, it is important to note that through this view the health benefits of social support are restricted to those experiencing stress and will not apply on stress-free individuals.

The *constructionist perspective* on the other hand argues that concepts about the living world or reality are dependent on one's reflection of the social context, that is, each individual or group has different interpretations of the real world (Kelly, 1969). Through this view, two viewpoints on understanding social support have emerged namely social cognition (Barone, Maddux, & Snyder, 1997) and symbolic interactionism (Stryker, 1980). The former states that support influences health by improving self-evaluation and promoting self-esteem and self-regulation. Alternatively, the latter suggests that social support promote health and well-being by providing people with a way of making sense of the self through creation and maintenance of identity (i.e. role).

Lastly, the *relationship perspective* predicts that the health benefits of social support are transmitted via qualities or processes of relationship. It should be noted, nonetheless, that this approach came to be due to a collection of hypotheses that attribute social support to other

relationship qualities or processes and not through the culmination of preexisting research literature or intellectual tradition (Lakey & Cohen, 2000). As such, scholars have struggled to explain the mechanisms through which relationship affects health since measures of support cannot be fully isolated from concepts such as companionship, intimacy, and low social conflict. Consequently, the mechanisms that have been proposed to date tend to emulate the concept suggested by the *stress and coping perspective*, which are not exactly accurate because the premise of *relationship perspective* reflects neither actual aid during times of stress nor beliefs about support per se but prioritize on the characteristics of the relationship instead (Lakey & Cohen, 2000). Even though the field of social psychology has since developed strategies for quantifying transference of support through relationships (Buss, 1996), they have not been well-received by researchers and experts alike considering the minimal application of relationship support seen in the literature.

Based on this review, it can be argued that social support is different than social engagement to some extent. In terms of modus operandi, social support requires actors other than ourselves to impart the "social goods" while social engagement operates on one's own aptitude to take on the roles in life. Social support also differs when it comes to whom the goods will be of service to – it is only restricted to stressful people as aforementioned – but the same rule does not apply to social engagement. There is a hint of similarity, so it seems, when the viewpoint of social support's symbolic interactionism of *constructionist perspective* is contrasted with the role-taking concept of social engagement. Nevertheless, the resemblance only goes as far as having parallel pathways in influencing health that is, by creating meaning to life. The core concept of how and where their goods originated from remain distinct and specific to each construct.

Social integration. Another feature afforded by social relationships is social integration. Social integration is described as *participation* in a broad range of social activities through existing social ties (Brissette, Cohen, & Seeman, 2000; Heaney & Israel, 2008). There are four methods to measuring social integration (Brissette et al., 2000). First, integration can be examined by assessing the quantity of social positions or social identities an individual has and this is called *role-based* measures. Second, integration is determined through individual's degree and frequency of social activities and is known as *social participation* measures. Third, integration is defined by probing individual perception of his/her communality (i.e. living in stable social structure, identify with community members) and is termed *perceived integration* measures. Fourth, integration is evaluated through composite index that utilizes all previous three measures and is called *complex indicators*. It is therefore thought that social integration is a multidimensional construct covering behavioral (i.e. role-based and social participation measures) and cognitive aspects (perceived integration measures) of a person.

Individuals who are integrating actively in the society usually welcome their roles and identities and hence are confined to the normative health behaviors of the group they are part of due to social controls and peer pressure. Integration may also elicit or reinforce sense of responsibility for others, which in turn, increase one's motivation to take care of himself so those responsibilities can be executed (Cohen, 2004). Furthermore, meaningful social roles provide a sense of value, belonging, attachment, predictability and stability, and purpose in life (Cassel, 1976; Cohen, 1988; Thoits, 1983; Wills, 1985). Arguably, these mechanisms are comparable to that of the social engagement approach to improve health. Based on this assumption, it appears that social integration has the closest resemblance to social engagement considering the measures used to quantify the former coincide with what the latter represents conceptually. The term

engagement also carries with it a connotation that resembles what social integration symbolizes which is individual involvement/participation in social groups.

This discussion is by no means exhaustive but it has concretely established a foundation for future studies interested in differentiating social engagement from the rest. For example, scholars should consider a wider coverage of role-enactment activities beyond one's primary ties and that may include working, volunteering, or faith-based gatherings. Other means to creating holistic composite measures of social engagement is to test different elements from each construct together using confirmatory factor analysis. Importantly, these instruments should be able to answer research questions at hand and sensitive to the heterogeneity of population under study. With the development and use of measurement instruments capable of reliably assessing quality of engagement, greater progress will be made in the social engagement field and specifically in the health intervention domain as scholars will soon be able to accurately pinpoint precise "engagement dosage" required to improve health in a multitude of settings.

Mediators of social engagement and health

Behavioral pathways. There are several possible behavioral pathways linking social engagement to health, and health practices such as smoking, alcohol consumption, physical activity, as well as sleep have been suggested (Berkman & Syme, 1979; Cohen et al., 1997; House, Landis, & Umberson, 1988; Kaplan et al., 1988; Umberson, 1987). One of the earliest studies which investigate this claim demonstrated that men and women who were socially disconnected showed a higher prevalence of health-damaging behaviors such as smoking, drinking, and physical inactivity (Berkman & Syme, 1979). The study measured social engagement in terms of marital status, size and frequency of contacts with social ties, church membership, and group affiliations whether it is formal or informal. The findings certainly

illustrate that there is a strong evidence linking social engagement to these behavioral factors when the latter are treated as outcomes in their own right (i.e. dependent variables). Despite its contribution to the literature, the study merely employs correlational analyses thus do not view the behaviors as mediators or pathways linking social engagement with health outcomes.

A preliminary attempt at testing behavioral factors as mediators by Cohen et al. (1997) revealed that those with low levels of social engagement were more likely to be smokers and less likely to exercise. However, the authors cautioned that these health practices taken together can explain only a small fraction ($\Delta\beta$= 5%) of the relation between network diversity (assessed through participation in 12 types of social relationships) and susceptibility to common cold, an indication the behaviors were not empirically supported to be considered as primary pathways. A similar effort has been undertaken recently using longitudinal data of 1,352 older adults aged 70 to 79 years (Crittenden et al., 2014). The study attempted to determine whether social integration, defined as number of social roles, was associated with better pulmonary function in the elderly while explicating pathways that connect social integration to better lung health. The findings specified that only smoking and physical activity significantly mediated the association explaining 19% and 27% of the variability respectively. The percentages – even though small – are not surprising considering the study only examined one potential behavioral mechanism at a time. It is unfortunate, however, that the explanatory percentages of those two were not considered in a single analysis as verification for a dominant behavioral mediator would be beneficial for theoretical and interventional studies alike.

According to Cohen (1988) people who are socially engaged typically assume a multitude of social roles and therefore are bounded by responsibilities of those roles. These responsibilities are known as social control and serve as the driving force in shaping individuals'

health practices. For example, engagement through membership of religious and other organizations have shown to curb certain health damaging behaviors such as illicit drug use, alcohol use, and criminal involvement while at the same time promoting self-care because commitments and responsibilities to members of congregation (i.e. role partners) can exert implicit pressures on individuals to behave accordingly (Hughes & Gove, 1981; Johnson, Jang, De Li, & Larson, 2000; Lincoln & Mamiya, 1990; Rook & Underwood, 2000; Umberson, 1987). It appears that role obligations are constraining individuals' desires and behaviors to be within the accepted boundaries of normalcy, a phenomenon dubbed by Durkheim as regulatory functions of norms (Durkheim, 1951). Being engaged also provides avenue for multiple sources of health information which thereby increases the probability of accessing appropriate medical care (Cohen, 2004). Likewise, information could influence health-relevant behaviors or help one to avoid or minimize stressful or other high-risk situations (Cohen, 2004).

On the contrary, failure to cope with the multiple roles afforded by a myriad of social ties can cause quite the opposite. Studies in the substance abuse domain suggested that social role demands may be perceived as a major barrier for seeking help or adhering to treatment regime (Kissman & Torres, 2004). For example, female drug users who are mothers and sole caregivers to their children have claimed that responsibilities of assuming such roles have been hindering them from accessing certain types of addiction treatment (Dawson, 1996; A. Kline, 1996; Knight, Hood, Logan, & Chatham, 1999). Others have indicated that interpersonal conflicts with social ties can be a trigger for relapse and disrupt treatment and recovery among women with substance use disorders (Lincoln, 2000; Sun, 2007). Though these data were suggestive of important behavioral connection between social engagement and health, they remained inconclusive as to the exact processes that occur via these linkages.

Psychological pathways. The following is the discussion of studies that prioritize in establishing psychological variables as mediator for social engagement and health. In their social network framework, Berkman and colleagues (2000) postulated that psychological factors such as self-efficacy, self-esteem, depression, distress, and sense of well-being represent some of the "downstream" pathways linking social relationships to health. Based on the constructs suggested, it can be argued that their work on the social engagement domain alone was strongly influenced by the early theoretical perspectives published in the mid-1970s to mid-1980s (Sieber, 1974; Thoits, 1983). The more recent studies however, have added several other psychological processes in the mix which include feelings of purpose, control, identity, self-acceptance, affect regulation, and coping (Cohen, 1988; Cohen, 2004; Thoits, 1995; Uchino, 2004). Cohen (1988) for example, contended that social integration presumably provided a source of generalized positive emotion, a sense of predictability and stability in one's life, and a recognition of self-worth due to demonstrated ability to meet normative role expectations.

Others have suggested that possessing multiple social roles, an attribute of social engagement, promote self-esteem or self-worth and these feelings are thought to enhance adaptation to stressful life events, promote positive emotion, reduce psychological despair and results in greater motivations to care for oneself (Cohen & Syme, 1985; Thoits, 1985). Empirical data have corroborated this claim by illustrating that self-esteem was associated with lower symptoms of anxiety and distress and relates positively to life satisfaction and happiness (Baumeister, Campbell, Krueger, & Vohs, 2003; Taylor & Stanton, 2007; Thoits, 2003; Turner & Lloyd, 1999; Turner & Roszell, 1994). Those who hold few social identities and conceivably low self-esteem have a greater risk of psychological disturbance than their more integrated counterparts. Specifically, several studies showed that small social networks (i.e. limited roles)

and the lack of intimate relationships with a spouse or other primary group members were associated with the development of depression, more serious mental illness, or even death (Berkman & Syme, 1979; Holt-Lunstad et al., 2010). In short, these findings are indicative of self-esteem's position as mediator between role relationships and health in general.

Role identities have also been shown to provide foundation for behavioral expectations, meaning and guidance to life (Thoits, 1983) which are hypothesized to buffer against anxiety and despair (Thoits, 2011). The greater the number of identities held, the stronger one's sense of meaningful existence is as roles produce "ego-gratification", that is, the sense of being appreciated or needed by diverse role partners (Sieber, 1974). In other words, if one does not know who one is in a society, or if one loses a valued identity, then one may experience profound sense of anxiety or depression. Identity accumulation should therefore enhance psychological well-being whilst lack thereof may impair it, provided that one can manage those identities effectively. In addition, Mendes de Leon et al. (2003) asserted that greater sense of meaning and purpose could help modify the detrimental effects of age-related changes and disease. They believed the psychological feeling of being worthy may promote or reinforce personal resources that enhance resilience in the face of disease processes which become more severe over time, although, the exact mechanisms involved in this process remain poorly understood and require further study.

Nonetheless, there has been much debate on the conceptualization of feeling of meaning and purpose in life, with some theorist using the terms to refer to the extent to which individuals identify with their roles (Thoits, 1983). Others have used the idea of "mattering" in explaining the concept of meaning in life where it is achieved through believing that one is an object of another person's attention, and one is important to that person, and he or she depends on one for

fulfillment of specific needs (Morris Rosenberg & McCullough, 1981). Alternatively, Antonovsky (1979) and Burton (1998) described it as the belief that life provides suitable challenges and rewards and continue to be worth living. Because of the ongoing theoretical contention concerning meaning and purpose, this area has been lagging in its scales development (Berkman et al., 2000) and the presence of measurement errors in existing scales used in several studies could have mislead the studies' proposed impact on health habits and psychological well-being (Berkman et al., 2000; Brissette et al., 2000; Cohen, 2004; House et al., 1988; Taylor & Turner, 2001; Uchino, 2004; Umberson & Montez, 2010).

Based on the evidences presented here, there is certainly strong evidence linking social engagement to psychological factors but it should be noted that many of the authors also caution about extending the inference to health outcomes given the insufficient evidence to demonstrate direct causal pathways (Berkman et al., 2000; Cohen, 2004; Uchino, 2004). To date, only one study has explicitly conducted a mediation test on psychological measures that potentially connect social engagement to health. In the study, Crittenden and her colleagues (2014) sought to determine whether depression, somatization, anxiety, mastery, self-efficacy, life satisfaction, or happiness mediate the relationship between social integration, defined as number of social roles, with better pulmonary function in the elderly. Despite previous theoretical propositions and correlational evidences, happiness is the sole construct to have reported significant Sobel test finding ($p < .001$) accounting about 13% of the association between social integration and lung function.

It seems previous studies have failed to generate enough confidence in answering the mechanistic question of psychological factors in relation to social engagement and health. Although numerous studies have indicated the connection of social engagement with these

factors, and established the former to be a robust predictor of future morbidity and mortality (Holt-Lunstad et al., 2010), the majority of evidence have consistently been unable to explicate the psychological mechanisms directly responsible for such links.

Job strain and social engagement among white-collars

Social engagement is best promoted in balanced social structures and settings (Kawachi & Berkman, 2000) and a deviation from these conditions have shown to be detrimental (R. D. Putnam, 2000). With economic and technological progress transforming the organization of workplaces (Faragher, Cass, & Cooper, 2005; Susskind & Susskind, 2015) and globalization and corporate mergers continue to increase job mobility and insecurity (Cooper, 1999; Faragher et al., 2005; Susskind & Susskind, 2015), social engagement among the workers may have took a turn for the worse. Nowadays, working environments are generally characterized by unfavorable material and psychosocial conditions and these have been shown to negatively affect leisure time and social participation (Karasek, 1997; Karasek, 1976; Lindström, 2004; Lindström & The Malmö Shoulder-Neck Study Group, 2006). Workers who are forced to relocate on the other hand may struggle to engage and integrate with the local community at the new place as evident by the declining club and church membership between them (Heying, 1997). Additionally, exhaustion caused by extended working hours and the long commute to work could also limit family activities and other social activities.

Dwindling social engagement caused by hostile work conditions, or more commonly referred to as job strain (Karasek & Theorell, 1990) will in turn compromise the health of these workers through adverse health behaviors (e.g. smoking, binge drinking, physical inactivity) and psychological states (e.g. depression, low self-efficacy, low self-esteem) (Berkman et al., 2000). Working adults between 20 and up to 64 years of age are in fact at increased risk of experiencing

job strain considering they spend nearly one-third of their waking hours at work or doing work-related activities (U.S. Bureau of Labor Statistics, 2015). Their day-to-day routine is mostly engrossed with the responsibilities and demands of work along with other psychosocial and environment-related stressors at the workplace (Karasek & Theorell, 1990). This is particularly true among those who hold professional and administrative positions whose career is typically characterized by high psychological demand, low to limited autonomy, and long working hours (Bourbonnais, Brisson, Moisan, & Vézina, 1996; Hill, Mead, & Dean, 2006). Often regarded as the white-collar workers, they devote a quarter of their lifespans working.

As work practices continue to evolve, white-collar employees frequently find themselves working well beyond the contracted hours, often unwillingly, to meet tight deadlines and targets (Paoli & Litske, 1992). Work responsibilities are becoming more automated and inflexible, leaving them with less control over their workload (Faragher et al., 2005). The culture of "out-sourcing" contracts practiced by many organizations further increases the feeling of job insecurity (Faragher et al., 2005; Susskind & Susskind, 2015). This trend coupled with the constant need to stay relevant at the company substantially contribute to the development of a workaholic culture and gradually robbing the enjoyment and satisfaction in performing work-related tasks (Faragher et al., 2005; Susskind & Susskind, 2015). At present, studies examining the aggregate level of social engagement among white-collars are sparsely available and even lesser studies considered investigating its determinants. Even so, evidence of some part of engagement activities particularly of civic participation and political affairs are aplenty and reviewing the rise and fall of such behaviors will provide a few insights, if not all, into how their social conducts unfold.

In testing the impacts of psychosocial work conditions on multiple aspects of social engagement, Lindstrom and his team (2006) compared the level of engagement of high and low strain workers in formal and informal social activities. The study discovered that low strain workers significantly reported higher odds ratios of social engagement activities at 1-year follow-up compared to high strain workers. In another population-based sample, Lindstrom (2004) found that among individuals with high strain jobs, low social engagement was associated with increased odds of daily smoking. These results strongly support the notion that there is a causal pathway between work related psychosocial conditions and participation in social engagement activities which will then trigger health-related behaviors.

White-collars' diminishing social engagement could also be attributed to strains external to the job, one being job relocation. The constant economic restructuring and consolidation of business of late combined with lower corporate taxes in the outer city area eventually pushed corporations out to the suburbs (Moss, 2008; Wood, 2002). The shift however, has slowly weeded out local capitalism and local business owners whom usually possess a strong attachment with the community. For example, the consolidation of banks has raised concern over the availability and affordability of financing for small, local businesses (Berger, Saunders, Scalise, & Udell, 1998; Black & Strahan, 2002). Restructuring in the retail industry has led to the replacement of small, locally owned stores and service providers with hypermarkets like Walmart (Stone, 1995). These mega corporations brought with them office complexes and corporate campuses for aspiring white-collars who were lured in by the appeal of privacy, space and lower crime rate that of a suburb. However, relocating to unfamiliar places inherently disconnect neo-suburbanites from the local community as they were surrounded by more strangers than familiar faces and would inevitably limit their human interaction with primary

social actors (e.g. spouse, family, close relatives or friends) in seeking psychic refuge from heightened social uncertainty. They eventually turned into absentee neighbors who were less likely to be committed to the general welfare of the local community, less likely to be connected to other business leaders in the community, and less likely to be involved in local charitable or civic organizations and betterment projects (Besser, 2002; Heying, 1997; Tolbert, Lyson, & Irwin, 1998).

On the other hand, white-collars who live in the city are not doing well at maintaining healthy level of social engagement either. Oliver (2000) argued that lower civic engagement in these contemporary metropolitans might be affected by the size of its population. To test this hypothesis, he estimated four types of civic activity namely contacting locally elected officials, attending community board meetings, attending meetings of voluntary organizations, and voting in local elections using Citizen Participation Study (Verba, Schlozman, & Brady, 1995) and the 1990 Census (U.S. Bureau of the Census, 1991). By comparing average rates of participation in civic activities across five categories of city size (less than 5,000; 5,000 to 50,000; 50,000 to 250,000; 250,000 to one million; and more than one million); the study found that, except for voting in local elections, the average rate of participation in three other types of local affairs steadily decreased when the city size increased (Oliver, 2000). This should be a cause for concern since white-collars typically cluster in big major cities with more than a quarter million population.

Earlier research postulated that the size, density, and heterogeneity of larger places dissolves the social and psychological bonds that exist between neighbors in small towns (Simmel, 1969; Tonnies, 1988; Weber, 1958; Wirth, 1969). It is especially true now more than ever considering urban white-collars concentrate mostly on their work in the current economy,

often working overtime, to stay relevant and keeping their job safe (Hamermesh & Stancanelli, 2014; Otterbach, 2010). Consequently, these professionals distance themselves from formalized social contact, feeling content as "bystanders" to the political process (Finifter, 1970; Latane & Darley, 1970; Nie, Powell, & Prewitt, 1969; Reisman, 1953; Sidney Verba & Nie, 1972). In addition, people in larger places were less likely to know their neighbors, have mutual friends, and see acquaintances in public settings (Fischer, 1982; Lofland, 1973) which in turn may inhibit political mobilization (Huckfeldt & Sprague, 1995).

Given the multitude forms of job strain beyond the workplace, this study has limited its scope to only assessing the effect of task-related and workplace stress on social engagement. Total of hours working − including those outside office period − per day, and several other demographic factors such as gender, age, race, education and income were also tested against social engagement in a Malaysian white-collar sample.

Hypotheses

Based on the literatures reviewed as well as the study objectives and conceptual model presented earlier, the study hypothesized that, when all covariates and mediators in the model are considered:

Hypothesis 1.
H1 : Social engagement will correlate positively with health.

Hypothesis 2.
H2 (a): Job strain and working hours will correlate negatively with social engagement level.

H2 (b): Age, race, education, and income will significantly predict social engagement level.

Hypothesis 3.
H3 (a): Social engagement will correlate positively with physical activity, good dietary behavior, help seeking behavior, self-efficacy, self-esteem, coping effectiveness, and purpose in life.

H3 (b): Social engagement will correlate negatively with smoking, binge drinking, depression, and stress.

Hypothesis 4.

H4 (a): Smoking, binge drinking, physical activity, dietary behavior, and help seeking behavior will mediate the behavioral pathways linking social engagement to health.

H4 (b): Self-efficacy, self-esteem, coping effectiveness, depression, stress, and purpose in life will mediate the psychological pathways linking social engagement to health.

CHAPTER III

METHODS

A cross-sectional design with a two-phase approach to data collection was employed in the current study. The first phase involved participant recruitment for a cognitive interview session whom were chosen through purposeful (criterion) sampling. A similar sampling method was used in the second phase in which participants were surveyed with multiple self-administered questionnaires either electronically or face-to-face. All study procedures were approved by the Institutional Review Board at UW-Milwaukee (IRB #16.334; see Appendix B)

Participants

Malaysian white-collar professionals and/or employees aged 18 years and above whose jobs were done in an office instead of a factory or warehouse and generally did not involve manual labor or the wearing of uniforms or work clothes, were recruited as respondents.

Study procedures

Cognitive interview. Instruments were pretested to ensure the content validity in the current sample were as good as their original source via cognitive interviews (Willis, 2005). These instruments were developed for Western samples and may be viewed differently by Malaysian professionals thus exploring whether they remained as credible measures was essential. Participants were selected based on aspects in accordance with the anticipated characteristics of the respondents to be enrolled in the research such as age (i.e. 18 years and above), sex, and race/ethnicity (i.e. Malay, Chinese, Indian). In the interview, participants were probed about what they thought about what was meant by each item and response option. This includes asking the participants to restate in their own words what they believed each item or response implied. Participants were also queried on difficulty level in responding to the questions

and how certain they were of their answers. The interview aimed to find items or responses that were confusing or misunderstood by the target population. Suggestions for improvement were gathered and necessary modifications were applied to respective instruments (see *Table 1*) before implementation within the larger sample.

Survey research. Participants for survey research were recruited via web invitations (Appendix C) through multiple organizations located within the Klang Valley area. The Klang Valley covered two federal territories (i.e. Kuala Lumpur and Putrajaya) and several neighboring cities and towns in the state of Selangor. It is home to most governmental and business agencies located in West Malaysia. Twenty-nine organizations were selected and personal contacts of student principal investigator (SPI) who work in these organizations were enlisted (N= 33) to perform email blast within their respective organizations' web domain (e.g. @mckl.edu.my, @imr.gov.my, @kpmg.com.my). In the event the contacts were unable to do so, those with access to carry out such broadcast (e.g. head of departments, higher-ranked officers, IT specialists) were approached instead (N= 5). Meetings with these authorities were set with the help of SPI's contacts at the respective organizations during which request for authorization to circulate the introductory email was made. Twenty-seven companies granted access to their email server and workers while two others declined participation.

The introductory email informed the recipients about the study and served as a medium for recruitment. Those who agreed to participate were asked to follow a survey link included in the email to the SurveyMonkey server. Eligible participants were screened from those unqualified through their reported job post and age. Over the course of study period, at least two reminder emails were sent to potential respondents. Those who did not respond to the link even after the second reminder was sent were contacted again to complete the survey in-person to

increase sample size and response rate. A similar introductory material and eligibility verification method were used for these individuals. The purpose and nature of the study were explained prior to data collection and emphasis was given on the confidentiality and voluntary nature of participation. Informed consent was asked shortly after.

Monetary reward of 10 Malaysian Ringgit (RM10 is approximately USD2.50) was offered to those who completed the questionnaires. Web respondents who decided to accept the offer were asked to provide their name, bank's name and account number for online cash distribution on a separate web form created solely for that purpose. The form was not in any way connected to the survey responses that would have made identification possible. Link to this form were given following survey submission. Record of respondents' bank details were kept in a password protected folder and computer. On the contrary, paper respondents were asked to sign an acceptance form which were kept in a locked room. The forms too were not connected to the survey responses in any way. Following completion of data collection, access to the website was terminated and records were downloaded for analysis.

Measures

All questionnaires were administered in its original English version as most Malaysian employees were naturally bilingual – they were educated in Malay during school years but utilize English business communication at work most of the time (Fontaine & Richardson, 2003). With respect to proficiency, Malaysia ranked second in Asia and fourteenth globally in English proficiency index (Education First, 2015). It was also assumed that these workers possessed at least tertiary level English reading comprehension and did not have issues understanding questions with a readability score equivalent to the level of a fifth grader. The Flesch-Kincaid

Grade Level test which rated text based on a U.S. school grade level recorded a readability score of 5.2 for the following instruments:

Demographics. Standard background and demographic information (i.e. age, sex, race/ethnicity, education, and monthly income) were collected through a brief questionnaire at the beginning of study. The demographics created for this study were informed by multiple national surveys (e.g. BRFSS, Add Health, Malaysian National Health and Morbidity Survey). Length of service at current company/organization and hours spent working in a week were also asked. These variables were used for descriptive purposes and as controls in structural analysis (see Appendix D).

Job strain. Job strain was measured with Job Content Questionnaire (JCQ) (Karasek, Gordon, & Peitrokovshy, 1985; see Appendix D), a scale based on Karasek's demand-control model. The model states that workers are exposed to high levels of job strain when they report high psychological job demands and low decision latitude (Reed, Lacroix, Karasek, Miller, & Maclean, 1989). The psychological job demands domain was assessed by five questions about the nature of one's work ranging from very fast, very hard, not enough time to get work done, exposed to conflicting demands, to excessive amount of task. Decision latitude was quantified by the sum of score of two subdivisions within the domain namely skill discretion (6 items) and decision authority (3 items). Skill discretion was measured by questions on the worker's opportunity to learn new skills and to develop existing knowledge or skills, and questions on job requirements to perform repetitive tasks, variety of tasks, tasks of high level of knowledge and skills, as well as tasks that call for creativity. Decision authority was determined by questions on opportunities to exert authority at workplace such as making decisions for company, freedom to decide how to do job, and to openly voice opinions. Respondents had four possible responses to

each of the 14 questions: 1 - “strongly disagree”, 2 - “disagree”, 3 - “agree”, and 4 - “strongly agree”. Scores were weighted and summed as outlined in Karasek et al. (1985) to define the two work dimensions. Higher scores for job demands indicated jobs more demanding in pace and intensity while higher scores for job latitude indicated more worker skill discretion and authority. The JCQ has shown good internal reliability with Cronbach score for job demands scale of α= 0.73 for men and α= 0.75 for women, and α= 0.74 for men and α= 0.71 for women for the job latitude scale (Karasek et al., 1985). The state of “high” or “low” demands and latitude were then specified by median scores of the two scales to create a four-level job strain variable. Applying Karasek’s terminology, these variables were defined as high strain (high psychological demands and low decision latitude), low strain (low psychological demands and high decision latitude), active (high psychological demands and high decision latitude), and passive (low psychological demands and low decision latitude) (Karasek & Theorell, 1990).

General health. Physical health status was estimated using questions adapted from Domain 1 of the short version of the World Health Organization Quality of Life assessment (WHOQOL-BREF) (The WHOQOL Group, 1998). The domain comprised of seven questions representing facet of pain and discomfort, sleep and rest, energy and fatigue, mobility, activities of daily living, dependence on medicinal substances and medical aids, and work capacity (see Appendix E). Scores for items 1 and 2 were reverse coded. Each question carried 1 to 5 points for a possible total score between 7 and 35. The mean score of items (i.e. total score divide by 7) was used to represent the domain score. Scores were scaled in a positive direction where higher scores denoted better physical health. Domain 1 was not scored when two or more items were missed (Skevington, Lotfy, & O’connell, 2004). Questions within this domain have demonstrated acceptable test-retest reliability (r= 0.66) and good internal consistency (α=.84)

(The WHOQOL Group, 1998). It should be noted that fluctuations in health are expected for certain individuals over time, especially those who are prone to a faster rate of clinical deterioration (Richardson & Jones, 2009), hence the modest test-retest reliability coefficient reported here is considered reasonable. Additionally, WHOQOL-BREF is short in comparison to other health measures of comparable psychometric properties and was chosen to minimize survey fatigue in respondents considering the long list of instruments they had to answer.

Health behavioral pathway variables.

Health behaviors. Several health behaviors were measured with Behavioral Risk Factor Surveillance System (BRFSS) items (see Appendix F). The behaviors include smoking, alcohol consumption, and physical activity. These variables were dichotomized as follows: current smoker or not current smoker, binge drinker or not binge drinker, and any physical activity or no physical activity. Such categorizations have been applied in several epidemiological studies previously (Ahluwalia, Mack, Murphy, Mokdad, & Bales, 2003; Fahimi, Link, Schwartz, Levy, & Mokdad, 2008; Li et al., 2012; Mokdad, Stroup, & Giles, 2003; Nelson, Powell-Griner, Town, & Kovar, 2003). Specifically, current smokers were defined as having smoked at least 100 cigarettes in their entire life and currently smoking some days or every day. Binge-drinking was specified as consumption of 5 or more alcoholic beverages on any given occasion within the last 30 days. Physical activity was determined from the following question. ‘‘During the past 30 days, other than your regular job, did you participate in any physical activities or exercise such as running, calisthenics, golf, gardening, or walking for exercise?’’ with a “yes” or “no” answer options. Comprehensive review of BRFSS health and behavioral measures conducted by Nelson et al. (2001) concluded that its smoking, alcohol and physical activity items reported high to

moderate reliability and validity, or were directly related to similar items shown to have high validity in population surveys.

Dietary behavior. Dietary behavior was evaluated using the 22-item Kristal's Food Habit Questionnaire (FHQ) which has been shown to have acceptable test-retest reliability (r= 0.67 to 0.90) and internal consistency (α= 0.54 to 0.76) for the five subscales reported (Kristal, Shattuck, & Henry, 1990). The subscales included substituting low-fat foods for high-fat foods (SUBS: 7 items, r= 0.80, α= 0.67), modifying meat preparation (MODIFY: 3 items, r= 0.80, α= 0.57), avoiding fried foods (FRY: 4 items, r= 0.83, α= 0.69), avoiding fat as seasoning (FAT: 5 items, r= 0.90, α= 0.76), and replacing high-fat foods (REPLACE: 3 items, r= 0.67, α= 0.54). For MODIFY and REPLACE subscales, lower alpha values – which statistic is sensitive to number of indicators –were not unexpected since they were represented by only three items. The questionnaire also showed acceptable internal consistency (α=.70) as a unidimensional behavioral checklist in a sample of male manual laborers (Birkett & Boulet, 1995). In this study, questions on consumption of "potatoes" were modified to "rice" instead to reflect the sample's staple food for carbohydrate. Responses were reported on a 4-point scale from "usually" to "rarely or never"; a "refused" or "not applicable" options was also provided for all questions. A value of 4 was assigned to "usually" and 1 to "rarely or never" response, with appropriate intermediate values to other responses (see Appendix G). Items was assigned to subscales as described by Kristal et al. (1990). The scoring of five subscales was done by taking the mean response of items on the subscale for which valid responses were provided. These scores were then summed up and divided with the number of subscales for the final FHQ score. High scores demonstrated respondents' tendency to adopt low-fat diet.

Help seeking behavior. The General Help Seeking Questionnaire (GHSQ) (Wilson, Deane, Ciarrochi, & Rickwood, 2005) was used to assess intentions to seek help for personal or emotional problems (Cronbach's α =0.70, test-retest reliability *r*=0.86). The likelihood that respondents would seek help from 10 potential sources was quantified on a 7-point scale ranging from no intention to seek help to a very high likelihood of seeking help (1= "Extremely unlikely" to 7= "Extremely likely") (see Appendix H). Item 9 was reverse coded prior to calculation of total score. Higher mean scores (i.e. total score/number of questions answered) suggested higher intentions to look for assistance.

Social engagement. Social engagement was assessed using the modified version of Brief Assessment of Social Engagement (BASE) scale which, in its original form, has shown good internal consistency previously (Cronbach α= 0.70) (Morgan et al., 1987b). The instrument covered both actual (e.g. voting, attending religious services, taking holidays, library attendance) and symbolic engagement (e.g. reading newspapers/magazines, TV and internet access) and was dichotomously scored; 1 for a positive "yes" response and 0 for a negative "no" response. For this study, however, an item asking about possession of senior citizen's rail cards were dropped due to its inapplicability in the sample. In addition to BASE items, participants were also asked of their marital status (refer Appendix I for list of items). Higher scores signified higher level of engagement.

Social support. Measure of social support derived from the ENRICHD Social Support Instrument (ESSI), a six-item, self-report measure that assessed the four defining attributes of support: emotional, instrumental, informational, and appraisal (Berkman, 2000; ENRICHD Investigators, 2001). Participants were asked if there was someone available to them who listens, gave good advice, showed love and affection, helped with daily chores, someone whom they

trust, and can confide in (see Appendix J). Response options ranged from 1 (none of the time) to 5 (all the time). Items were summed to create a score ranging from 6 to 30. Greater scores indicated greater social support. Strong test-retest reliability (p =0.98), intra-class correlation coefficient (ICC =0.94) and Cronbach's alpha (α =0.88) have been reported for the ESSI (Vaglio & Conard, 2004).

Inclusion of social support measure in the study as control was vital to distinguish the construct from social engagement. Despite the fact that the two are correlated (Leedahl & Chapin, 2014), both remain conceptually distinct and unique as previously indicated (refer to discussion on Social support). In the hypothetical model, placement of a dashed double-headed arrow between the social engagement and social support constructs (see Appendix A) not only signify the relationship between them but also implies that they are control variables to each other.

Psychological pathway variables.

Self-efficacy. The General Self-efficacy Scale (GSS) was used to measure participants' broad and stable sense of personal competence to deal effectively with a variety of stressful situations (Schwarzer, Bäßler, Kwiatek, Schröder, & Zhang, 1997). The 10-item scale has been used in numerous research projects, where it typically yielded internal consistencies between α =0.78 and 0.91 (Schwarzer et al., 1997; Schwarzer, Mueller, & Greenglass, 1999; Schwarzer & Schröder, 1997). Possible responses include "not at all true" which scored as 1, "hardly true" as 2, "almost true" as 3, and "very true" as 4, yielding a total score between 10 and 40 (see Appendix K). Higher scores demonstrated stronger self-efficacy in the face of adversity.

Self-esteem. Self-esteem was measured using the Rosenberg Self-Esteem Scale (RSES) (Rosenberg, 1965, 1989), one of the most extensively used instruments to assess self-esteem. In

this study self-esteem is defined as an individual's set of thoughts and feelings about his or her own worth and importance, that is, a global positive or negative attitude toward oneself (Rosenberg, 1965). The RSES is a unidimensional instrument that captures participants' global perception of their own worth by means of a 10-item scale; 5 positively worded items and 5 negatively worded items. All items were answered using a 4-point Likert scale format ranging from 1= strongly agree to 4= strongly disagree, with higher scores indicating more positive self-regard (see Appendix L). The internal reliabilities (Cronbach alphas) of the RSES scale within 53 nations have been reported previously with an average reliability of α= 0.81 across all nations (Schmitt & Allik, 2005).

Coping effectiveness. The coping self-efficacy (CSE) (Chesney, Neilands, Chambers, Taylor, & Folkman, 2006) scale measures one's confidence in performing coping behaviors when faced with life challenges (α = 0.95). Participants were asked to rate 26 coping responses on an 11-point scale assessing the extent to which they believed they could perform behaviors important to adaptive coping. Key indicator points on the scale were 0= cannot do at all, 5= moderately certain can do, and 10= certain can do (see Appendix M). An overall CSE score was created by summing the item ratings in which higher scores suggested higher level of coping confidence.

Depression. The Patient Health Questionnaire depression scale (PHQ-9) is a 9-item measure of depression severity where respondents rated the frequency of depressive symptoms they experience over the past 2 weeks on a 4-point Likert scale. The scale options and scores were as follow: 0= not at all, 1= several days, 2= more than half the days, and 3= nearly every day (see Appendix N). The total score ranged from 0 to 27 and the standard cut-off threshold for "moderate" depression severity was set at 10 and higher (Furukawa, 2010; Kroenke & Spitzer,

2002; Wittkampf, Naeije, Schene, Huyser, & van Weert, 2007). PHQ-9 has been shown to be as accurate as longer tools for identifying major depression in a range of settings, countries and patient populations (Furukawa, 2010; Wittkampf et al., 2007). Its overall scale reliability is reported to be α= 0.87 (Milette, Hudson, Baron, & Thombs, 2010).

Purpose in life. The Purpose in Life (PIL) is a 20-item self-report attitude questionnaire to measure the extent to which people perceive their lives to be purposeful and meaningful. The scale has been widely used and has been translated into several languages. Several studies have reported good to excellent internal consistency of the English language version with Cronbach alpha ranging from 0.86 to 0.92 (Coward, 1996; Crumbaugh, 1968; Klaas, 1998; Lyon & Younger, 2001; Sarvimaki & Stenbock-Hult, 2000; Schulenberg, 2004; Zika & Chamberlain, 1992). The PIL consisted of 20 statements with 7-point Likert response categories from 1= low degree to 7= high degree (see Appendix O). Total score ranged from 20 to 140 where higher score demonstrated higher degree of purpose in life (Crumbaugh & Maholick, 1964; Crumbaugh & Henrion, 1988).

Sample size calculation

A free interactive webpage developed by Preacher and Coffman (2006) which is based on the MacCallum-Browner-Sugawara (1996) method was utilized to approximate the sample size needed for this study. Estimation was determined by specifying several parameters as follows: alpha probability (α) = 0.05, desired power level= 0.80, null RMSEA (ε_0) = 0.05, alternative RMSEA (ε_1) = 0.01 (excellent fit), and degrees of freedom (df_M) = 155. df_M was derived by subtracting the total parameters of the hypothesized model from the unique elements. The figure in Appendix A indicated 76 parameters needed to be estimated excluding the fixed variables (*). The unique elements on the other hand were calculated as follow $r(r+1)/2$, where r is the

observed variable of the model. There were 21 observed variables present (□) making the total of unique element as: 21(21+1)/2= 231. Thus, $df_M = 231-76 = 155$. Using these information, a sample of 137.89 was generated. Hence, a minimum of 138 participants is required to be recruited for the study. Different values for ε1 were also applied in the webpage such as 0.02, 0.03, 0.05, 0.07 and 0.08 while keeping all else constant. The resultants sample size were 164.06, 237.50, null, 178.13 and 98.83 respectively. Other sample size or power estimators at the model level that support the MacCallum-Browner-Sugawara (1996) method include SAS/STAT and STATISTICA in which the SPI lacked resources to have access to.

Data analysis

Confirmatory factor analysis. Items for each instrument were loaded to their respective constructs based on a priori assumptions. For each construct, factor loading of one of its item was fixed to 1 while the rest were freely estimated, unless otherwise stated. Estimates and level of significance of these items in the confirmatory factor analysis (CFA) models were evaluated to determine the composition and structure validity of all constructs in the model within the sample. Items with non-significant loadings, zero variance responses, and linear dependency were dropped. The constructs include job strain/stress, general health, social engagement, social support, self-efficacy, self-esteem, coping effectiveness, depression, purpose in life, dietary behavior, and help seeking behavior. All analyses were conducted with Mplus version 7.4. Maximum likelihood (ML) estimator was used for instruments with five or more Likert scale options and displayed normal distribution while others were estimated using the Weighted Least Squares Mean and Variance (WLSMV) procedure.

Model fit was determined using multiple, established fit indices. Specifically, the study used Chi-square (χ^2) badness-of-fit index, root mean square error of approximation (RMSEA),

comparative fit index (CFI), and Tucker-Lewis index (TFI) to guide an estimation of overall model fit. While non-significant χ^2 suggests the model fits the data adequately, researchers often asserted that χ^2 is likely to be significant with larger sample sizes (Hair, Anderson, Tatham, & Black, 1998; Iacobucci, 2010). Some even argued it can be disregarded because of its sensitivity to sample size and large number of items (Thompson & Prottas, 2006). Following this controversy, Kline (2015) has suggested the use of chi-square/df ratio to compensate for the limitations of χ^2 and therefore was consulted in the model fit assessment as well. Of note, RMSEA is a measure of the average of the residual variance and covariance while the width of RMSEA's confidence interval (CI) is indicative of the precision of its estimate. Ideally, the lower bound of the 90% CI should include or is very close to zero (or no worse than 0.05) and the upper bound should be less than 0.08. An RMSEA point estimate is most accurate when the error around that estimate is small, that is, when the 90% CI is around 0.00 to 0.08. CFI and TFI on the other hand are indexes that depend on the average size of the correlations in the data. A model was considered to have "good" fit when the χ^2 was non-significant, χ^2/df ratio was 3 or less, RMSEA $\leq$ 0.05 (90% CI 0.00–0.08), CFI $\geq$ 0.95, and TFI $\geq$ 0.95 (Hoyle & Panter, 1995; Kline, 2015; McDonald & Ho, 2002; West, Taylor, & Wu, 2012). Alternatively, a model was regarded as "acceptable" when the χ^2 was non-significant, χ^2/df ratio was 5 or less, RMSEA $\leq$ 0.08 (90% CI 0.00–0.08), CFI $\geq$ 0.90, and TFI $\geq$ 0.90 (Bentler, 1990; Bentler & Chou, 1987; Bollen, 1989; Williams, Vandenberg, & Edwards, 2009). An alpha level of 0.05 was chosen for all analyses.

Structural equation modelling. Following CFA, constructs were modelled as conceptualized in the hypothesized model (Appendix A) with ML estimator and bootstrap method set for 1000. Because of the study's small sample, constructs were represented by their

respective instrument's summary score and a correction for single indicator latent variable was employed. Specifically, the error variances were set to [(1 – internal reliability) x sample variance]. The total score of ESSI, RSES, CSE, PHQ-9, and PIL, however, were divided by a constant a priori to keep their variances between one and ten. Binary variables such as smoking, binge drinking, and physical activity were adjusted accordingly based on corresponding standard deviations and covariance estimates with the causal variable (i.e. social engagement) (Stride, Gardner, Catley, & Thomas, 2015). Age, income and years of working at current company were log(x + 1) transformed to improve normality. Fit statistic of Akaike information criterion (AIC), Bayesian information criterion (BIC), and sample-size adjusted BIC (SABIC) were used to determine model fit since estimation of the usual fit measures were not possible with saturated mediation models. The best fitting model was the one with the lowest values. Given that standardized coefficients were not available for models with categorical mediating or predictor variables, results were interpreted based on non-standardized estimates instead. For consistency, non-standardized estimates were also used for CFA results.

CHAPTER IV

RESULTS

Cognitive interview

Twelve white-collar professionals were invited to participate in the interview through a convenience sampling strategy. Two persons declined and the rest agreed. Among the 10 who agreed, one did not show up for the interview leaving a final sample of *N*=9 individuals. Six women and three men enrolled in the interview with age ranging from 23 to 57 years old. Five individuals identified themselves as Malay, three as Chinese, and one as Indian. Comments and suggestions recorded from the interview were reviewed and used to form the basis for revisions in the instruments (*Table 1*).

Descriptive statistics

Out of the 27 organizations that consented to data collection, 13 were Malaysian government linked companies, nine were international business corporations, three were government agencies, and two were higher education institutions. A total of 247 professionals from these organizations managed to be contacted but only 208 responded to the email (*N*= 155) and personal invitations (*N*= 53). Of these, six did not complete the online survey even after reminders and request for personal meeting were sent while data from two other individuals who responded electronically had to be removed due to non-meaningful responses (i.e. same answer option selected throughout every questionnaires). This resulted in a final sample of *N*=200 respondents (response rate= 80.9%) which was used for analysis. The sample consisted of 50.5% women and 49.5% men with a mean age of 34.4 and ranging from 20 to 61 years of age. 91% of them identified as Malay, 3.5% Chinese, 2% Indian, and 3.5% identified as Others.

Table 1: Summary of modifications and revisions made to selected instruments

Instruments[a]	Modifications
WHOQOL	
How much do you need any medical treatment to function in your daily life in the last four weeks?	How much do you need any medical treatment and ***prescription medication*** to function in your daily life in the last four weeks?
FHQ	
Did you eat red meat such as beef, pork or lamb?	Did you eat red meat such as beef, ~~***pork***~~ or lamb?
Did you eat ground meat?	Did you eat ground meat ***(e.g. hamburgers, sausages, lasagna's meat sauces)***?
When you ate spaghetti or noodles, were they plain or with red or tomato sauce without meat?	When you ate spaghetti or noodles, ***how often were they plain (i.e. made with just gravy and without meat?***
Did you eat cooked vegetables?	Did you eat cooked vegetables, ***that is vegetables that are fried, sautéed etc.***?
Did you eat bread, rolls or muffins?	Did you eat bread ~~***rolls***~~ or muffins?
Did you drink milk or use milk on cereal?	Did you drink ***fresh/powdered*** milk or use milk on cereal?
How often was it 1% or non-fat milk?	How often was it ***low-fat*** or non-fat milk?
Did you eat home-baked cookies, cakes or pies?	Did you eat cookies, cakes or pies ***baked at home***?
Did you eat frozen desserts like ice cream or sherbet?	Did you eat frozen desserts like ice cream or sherbet ***(frozen fruit juice)***?
GHSQ	
Minister or religious leader (e.g. Priest, Rabbi, Chaplain)	Religious leader (e.g. ***Imam***, Priest, ***Swami, Abbot, Gurus***)
BASE	
Do you attend religious services, gatherings, or meetings?	Do you ***currently*** attend religious ***talks***, gatherings, or meetings ***(e.g. tazkirah, church sermon, committee/council meeting)***?
Do you attend meetings of any clubs or societies etc.?	Do you ***currently*** attend meetings of any clubs or societies ***such as social or work group, self-help group, charity, public service, or community group?***
Are you employed or engaged in voluntary work?	Are you ~~***employed or***~~ engaged in voluntary work?
Do you have access to a car?	Do you have access to a ***vehicle***?
Do you have one or more friends in the district?	Do you have one or more friends, ***family members, or relatives*** in the district?
Do you have sufficient contact with family and friends?	Do you have sufficient contact/***communication*** with friends, ***family members, or relatives***?
Are you mobile?	***Do you have any physical limitations that prevent you from moving around?***
ESSI	
Is there someone available to whom you can count on to listen to you when you need to talk?	Is there someone available to whom you can ***depend*** on to listen to you when you need to talk?
Is there someone available to help with daily chores?	Is there someone available to help with daily ***tasks***?
CSE	
Keep from getting down in the dumps.	***Bounce back from feeling sad or discouraged.***
Keep from feeling sad.	Dropped due to its similarity with the item above

[a] WHOQOL= General health, FHQ= Dietary habit, GHSQ= Help seeking, BASE= Social engagement, ESSI= Social support, CSE= Coping effectiveness

Over half of the respondents had obtained a Bachelor's degree (54.5%) and nearly 35% received either postgraduate education or post bachelor professional training (34.5%). Those with high school diplomas and post high school certificates made 2.5% and 8.5% of the sample respectively. The respondent's mean monthly income was RM5670 (range= RM1000–27000) which was slightly over the 2014 national median monthly gross household income of RM4585 (Economic Planning Unit, 2014). Overall, those in the sample worked 7.9 hours per day on average (range= 1–18) and have worked at their respective organizations for about 8 years (mean= 7.8) with one year recorded as the shortest period and 37 years the highest. Additionally, 88.5% (n=177) of the respondents were non-smokers, 99.5% (n=199) did not consume alcohol, and 72.5% (n=145) were physically active. The demographic and background characteristics of the final sample are summarized in *Table 2.*

Confirmatory factor analysis

Job Content Questionnaire (JCQ). The two job dimensions were subjected to confirmatory factor analysis (CFA) based on the solution of the original JCQ (Karasek & Theorell, 1990). The five items measuring respondents' work nature were loaded on psychological job demands (PJD; represented by items 19, 20, 22, 23, and 26) while the remaining nine items about workers' skills and authority were loaded on decision latitude (DL; represented by items 3, 4, 5, 6, 7, 8, 9, 10 and 11). A correlation was allowed for PJD and DL. The model did not fit the data well as indicated by the poor fit indices. The model resulted in an χ^2/df ratio of 4.35 [χ^2 (76) = 330.91, p = 0.00], RMSEA of 0.131 (90% CI= 0.117–0.146), CFI of 0.810 and a TLI of 0.773. Modification indices (MI) estimates were examined and theoretically meaningful (i.e. correlating items representing the same domain) and statistically sound (i.e. MI=

>10.0) recommendations were applied to improve model fit. Specifically, for PJD, the error variance of item 22 was correlated

Table 2: Demographic and Background Characteristics of Malaysian White-Collar Professionals

Characteristics	Overall *N*/Mean (SD)	Percentage (%)
Total	200	100
Mean age	34.4 (9.6)	–
Sex		
Male	99	49.5
Female	101	50.5
Race		
Malay	182	91.0
Chinese	7	3.5
Indian	4	2
Others	7	3.5
Education		
High school diplomas	5	2.5
Post high school certificates	17	8.5
Bachelor's degree	109	54.5
Postgraduate degree/certificates	69	34.5
Mean income (RM)	5670 (3674)	–
Mean hours working per day	7.9 (2.6)	–
Mean years working	7.8 (7.9)	–
Smoking status		
Smokers	177	88.5
Non-smokers	23	11.5
Alcohol		
Do not drink	199	99.5
Binge drinker	1	0.5
Physical activity		
Physically inactive	54	27.5
Physically active	145	72.5

with item 23, while item 23 with 26. For DL on the other hand, the error variance of item 6 was correlated with item 8, item 10 with 6 and 8, while item 11 with 3, 8, 9, and 10. Item 4 (repetitive tasks) was loaded on PJD in addition to being loaded on DL since performing repetitive works could also be interpreted as psychologically demanding by the respondents. Fit indices of the modified model improved following these changes with $\chi^2/df = 1.94$ [χ^2 (66) = 128.34, $p = 0.00$], RMSEA= 0.070 (90% CI= 0.051–0.087), CFI= 0.954, and TLI= 0.936. All item loadings reported significant findings ($p < 0.05$). Scoring formula was revised but relative weights of the

items within each scale remained the same as those in the initial version (Alexopoulos et al., 2015). The modified model and formula are included in Appendix D. The new Cronbach α coefficient for DL and PJD were 0.72 and 0.69 respectively.

Food Habits Questionnaire (FHQ). FHQ was originally fit to a second order CFA by loading on substituting low-fat foods for high-fat foods (SUBS), modifying meat preparation (MODIFY), avoiding fried foods (FRY), avoiding fat as seasoning (FAT), and replacing high-fat foods (REPLACE) scales. These scales, with their own indicators, were treated as the five first-order constructs. The preliminary model exhibited less than ideal fit; χ^2/df= 2.24 [χ^2 (204) = 457.12, p= 0.00], RMSEA= 0.080 (90 % CI= 0.070–0.090), CFI= 0.726, TLI= 0.689, and continued to display unacceptable fit even after several modifications, suggesting FHQ was not accurately represented by the five scales. The misspecification came from the FRY scale which explained a mere 6.1% of the total variance (r^2= 0.061, p= 0.208). Given that FRY and FAT both assessed fat intake, and several of the biggest estimates of modification indices suggested a merger of these two [e.g. 7B of FRY with 7A of FAT (38.01), FRY by 7A (42.51)], indicators of each dimension were combined into a single scale (FAT) to improve model fit. A CFA was rerun with the resulting four scales with relevant modifications applied and non-significant items dropped (refer Table 3 and for Appendix G for details). It is worth mentioning that, item 10B was not loaded on its original SUBS scale because of its strong modification estimate to correlate with 10A, an indicator of FAT (51.76) and to load on FAT (57.88). This modification was deemed sound and meaningful since "dressing" could be viewed as high-caloric food instead of substitution meal in the sample. The alternative model recorded acceptable fit [χ^2/df=1.52, χ^2 (163)= 248.28, p = 0.00; RMSEA= 0.052 (90 % CI= 0.038–0.064), CFI= 0.923, TLI= 0.910] with high and significant estimates on all loadings (p< 0.05).

Brief Assessment of Social Engagement (BASE). Prior to CFA, items probing on "cellphone ownership", "read or watch the news", and "access to television, radio or internet" were dropped from the scale following zero variance responses (only "yes" responses were recorded), leaving 18 items in total. The items were all loaded to BASE and factor loadings were freely estimated given that convergence could not be achieved when either one of the indicator was fixed. Instead, BASE was constrained to one. Adjustments were made to the model based on estimates of modification indices to improve model fit, that is, the error variance of item 4 was correlated with items 5 and 15, item 17 with 10 and 16, and item 18 with 5 and 8. The model, however, fit the data poorly with χ^2/df=1.59 [χ^2 (129) = 204.57, p = 0.00], RMSEA= 0.055 (90% CI= 0.040–0.069), CFI= 0.736, and TLI= 0.687. Items 17 and 18 had linear dependency among the variables and needed to be removed. A few other items with non-significant loadings were also dropped (i.e. items 6, 9, 11, and 15) before the modified model reached acceptable fit. Only the error variance of items 4 and 5 were correlated in the model since both items measured voluntary participation either through involvement in clubs/societies or actual voluntary works. The final indices were χ^2/df=1.09 [χ^2 (53) = 58.17, p = 0.29], RMSEA= 0.022 (90% CI= 0.000–0.052), CFI= 0.963, and TLI= 0.953.

CFA for WHOQOL, GHSQ, ESSI, GSS, RSES, CSE, PHQ-9, and PIL were also conducted in which each preliminary model showed poor data fit. Modification indices were reviewed and necessary recommendations were applied to each model. Specifically, the error variances of several items were correlated and non-significant loadings were dropped (refer *Table 3* for details). For WHOQOL, items measuring pain threshold (i.e. items 1 and 2) and satisfaction in living everyday life (i.e. items 5, 6, and 7) were correlated. For GHSQ, correlations were allowed for items/individuals considered by respondents as family or relative

(i.e. items 1, 3, and 4,), health professionals (i.e. items 5 and 7), and unlikely sources of help (i.e. items 6 and 9). For ESSI, items which depicted support through talking to (i.e. item 1) or confiding in (i.e. item 6) confidants were viewed similarly among respondents and thus were correlated. For GSS, items assessing respondents' ability to achieve personal goals (i.e. items 1, 2, and 3), ability to handle unexpected situations (i.e. items 4 and 5), and ability to confront problems effectively (i.e. items 8 and 9) were correlated.

For RSES, items were correlated based on their portrayal of either positive or negative feelings. Positive feelings were represented by items 1, 3, 4, 7, and 10 while negative feelings were represented by items 2, 5, 6, and 9. For PHQ-9, items assessing sleeping and eating disorder as well as feeling of worthlessness were correlated (i.e. 3, 5, and 6). It may be that in this study respondents' reaction to having such feeling lead them to report sleeping and eating problems. Lastly, for PIL, correlations were allowed for items 1, 2, 3, 4, 5, 7, and 8 given their identical assessment of respondent's meaning of life, while items 10, 15, 16 and items 13 and 17 were correlated for their shared assessment of "view towards death" and "self-worth" respectively. The modified models showed better fit with χ^2/df ranging from 1.22 to 2.23, RMSEA= 0.033–0.080, CFI= 0.925–0.997, and TLI= 0.911−0.994 (refer *Table 3* for details). Factor loadings for the remaining items were significant as well ($p < 0.05$). Descriptive statistics and intra-class coefficients of indicator variables in the model are presented in *Table 5* and the variances, covariances, and correlations are presented in *Table 6*. Respondents in general were socially engaged and physically healthy with a BASE and WHOQOL mean score of 9.17 out of 12 and 3.67 out of 5 respectively. Examination of the univariate skewness and kurtosis found that all variables were within normal limits.

Table 3: CFA models modification

Instruments[a]	Items modified/correlated	Items dropped
JCQ	- Item 6 with 8, 10 with 6 and 8, 11 with 3, 8, 9, and 10, 22 with 23, 23 with 26 - PJD with DL - Item 4 loaded on PJD and DL	- None
WHOQOL	- Item 1 with 2, 6 with 5 and 7	- None
FHQ	- FAT and FRY indicators combined - Item 15A with 16A, 21A with 22 - MODIFY with SUBS - 10B loaded on FAT	- Items 4a, 6a, 7a, 8a, 9a
GHSQ	- Item 1 with 3 and 9, 3 with 4, 5 with 7, 6 with 9	- Items 2, 10
BASE	- Item 4 with 5	- Items 2, 4, 6, 9, 11, 14, 15, 17, 18
ESSI	- Item 1 with 6	- None
GSS	- Item 1 with 2 and 3, 2 with 3, 4 with 5, 8 with 9	- None
RSES	- Item 1 with 10, 2 with 5, 6 and 9, 3 with 4, 7 and 9, 4 with 9, 5 with 6 and 9	- Item 8
CSE	- Item 1 with 2, 3 with 20, 4 with 16 and 23, 5 with 6 and 20, 6 with 7 and 19, 7 with 8, 10 with 9, 14, 18, and 19, 11 with 21, 16 with 15 and 23, 18 with 14, 19, and 20	- Items 24, 25
PHQ-9	- Item 3 with 5 and 6	- None
PIL	- Item 1 with 2, 2 with 3 and 5, 3 with 4, 16 and 17, 4 with 8, 5 with 7, 10 with 15, 13 with 17	- Items 19, 20

[a] JCQ= Job strain, WHOQOL= General health, FHQ= Dietary habit, GHSQ= Help seeking, BASE= Social engagement, ESSI= Social support, GSS= Self-efficacy, RSES= Self-esteem, CSE= Coping effectiveness, PHQ-9= Depression, PIL= Purpose in life

Table 4: Summary of CFA model fit indices

Instruments[a]	Estimator	χ^2/df	RMSEA (90% CI)	CFI	TLI	Appendix[b]
JCQ	WLSMV	1.94	0.070 (0.051–0.087)	0.954	0.936	B
WHOQOL	ML	1.43	0.047 (0.000–0.095)	0.988	0.978	C
FHQ	WLSMV	1.52	0.052 (0.038–0.064)	0.923	0.910	E
GHSQ	ML	1.85	0.066 (0.024–0.104)	0.957	0.920	F
BASE	WLSMV	1.09	0.022 (0.000–0.052)	0.963	0.953	G
ESSI	ML	1.23	0.035 (0.000–0.095)	0.996	0.993	H
GSS	WLSMV	2.21	0.079 (0.053–0.104)	0.987	0.980	I
RSES	WLSMV	1.22	0.033 (0.000–0.077)	0.997	0.994	J
CSE	ML	2.23	0.080 (0.070–0.089)	0.925	0.911	K
PHQ-9	WLSMV	1.72	0.061 (0.028–0.091)	0.985	0.978	L
PIL	ML	2.17	0.077 (0.065–0.090)	0.936	0.922	M

[a] JCQ= Job strain, WHOQOL= General health, FHQ= Dietary habit, GHSQ= Help seeking, BASE= Social engagement, ESSI= Social support, GSS= Self-efficacy, RSES= Self-esteem, CSE= Coping effectiveness, PHQ-9= Depression, PIL= Purpose in life
[b] Diagram for each model can be found in respective appendices

Table 5: Descriptive statistics and reliabilities of model indicators

Instruments[a]	Instruments' scoring range	Mean	*SD*[b]	Sample's scoring range	α[c]
JCQ					
DL	24–96	67.80	6.53	46–82	0.72
PJD	12–48	32.87	3.26	24–42	0.69
WHOQOL	1–5	3.67	0.61	1.71–5.00	0.80
FHQ	0–4	2.29	0.48	1.06–3.49	0.64
SUBS	0–4	2.15	0.79	0.00–4.00	0.65
MODIFY	0–4	2.45	0.85	0.00–4.00	0.57
FAT	0–4	2.19	0.51	1.00–3.50	0.58
REPLACE	0–4	2.35	0.59	1.00–3.80	0.62
GHSQ	1–7	4.95	0.95	2.13–6.88	0.70
BASE	0–12	9.17	1.97	3–12	0.59
ESSI	6–30	22.72	5.22	7–30	0.92
GSS	10–40	36.91	2.77	28–40	0.89
RSES	9–36	27.57	4.04	14–36	0.81
CSE	0–230	161.65	34.03	47–230	0.96
PHQ-9	0–27	6.09	4.57	0–24	0.84
PIL	18–126	100.27	16.40	30–126	0.94

[a] JCQ= Job strain, DL= Decision latitude, PJD= Psychological job demands, WHOQOL= General health, FHQ= Dietary habit, GHSQ= Help seeking, BASE= Social engagement, ESSI= Social support, GSS= Self-efficacy, RSES= Self-esteem, CSE= Coping effectiveness, PHQ-9= Depression, PIL= Purpose in life
[b] *SD*= Standard deviation
[c] α= Reliability (Cronbach's alpha)

Table 6: Variances, covariances, and correlations of indicator variables

	1	2	3	4	5	6	7	8	9	10	11
1. BASE	3.881	*.333**	*.468**	*-.015*	*.327**	*-.014*	*-.037*	*.043*	*.243**	*.005*	*.248**
2. WHOQOL	.403	.376	*.414**	*.122*	*.148**	*.142**	*-.117*	*.020*	*.164**	*-.024*	*.080*
3. ESSI	2.393	.658	6.741	*-.062*	*.017*	*-.135*	*-.219**	*.114*	*.150**	*.077*	*.032*
Covariates											
4. Job strain	-.038	.10	-.208	1.640	*.095*	*-.021*	*-.032*	*-.010*	*.119*	*.076*	*.099*
5. Age	.069	.01	.005	.01	.011	*-.049*	*-.028*	*.021*	*.628**	*.087*	*.776**
6. Sex	-.014	.04	-.175	-.01	-.003	.251	*-.013*	*.032*	*.067*	*-.002*	*-.050*
7. Race	-.046	-.05	-.360	-.02	-.002	-.004	.400	*-.109*	*-.119*	*.037*	*-.063*
8. Education	.060	.01	.207	-.01	.002	.011	-.048	.488	*.291**	*.113*	*-.071*
9. Income	.120	.03	.098	.04	.017	.008	-.019	.051	.063	*.121*	*.547**
10. Hours[a]	.025	-.04	.516	.25	.024	-.003	.061	.204	.079	6.661	*.069*
11. Years[b]	.168	.02	.029	.04	.029	-.009	-.014	-.017	.047	.061	.119
Mediators											
12. Smoke	.021	-.006	.028	-.027	-.002	.028	.014	-.044	.002	-.025	-.006
13. Alcohol	-.006	.003	.006	-.006	-.001	.003	.009	-.001	.000	.010	-.003
14. PA[c]	-20.81	-4.003	-29.31	-6.429	-.682	-2.439	9.071	3.959	-.406	-24.697	-2.516
15. FHQ	.285	.009	.205	.052	.008	-.044	.000	-.042	.013	-.147	.029
16. GHSQ	.568	-.007	.687	.006	.001	-.081	.029	-.052	-.009	-.067	-.005
17. GSS	1.398	.176	2.379	.343	.020	-.119	.077	.216	.036	-.249	.060
18. RSES	1.411	.427	1.940	.234	.046	-.159	-.016	.191	.107	.130	.150
19. CSE	1.994	.478	2.346	.175	.021	-.164	-.078	.050	.028	-.038	.084
20. PHQ-9	-1.517	-.760	-1.760	-.205	-.066	.001	-.023	.056	-.123	.112	-.151
21. PIL	1.046	.292	1.148	.185	.034	-.061	-.047	.037	.055	.142	.085

Covariances in lower left, variances along diagonal (shaded), and correlations in upper right italicized (*= $p < 0.05$); covariances and variances were standardized for variables 17-20

a= working hours per day, b= years working at current company, c= physical activity

* JCQ= Job strain, DL= Decision latitude, PJD= Psychological job demands, WHOQOL= General health, FHQ= Dietary habit, GHSQ= Help seeking, BASE= Social engagement, ESSI= Social support, GSS= Self-efficacy, RSES= Self-esteem, CSE= Coping effectiveness, PHQ-9= Depression, PIL= Purpose in life

Table 6 (cont.): Variances, covariances, and correlations of indicator variables

	12	13	14	15	16	17	18	19	20	21
1. BASE	*.033*	*-.042*	*-.150**	*.300**	*.302**	*.256**	*.355**	*.446**	*-.345**	*.486**
2. WHOQOL	*-.029*	*.072*	*-.093*	*.031*	*-.012*	*.104*	*.345**	*.344**	*-.555**	*.435**
3. ESSI	*.034*	*.031*	*-.160**	*.164**	*.277**	*.331**	*.370**	*.398**	*-.304**	*.404**
4. Job strain	*-.067*	*-.071*	*-.071*	*.085*	*.005*	*.097*	*.090*	*.060*	*-.072*	*.132*
Covariates										
5. Age	*-.051*	*-.104*	*-.090*	*.163**	*.005*	*.067*	*.213**	*.088*	*-.277**	*.291**
6. Sex	*.176*	*.072*	*-.069*	*-.180**	*-.169**	*-.085*	*-.158**	*-.144**	*.001*	*-.112*
7. Race	*.071*	*.205**	*.203**	*.000*	*.048*	*.044*	*-.013*	*-.055*	*-.016*	*-.068*
8. Education	*-.199**	*-.021*	*.080*	*-.125*	*-.078*	*.112*	*.135*	*.032*	*.036*	*.049*
9. Income	*.023*	*-.023*	*-.023*	*.111*	*-.037*	*.052*	*.211**	*.049*	*-.219**	*.201**
10. Hours[a]	*-.031*	*.057*	*-.136*	*-.118*	*-.027*	*-.035*	*.025*	*-.006*	*.019*	*.050*
11. Years[b]	*-.053*	*-.104*	*-.103*	*.174**	*-.015*	*.062*	*.215**	*.108*	*-.196**	*.224**
Mediators										
12. Smoke	.102	*.197**	*-.025*	*-.166**	*.030*	*.086*	*-.043*	*-.049*	*.011*	*-.083*
13. Alcohol	.004	.005	*-.005*	*.129*	*.041*	*.028*	*.131*	*.107*	*-.081*	*.064*
14. PA[c]	-.561	-.024	4982	*-.071*	*-.006*	*.029*	*-.133*	*-.078*	*-.098*	*-.057*
15. FHQ	-.026	.004	-2.418	.233	*.288**	*.170**	*.148**	*.252**	*-.183**	*.251**
16. GHSQ	.009	.003	-.405	.133	.910	*.078*	*.080*	*.220**	*-.028*	*.216**
17. GSS	.076	.006	5.682	.227	.205	7.674	*.270**	*.341**	*-.138*	*.374**
18. RSES	-.028	.019	-18.917	.144	.154	1.510	4.074	*.534**	*-.376**	*.534**
19. CSE	-.036	.017	-12.537	.275	.476	2.141	2.446	5.148	*-.311**	*.608**
20. PHQ-9	.008	-.013	-15.498	-.198	-.059	-.855	-1.696	-1.574	4.987	*-.448**
21. PIL	-.029	.005	-4.399	.132	.225	1.133	1.178	1.508	-1.094	1.195

Covariances in lower left, variances along diagonal (shaded), and correlations in upper right italicized (*= $p < 0.05$); covariances and variances were standardized for variables 17-20

a= working hours per day, b= years working at current company, c= physical activity

* JCQ= Job strain, DL= Decision latitude, PJD= Psychological job demands, WHOQOL= General health, FHQ= Dietary habit, GHSQ= Help seeking, BASE= Social engagement, ESSI= Social support, GSS= Self-efficacy, RSES= Self-esteem, CSE= Coping effectiveness, PHQ-9= Depression, PIL= Purpose in life

Structural analysis

A path diagram was first tested as specified in the hypothesized model. The analysis resulted with an AIC of 7201.72, BIC= 7379.83, and SABIC= 7208.75. Several other alternative and theoretically meaningful structural models were tested later using these preliminary fit indices as guidance to find the best model. In the first alternative model, mediators with significant bivariate correlations (*Table 6*) were correlated within the boundary of corresponding pathways (i.e. no behavioral mediators were correlated with psychological mediators). The reported indices were 7187.10, 7391.60, and 7195.18 for AIC, BIC, and SABIC respectively.

An additional correlation aside from those specified for alternative Model 1 was allowed in the second model involving social engagement (BASE) and social support (ESSI). Association between those two were deemed plausible based on previous literature suggestive of their relationship (Leedahl & Chapin, 2014). The second model or Model 2 showed better fit indices than Model 1 with AIC= 7096.77, BIC= 7314.46, and SABIC= 7105.36. To test for parsimony, non-significant pathways in Model 2 were dropped to form the third model leaving only significant estimates ($p< 0.05$). The parsimonious model displayed improved fit for all three indices where AIC= 6699.61, BIC= 6851.34, and SABIC= 6705.60. To note, a model with serial mediator specifications were also tested but not reported here given their poor fit. Behavioral mediators such as diet (FHQ), help seeking (GHSQ), smoking, binge drinking, and physical activity were specified as secondary mediator after either self-efficacy (GSS) or self-esteem (RSES) or both. In all three models, values reported for AIC, BIC, and SABIC were all over 8000.

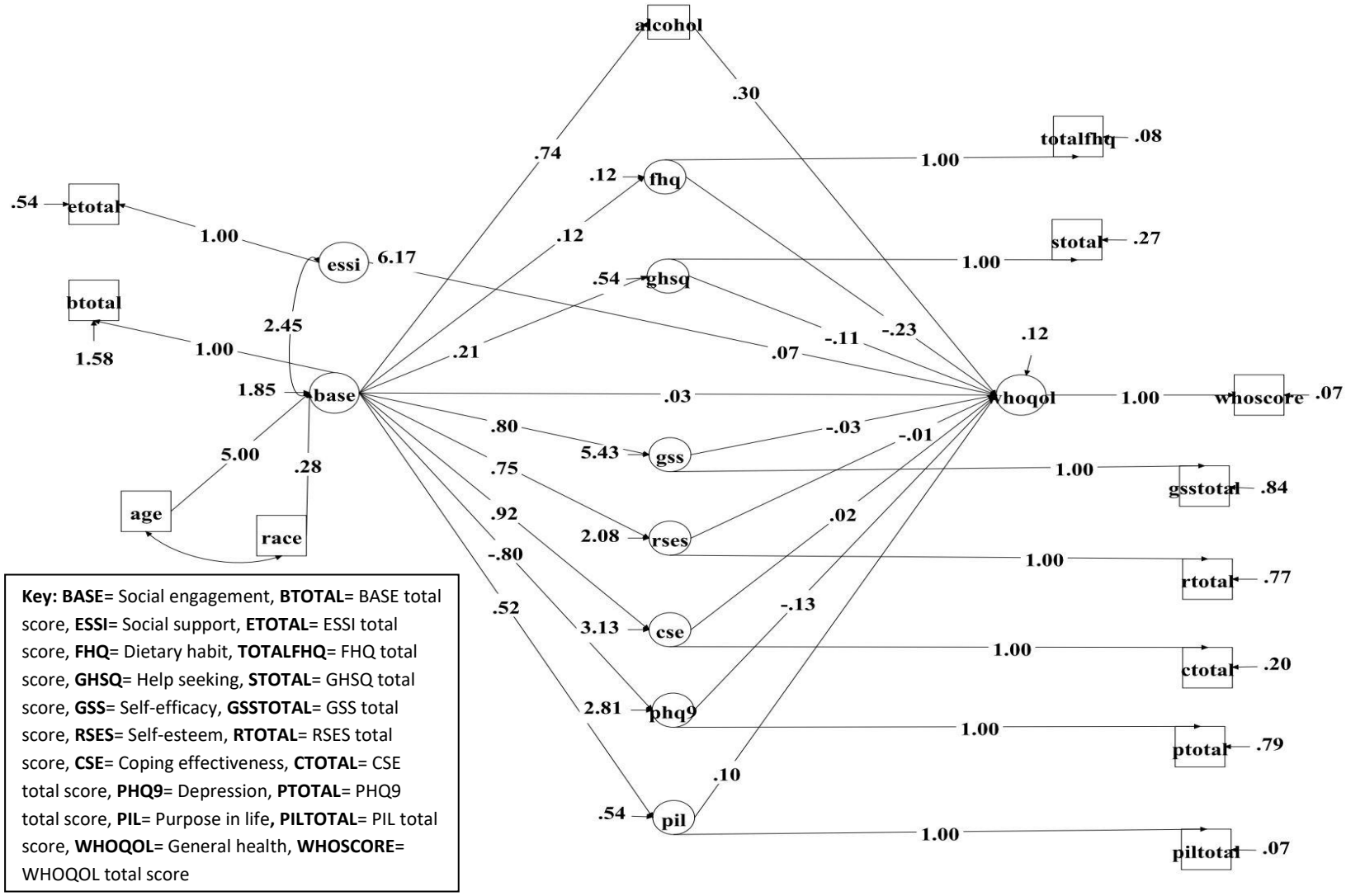
The full path diagram of Model 3 is illustrated in Figure 3. In the model, age and race significantly predicted level of social engagement (BASE) in the sample ($\beta_{age}= 5.00$, $\beta_{race}= 0.28$).

Social engagement on the other hand was no longer a significant predictor of health (WHOQOL) after controlling for mediators and social support (ESSI) (β= 0.029, *p*= 0.766), indicative of full mediation. Results showed that although social engagement (BASE) significantly predicted all but binge drinking (ALCOHOL), only self-efficacy (GSS), depression (PHQ9) and binge drinking significantly related to health (β_{GSS}= -0.032, β_{PHQ9}= -0.132, $\beta_{ALCOHOL}$= 0.012). Additionally, the indirect effect coefficient was significant for depression (β= 0.106, p= 0.002), attesting to the fact that association of social engagement with health was fully mediated by depression. All other indirect effects were not significant. Summary of beta coefficients, standard errors, and *p*-values for estimates from model 3 are presented in *Table 7*.

Table 7: Beta coefficient, standard errors, and *p*-values

Parameters[a]	Estimates	SE	*p*-values
Covariates			
Age → BASE	4.996	0.862	0.000
Race → BASE	0.275	0.141	0.051
Direct effect			
BASE → WHOQOL	0.029	0.098	0.766
BASE to mediators			
BASE → Alcohol	0.628	0.448	0.161
BASE → FHQ	0.119	0.023	0.000
BASE → GHSQ	0.207	0.056	0.000
BASE → GSS	0.802	0.181	0.000
BASE → RSES	0.754	0.135	0.000
BASE → CSE	0.921	0.162	0.000
BASE → PHQ9	-0.800	0.154	0.000
BASE → PIL	0.522	0.073	0.000
Mediators to WHOQOL			
Alcohol → WHOQOL	0.012	0.004	0.002
FHQ → WHOQOL	-0.232	0.165	0.159
GHSQ → WHOQOL	-0.114	0.066	0.086
GSS → WHOQOL	-0.032	0.015	0.035
RSES → WHOQOL	-0.007	0.031	0.828
CSE → WHOQOL	0.020	0.022	0.364
PHQ9 → WHOQOL	-0.132	0.030	0.000
PIL → WHOQOL	0.101	0.065	0.123
Indirect effects			
BASE → Alcohol → WHOQOL	0.007	0.006	0.184
BASE → FHQ → WHOQOL	-0.028	0.021	0.198
BASE → GHSQ → WHOQOL	-0.024	0.016	0.144
BASE → GSS→ WHOQOL	-0.026	0.013	0.056
BASE → RSES → WHOQOL	-0.005	0.024	0.834
BASE → CSE → WHOQOL	0.018	0.021	0.385
BASE → PHQ9 → WHOQOL	0.106	0.035	0.002
BASE → PIL → WHOQOL	0.053	0.036	0.140
Error variance correlations			
BASE ↔ ESSI	2.454	0.380	0.000
FHQ ↔ GHSQ	0.080	0.034	0.019
CSE ↔ RSES	0.962	0.271	0.000
PIL ↔ RSES	0.338	0.131	0.010
PIL ↔ CSE	0.482	0.164	0.003

[a] JCQ= Job strain, DL= Decision latitude, PJD= Psychological job demands, WHOQOL= General health, FHQ= Dietary habit, GHSQ= Help seeking, BASE= Social engagement, ESSI= Social support, GSS= Self-efficacy, RSES= Self-esteem, CSE= Coping effectiveness, PHQ-9= Depression, PIL= Purpose in life



Key: BASE= Social engagement, **BTOTAL**= BASE total score, **ESSI**= Social support, **ETOTAL**= ESSI total score, **FHQ**= Dietary habit, **TOTALFHQ**= FHQ total score, **GHSQ**= Help seeking, **STOTAL**= GHSQ total score, **GSS**= Self-efficacy, **GSSTOTAL**= GSS total score, **RSES**= Self-esteem, **RTOTAL**= RSES total score, **CSE**= Coping effectiveness, **CTOTAL**= CSE total score, **PHQ9**= Depression, **PTOTAL**= PHQ9 total score, **PIL**= Purpose in life**, PILTOTAL**= PIL total score, **WHOQOL**= General health, **WHOSCORE**= WHOQOL total score

Figure 3: Path diagram for Model 3 (error variance correlations not included)

CHAPTER V

DISCUSSION & CONCLUSION

Research and analyses of social engagement in this study were guided by Berkman's model (Berkman, Glass, Brissette, & Seeman, 2000). The need for the study was driven by the fact that social engagement has never been investigated as a factor in predicting health status among workers, albeit strong indications of its impact on health (Bassuk et al., 1999; Berkman & Syme, 1979; Bygren et al., 1996; Glass et al., 1999; House et al., 1982; Kaplan et al., 1988; Mendes de Leon, 2003; Seeman & Kaplan, 1987; Wang, 2002). The hypothesized model (Appendix A), which consisted of predictors as well as mediators of social engagement and health was used to test the study's four objectives: (a) to investigate the relationship between social engagement and health among the white-collars, (b) to evaluate the influence of job stress/strain and selected covariates (i.e. age, race, education, income) on white-collar professionals' social engagement level, (c) to examine the association of social engagement with downstream pathways and, (d) to assess the mediating factors linking social engagement to health. The subsections that follow discuss each hypothesis proposed based on these objectives.

Social engagement and health

The hypothesis that social engagement is associated with health when all covariates and mediators in the model are considered was not met. The finding contradicted evidence from past studies that underscore the role of social engagement in influencing several physical health dimensions (Bassuk et al., 1999; Berkman & Syme, 1979; Bygren et al., 1996; Glass et al., 1999; House et al., 1982; Kaplan et al., 1988; Mendes de Leon, 2003; Seeman & Kaplan, 1987; Wang, 2002). Notwithstanding, it should be noted that the bivariate correlation between social engagement and health was found to be significant (Pearson r= 0.33; see Table 6). A possible explanation for why the association of these two was rendered insignificant in the full model (p=

0.766) could be due to full mediation effect. This will be further discussed in *Social Engagement Mediators*.

Despite these findings, a couple of issues pertaining to the relationship of social engagement and health persist. First, given the lack of evidence to support the existence of a causal relationship between these two, it has been suggested that social engagement may confer benefit on health through complex *reciprocal* relationship that begins with the social engagement role in preserving and improving health (i.e. mental health, functional ability) which in turn enable continued social engagement (Mendes de Leon, Gold, Glass, Kaplan, & George, 2001). While the path in Berkman et al. (2000) model was specified such that social engagement had a linear correlation with health, the current study was not able to put the reciprocity theory to the test in view of the cross-sectional nature of the study. Second, several studies have indicated that the protective effect of social engagement among older adults aged 65 years or older diminishes slowly over time (Bennett, 2005; Mendes de Leon, 2003). Nonetheless, the question of whether this is replicable in the current sample or in the younger age group could not be answered this time around and without longitudinal data it remains a compelling matter for researchers to explore in future research.

Determinants of social engagement level in white-collar

The study hypothesized that job strain, working hours, age, race, education, and income will significantly predict social engagement level. The model, however, only partially supported the proposition where only race and age were associated with social engagement. In terms of race, the study found that Malay (dummy variable) scored 1.20 higher ($p< 0.05$) in the social engagement scale (scoring range= 0–12) compared to Others, while Chinese and Indian showed non-significant findings with estimates of -1.09 ($p= 0.08$) and 0.59 ($p= 0.38$) respectively.

Although Malay professionals' involvement in social engagement activities are significantly higher than Others, the level is practically on par with those of Chinese and Indian. A separate analysis using Chinese as dummy variable also showed no significant difference between the engagement levels of Chinese–Malay (1.09; p= 0.08) and Chinese–Indian (1.71; p= 0.051). The fact that Malay, Chinese, and Indian had comparable level of social engagement may stem from the shared Malaysian values they hold as a collectivist society where qualities such as social integration, social relations, self-sacrifice and family integrity are at its core (Lu & Gilmour, 2004; Noordin, Williams, & Zimmer, 2002).

Malay cultural values to a large extent are similar to Chinese and Indian (Bochner, 1994; Rowley & Abdul-Rahman, 2007) and these values can be traced back to the religious beliefs that each of the race mostly identified with. As stated earlier, Malays are all Muslims by constitution (*Federal Constitution*, 2010) while Chinese are generally Buddhist and Indians are Hindus. Malay culture is essentially a cooperative society based on Islamic concept of "*ummah*" where each Muslim is responsible for fellow Muslims (Mellahi/Wood 2004: 202), and "*tasamuh*" which refers to the acceptance and appreciation of the rich diversity of cultures, forms of expression and ways of being human (Khan, 2011). Buddhism on the other hand emphasizes the importance of being altruistic towards others as by doing so one cultivates compassion and washes away past sins (Charles, n.d.), while Hindu scriptures affirm that transcending selfishness is an important virtue and serving humanity is equal to serving God (Hinduwebsite, n.d.).

However, the same could not be said for Others and this is possibly because of the mix of multiple ethnicities of different cultural values being grouped into a single category. Thus, further research is needed to explicate the racial composition of this category and help explain the intricate links between religion, culture and ethnicity of those that made up the group.

Nevertheless, empirical evidences on race as a predictor of social engagement have been reported before (Hyman & Wright, 1971; M Lindström, 2005; Milbrath & Goel, 1977; Olsen, 1970; Sidney Verba & Nie, 1972; Wright & Hyman, 1958) and this study provided further support to the claim while expanding the scope of ethnic groups covered in the early literatures.

As for age, it appears that for one unit increase of log-age there was an increase of five unit of social engagement score when all other variables held constant. Alternatively, for one percent increase in age [(0.01*age) + age)] there was an increase of 5.00/100= 0.05 unit of social engagement score (scoring range= 0–12), showing that Malaysian white-collar professionals participated in more social engagement activities as they get older. This result contradicted findings from several longitudinal studies which found that the level of engagement of adults is relatively constant across the lifespan (Eng, Rimm, Fitzmaurice, & Kawachi, 2002; Hanifi, 2006; Hyyppä, Mäki, Alanen, Impivaara, & Aromaa, 2008). For example, Finland's Leisure Survey showed that the percentage of Finns involved in associations, clubs, organizations, or society groups at least once a year was quite similar across age groups from 15 years to 65+ years, ranging from approximately 40% among the 65+ group to approximately 55% in the 25 to 44 year's age group (Hanifi, 2006). Such inconsistencies could be explained by the different operationalization of social engagement between these studies. Past assessments of social engagement were typically limited to respondents' involvement in clubs, organizations, community and religious groups, and frequency of contact with close friends and relatives. In this study, additional questions on holiday trips, voting, access to vehicles and public transportations, and feeling of loneliness to name a few, were also considered. The wider coverage of engagement activities in the study sample may have had some impact on the

different levels of social engagement among Malaysian white-collars contrary to common findings.

It was also revealed that job strain was not associated with social engagement within the sample, a conflicting conclusion compared to previous studies (Karasek, 1997; Karasek, 1976; Lindström & The Malmö Shoulder-Neck Study Group, 2006). Reanalysis of the model with the inclusion of the two domains that made up the job strain variable namely psychological job demand (PJD) and decision latitude (DL) also showed non-significant relationship with social engagement. The discrepancies could be attributed to the Malaysian culture and the working environment in Malaysia being different from the Western and majority Asian countries (Wilkinson, Gamble, & Humphrey, 2001). Employees in Malaysia are known to be less loyal with a voluntary turnover rate of about 9.5% in 2015 (Jayaram, 2015) compared to 7.2% globally (Mercer, 2016), and are predominantly money-oriented who will job hop with less hesitation (Chew, 2005). Relocation is not an issue to them as it usually does not involve out-of-state move. Even if it did, feelings of alienation and loneliness at the new place may not arise since they are entitled for a generous sum of leaves yearly (up to 14 days of paid leaves and 18 public holidays) (Office Holidays, n.d.-b). For comparison, US professional, technical and related employees are only given 8.5 days of paid leaves on average on top of nine national holidays yearly (Office Holidays, n.d.-a; U.S. Bureau of Labor Statistics, n.d.). Such leeway could be critical in justifying the non-significance association between job strain and social engagement found in the study as Malaysian workers would probably utilize their leaves to go on holiday, return to hometown, or possibly engage in voluntary works. It seems having to work in less than ideal environments may not necessarily hinder their engagement activities due to productive use of

time off from work. In contrast, some polls have suggested that unused vacation is at an all-time high among American employees (Project: Time Off, n.d.).

Social engagement and behavioral and psychological variables

In the third hypothesis, social engagement was expected to correlate positively with physical activity, good dietary behavior, help seeking behavior, self-efficacy, self-esteem, coping effectiveness, and purpose in life. Social engagement was also predicted to correlate negatively with smoking, binge drinking, depression, and stress. These variables can be categorized as either representing behavioral or psychological pathways. For behavioral pathways, which consisted of smoking, binge drinking, physical activity, dietary behavior, and help seeking behavior, only dietary and help seeking behavior exhibited significant relationships. Specifically, a one unit increase in social engagement score resulted in 0.12 and 0.21-point increase in good dietary behavior and help seeking index, respectively. This means that respondents were more likely to adopt low-fat diet and seek help when they were engaged better socially.

In terms of diet, the finding is consistent with previous studies which suggests social participation is associated with higher consumption of fruits and vegetables (Lindström, Hanson, & Wirfält, 2001; Litt, Soobader, & Turbin, 2011). They also found that levels of participation in informal and formal groups correlated strongly with vegetable consumption regardless of socioeconomic status (Lindström et al., 2001; Litt et al., 2011). While dietary habits corroborated earlier literature, help seeking behavior did not. One study considered the relationship between the degree of participation in social activities (e.g., going to church and belonging to clubs) and the frequency and, amount of social contact is unrelated to the discomfort and distress associated with help seeking (Phillips & Murrell, 1994). Nonetheless, it should be noted that Phillips & Murrell's conclusion were derived from interpretation of the relationship's low correlation

coefficient (< 0.08) instead of the typical non-significance *p*-value. They deemed coefficients of less than 0.30 as "unmeaningful" as suggested by Pedhazur (1982).

Though correlation of social engagement with smoking, alcohol, and physical activity have been reported previously (Berkman & Syme, 1979; Cohen, 1988; Cohen, Doyle, Skoner, Rabin, & Gwaltney, 1997; Crittenden et al., 2014; House, Landis, & Umberson, 1988; Umberson, 1987), similar findings did not hold up in this study. One possible reason for that could be due to the sensitivity of the Malays toward smoking and alcohol consumption following their inclination towards the Islamic teachings. Smoking and anything to do with alcohol (e.g. promoting, distributing, selling, and drinking) are forbidden for them as these acts are against the Islamic teachings and punishable under the Islamic penal code. Sentences may include a fine of up to 3000 Malaysian Ringgit, or two years of jail time, or both (Turijan, 2013). Since the Malays accounted for over 90% of the total participants, their responses to questions that are sensitive and taboo such as these are bound to be influenced by social desirability bias. The results showed that only 11.5% of the respondents reported smoking compared to the national rate of 22.8% (Institute for Public Health, 2015b) while a mere 0.5% reported to consume alcohol excessively (i.e. binge drinker) against the national level of 5.0% (Institute for Public Health, 2015a).

Alternatively, the absence of correlation could also be explained by the little to no variation in the smoking and alcohol variables. Variation in these variables would provide multiple markers for the regression test to spot the slope of the true regression line, allowing the coefficients to be estimated more accurately. Thus, the "no effect" found here may have been estimated poorly given the low rates of smokers and alcoholics in the sample. Other explanation could stem from the way these behavioral variables were measured. Determining one's physical

activity dichotomously for example may have been too simplistic to capture the behavior in its entirety and the construct (i.e. physical activity) may not have been fully represented in the current sample.

For psychological pathways, social engagement displayed a significant correlation with the remaining five variables indicated in the hypothesis. Self-efficacy, self-esteem, coping effectiveness, and purpose in life showed positive relationships while depression had a negative association, confirming the stated hypothesis for psychological pathways. Positive coefficients ranged from β=0.52 (purpose in life; scoring range= 18–126), followed by β= 0.75 (self-esteem; scoring range= 9–36), β= 0.80 (self-efficacy; scoring range= 10–40), and β=0.92 (coping effectiveness; scoring range= 0–230) while negative coefficient was recorded at β= -0.80 (depression; scoring range= 0–27). The association of social engagement with self-efficacy, self-esteem, and depression found in the study corroborated previous theoretical claims of their connections (Bassuk et al., 1999; Berkman et al., 2000; Sieber, 1974) and further established empirical evidence of other studies (Berkman & Syme, 1979; Brown & Harris, 2012; Crittenden et al., 2014; Holt-Lunstad, Smith, & Layton, 2010; Reitzes, Mutran, & Verrill, 1995).

While discussion about the impact of social engagement on coping effectiveness and purpose in life are not uncommon in the literature (Bassuk et al., 1999; Berkman et al., 2000; Sieber, 1974; Thoits, 1995), the arguments nonetheless are often made from theoretical or conceptual perspective and lack empirical evidence. To date, no study has tested these relationships scientifically due to a lack of interest from researchers and an ambiguous conceptualization of the constructs. For example, literature on coping behavior thus far have mainly centered on its tie with social support as one of the coping source (Barger, Messerli-Bürgy, & Barth, 2014; Dunkel-Schetter & Folkman, 1987; Gulliver, Hughes, Solomon, & Dey,

1995; Major, Cozzarelli, & Sciacchitano, 1990; McFarlane, Bellissimo, & Norman, 1995). On the other hand, disputes of how to best operationalize the concept of purpose in life has derailed the work in this field (Berkman et al., 2000) leaving critical questions of its importance to social engagement unanswered. This study is one the few works to have attempted in filling the narrow gap left by past research. It was shown in the model that one unit increase in social engagement resulted in 0.92 and 0.52-point increase in respondents' coping effectiveness and purpose in life, respectively. White-collar employees in this sample appear to be more confident enacting coping behaviors and view life purposefully when they are socially engaged and integrated.

Social engagement mediators

The study's final hypothesis specified that all behavioral and psychological variables will mediate the pathways linking social engagement to health. Behavioral variables such as smoking, binge drinking, physical activity, dietary behavior, and help seeking behavior will mediate the behavioral pathways linking social engagement to health while psychological variables such as self-efficacy, self-esteem, coping effectiveness, depression, stress, and purpose in life will mediate the psychological pathways instead. The hypothesis was only partially supported where only depression was found to mediate the association between social engagement and health with indirect effect coefficients of β=0.106 ($p< 0.05$; $R^2= 0.329$).

Social engagement could improve health through depression through a range of mechanisms not explored in this study, including but not limited to social control, more positive and less negative emotions, greater feelings of personal control, and greater self-regard (Berkman et al., 2000; Cohen & Wills, 1985; Cohen, 2004; Crittenden et al., 2014). Being married or getting involved in clubs, societies or religious/voluntary organizations for example, may offer white-collars a much-needed space to engage in their social roles. This in turn could

elicit their sense of responsibility, leadership, empathy and in certain cases, happiness while simultaneously emulating the positive affect and feelings of those around them. Having surrounded oneself in such atmosphere may eventually reduce the impact of depression and promote health. Additionally, engagement activities such as planning and going for a holiday or simply taking a break from mundane routine have been found to provide the sort of joy that dampen depression and improve well-being (Tarumi & Hagihara, 1999; Project: Time Off, n.d.).

Engagement through connections with spouse, relatives, and friends as well as participation in group events has also been shown to predict low depression by altering the concentration of C-reactive protein (CRP) and interleukin-6 (IL-6) (Ford, Loucks, & Berkman, 2006; Loucks, Berkman, Gruenewald, & Seeman, 2006). Persistent high levels of CRP and IL-6 are early indications of cardiovascular disease either because of damaging health practice or disturbance in emotional state. In the case of depression, the vicious cycle of one's emotional turbulence could be disrupted by the positive feelings of being socially engaged, which in the end lower cardiovascular risk.

Nevertheless, these findings contradicted Crittenden et al.'s (2014) conclusion who did not find depression mediating the link between social engagement and health. Instead, they found only happiness to mediate the relationship between social engagement and pulmonary function among other psychological constructs measured (i.e. depression, somatization, anxiety, mastery, self-efficacy, life satisfaction), explaining about 13% of the variance (Sobel test $p <$ .001). They also found that smoking and physical activity were the strongest mediators of the social engagement-pulmonary function connection, accounting 19% and 27% of the variance respectively.

The discrepancies could be ascribed to the different analytical approaches taken in both studies in which SEM was used for the current study as opposed to the Sobel test in the other. The biggest distinction of these two lies in SEM's capability to measure all mediators concurrently while the Sobel test focuses on one level of analysis and one variable at a time. Furthermore, the instrument for physical activity in Crittenden et al. (2014) was not limited to binary responses as utilized in this study, but measured frequency and intensity of work- and leisure-related activities in great detail. Even though similar dichotomous measure was used to assess smoking status in both studies, the social desirability bias faced by the Malaysian white-collars in relation to smoking may have pressured them against providing honest and accurate answers. It could also be that the inconsistencies were caused by the difference in participants' age group between the studies. In this study, emphasis was given on the younger generation of white-collars (mean age= 34.4) while the other sampled older adults aged 70 to 79 years old. Socioemotional theory posits that elders tend to be more focused on their efforts in maintaining emotionally close social ties and nurturing intimate relationships over the spread of their engagement network (Carstensen, 1992; Lang & Carstensen, 1994). Such switch of social priority in later life may in turn alter how social engagement influences health.

Study limitations

The present findings should be considered in view of several limitations. The cross-sectional nature of the current study was a significant barrier to successfully affirm the mediation pathways in the model. Further research is needed to test mediating pathways using a longitudinal study design specifically those of the behavioral pathways because some of the behaviors have been shown previously to facilitate social engagement in influencing health (Crittenden et al., 2014). Since the model was not tested longitudinally, none of the behaviors

exhibited significant mediational effect and empirical support to establish causal inference was also lacking. However, these findings should be interpreted with caution following the use of single indicator latent variables in the full structural model as the approach did not account for the correlated residuals modelled in the CFA models. The single indicators failed to grasp the CFAs' complexity that contributed to the models' excellent fit and the scales' unidimensionality. But such approach was deemed necessary to minimize the measurement error variance of each construct in the model given the study's small sample size. Other than the limitations borne by the research design of this study, the use of SEM in testing these pathways was more advantageous over other mediational tests due to its powerful multivariate technique (Gunzler, Chen, Wu, & Zhang, 2013).

Additionally, the study relied on individual-level survey data and did not take social and environmental factors into account. Information on contextual features such as organizational policy on promotion, in-job training and paid leaves which define the work culture in the company could aid in explicating the non-significant relationship of job strain with social engagement found in the study. This, nonetheless, was inconsequential since the study's chief focus on social engagement downstream links to health outcomes took precedence over its upstream factors. The "mediation" tone set for the study also justified its dependency on individual-level information given that the mediators tested were typically measured through self-reported questionnaires. However, like all past studies using self-reported instruments, this study was unable rule out the potential for response bias even after steps have been taken to minimize demand effect (e.g. conducted in real-world setting, minimal contact with the respondents) and/or maximize honest response (e.g. participant's anonymity). It should also be noted that a couple of instruments used in the study showed low Cronbach's alpha reliability (i.e.

BASE α= 0.59, FHQ α= 0.64). Nevertheless, the self-reported bias and scales' limitation were counterbalanced by the adaptation work done through cognitive interviewing and tested for single dimensionality via CFAs. These processes carried out specifically for the sample of Malaysian white-collar professionals should afford the study with minimal information error.

Furthermore, the sample used in the current study limits generalizability in several ways. While attempts were made to recruit professionals with diverse sociocultural backgrounds, the majority of the participants were Malays. The homogenous sample was the result of SPI's personal contacts enlisted for recruitment being mostly Malay which naturally would have attracted professionals of the same race to respond. Therefore, these results may not be applicable to other groups of ethnic minorities. The participants "younger" mean age of 34.4 also indicates that the findings may not be generalized to mid-life professionals aged 45 to 65 years who could have different outlook towards life given their age (i.e. retirement, health issues) which then would impact other variables tested in the model. Despite these weaknesses, this study was the first to empirically test Berkman's model of social relationship that emphasized on its social engagement concept.

Implications for future research

Findings from the current study offer several future directions. The results extend prior social relationship research by focusing on the social engagement perspective, which is understudied. The study provides initial and tentative empirical support for social engagement determinants, its relationship with health, behavioral, and psychological constructs as well as establishing its pathway to health in a white-collar professional sample.

Because there were several paths that were not significant in the hypothesized structural model, it is recommended that future research explore alternative models to investigate whether a

modified model will better explain the mediators of social engagement, preferably with the inclusion of plausible moderators. With respect to the study sample, since this study was dominated by Malays and young adults, additional studies examining the validity of the Berkman et al.'s (2000) model with a representative and more heterogenous sample of Malaysian white-collars and the Malaysian population in general are warranted. Focus should also be given on the importance of religion in influencing the cultural values of each of the major races in Malaysia and how that have shaped their health behavior particularly those that have direct consequences from it (e.g. alcohol, smoking). Relatedly, further studies targeted on ethnic minorities and specific age-groups are also recommended. This way, the intersection of ethnicity and age with social engagement can be examined. Such studies would help shed additional light on the mechanisms and processes underlying the phenomenon.

Moreover, a closer look should be given to the specific forms of social engagement activities. In this study the focus was given on overall participation by considering a wide range of activities, but further research should test whether some forms of social involvement (e.g. political activity) play a different role in affecting individuals' wellbeing compared to others (e.g. religious participation, volunteering activities, etc.). Future research should also include other potentially relevant behavioral and psychological mediators. Behavior such as adherence to medical treatment and psychological construct such as self-concept and happiness would be a fitting addition to the current model.

Conclusions

The data reported here make several contributions to the existing literature. First, the current study is the first empirical test of Berkman et al.'s (2000) social relationship model in a sample of white-collar professionals. It is also the first to assess social engagement's behavioral and

psychological pathways simultaneously. Results from the structural model analysis revealed that social engagement is not statistically associated with health while age and race affect social engagement. They also demonstrated that social engagement is associated with dietary behavior, help seeking attitude, and several psychological variables (i.e. self-efficacy, self-esteem, coping effectiveness, purpose in life). The data however provided only partial support for the structural model when only depression showed significant mediation effect. The effect accounted for 33% of the association between social engagement and health. While the evidences presented were only partly aligned with the study hypotheses, the identification of the sole mediational pathway through structural equation modelling extended the current literature and theoretical conceptualization of Berkman's model in a way that has never been done before where all mediators were estimated in a single run. Moreover, the findings supported the model's contention that social relationships' influence on health are also possible with social engagement (via depression) and not just reserved for social support like many investigators have assumed (Berkman, Glass, et al., 2000). In view of the fact that social support relies on other individuals to impart its "social goods" which could be inaccessible for some, and how instrumental the construct has been in advancing the public health, the discovery of social engagement as an alternative is timely as those "social goods" are now attainable without having to depend on others but through one's own volition to embrace the ties they are afforded with in real life.

References

Ahluwalia, I., Mack, K., Murphy, W., Mokdad, A., & Bales, V. (2003). State-specific prevalence of selected chronic disease-related characteristics-Behavioral Risk Factor Surveillance System, 2001. *Morbidity and Mortality Weekly Report CDC Surveillance Summaries*, *52*(8). Retrieved from https://www.cdc.gov/Mmwr/preview/mmwrhtml/ss5208a1.htm

Alexopoulos, E., Argyriou, E., Bourna, V., & Bakoyannis, G. (2015). Reliability and validity of the Greek version of the Job Content Questionnaire in Greek health care workers. *Safety and Health at Work*, *6*(3), 233–239.

Antonovsky, A. (1979). *Health, stress and coping: New perspective on mental and physical well-being.* San Francisco, CA: Jossey-Bass.

Ayudurai, D., Yahaya, S. R., & Zainuddin, S. (2002). Malaysia. In M. Zanko (Ed.), *The Handbook of HRM Policies and Practices*. Cheltenham: Edward Egar.

Barger, S. D., Messerli-Bürgy, N., & Barth, J. (2014). Social relationship correlates of major depressive disorder and depressive symptoms in Switzerland: nationally representative cross sectional study. *BMC Public Health*, *14*(1), 273. http://doi.org/10.1186/1471-2458-14-273

Barone, F., Maddux, J., & Snyder, R. (1997). *Social Cognitive Psychology: History and Current Domains*. New York: Plenum Press.

Barth, J., Schneider, S., & von Känel, R. (2010). Lack of social support in the etiology and the prognosis of coronary heart disease: a systematic review and meta-analysis. *Psychosomatic Medicine*, *72*(3), 229–238. http://doi.org/10.1097/PSY.0b013e3181d01611

Bassuk, S. S., Glass, T. A., & Berkman, L. F. (1999). Social disengagement and incident cognitive decline in community- dwelling elderly persons. *Annals of Internal Medicine*, *131*(3), 165–173.

Bath, P. a., & Deeg, D. (2005). Social engagement and health outcomes among older people: Introduction to a special section. *European Journal of Ageing*, *2*(1), 24–30. http://doi.org/10.1007/s10433-005-0019-4

Baumeister, R. F., Campbell, J. D., Krueger, J. I. I., & Vohs, K. D. (2003). Does high self-esteem cause better performance, interpersonal success, happiness, or healthier lifestyles? *Psychological Science in the Public Interest*.

Bennett, K. M. (2005). Psychological wellbeing in later life: the longitudinal effects of marriage, widowhood and marital status change. *International Journal of Geriatric Psychiatry*, *20*(3), 280–4. http://doi.org/10.1002/gps.1280

Bentler, P. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, *107*(2), 238–246.

Bentler, P., & Chou, C. (1987). Practical issues in structural modeling. *Sociological Methods & Research*, *16*(1), 78–117.

Berger, A. N., Saunders, A., Scalise, J. M., & Udell, G. F. (1998). The effects of bank mergers and acquisitions on small business lending. *Journal of Financial Economics*, *50*(2), 187–229. http://doi.org/10.1016/S0304-405X(98)00036-1

Berkman, L. F., Carney, R., Blumenthal, J., Czakowski, S., Hosking, J., Jaffe, A., … Davis, L. (2000). Enhancing recovery in coronary heart disease patients (ENRICHD): Study design and methods. *American Heart Journal*, *139*(1), 1–9.

Berkman, L. F., Glass, T., Brissette, I., & Seeman, T. (2000). From social integration to health: Durkheim in the new millennium. *Social Science & Medicine*, *51*(6), 843–857. http://doi.org/10.1016/S0277-9536(00)00065-4

Berkman, L. F., Leo-Summers, L., & Horwitz, R. I. (1992). Emotional support and survival after myocardial infarction. A prospective, population-based study of the elderly. *Annals of Internal Medicine*, *117*(12), 1003–9.

Berkman, L. F., & Syme, L. (1979). Social Networks, Host Resistance, and Mortality: A Nine-Year Follow-Up Study of Alameda County Residents. *American Journal of Epidemiology*, *109*(2), 186–204.

Besser, T. (2002). *The conscience of capitalism: Business social responsibility to communities*. Westport, CT: Greenwood Publishing Group.

Birkett, N. J., & Boulet, J. (1995). Validation of a food habits questionnaire: poor performance in male manual laborers. *Journal of the American Dietetic Association*, *95*(5), 558–63. http://doi.org/10.1016/S0002-8223(95)00152-2

Black, S. E., & Strahan, P. E. (2002). Entrepreneurship and Bank Credit Availability. *The Journal of Finance*, *57*(6), 2807–2833. http://doi.org/10.1111/1540-6261.00513

Bochner, S. (1994). Cross-cultural differences in the self concept: A test of Hofstede's individualism/collectivism distinction. *Journal of Cross-Cultural Psychology*, *25*(2), 273–283.

Bollen, K. (1989). *Structural equations with latent variables*. New York: Wiley.

Borgatti, S. P., Mehra, A., Brass, D. J., & Labianca, G. (2009). Network analysis in the social sciences. *Science (New York, N.Y.)*, *323*(5916), 892–5. http://doi.org/10.1126/science.1165821

Bourbonnais, R., Brisson, C., Moisan, J., & Vézina, M. (1996). Job strain and psychological distress in white-collar workers. *Scandinavian Journal of Work, Environment & Health*, 139–145.

Bowling, A., & Browne, P. D. (1991). Social networks, health, and emotional well-being among the oldest old in London. *Journals of Gerontology*, *46*(1), S30–S32.

Brewer, D. (2000). Forgetting in the recall-based elicitation of personal and social networks. *Social Networks*, *22*(1), 29–43.

Brissette, I., Cohen, S., & Seeman, T. E. (2000). Measuring Social Integration and Social Networks. In S. Cohen, L. G. Underwood, & B. H. Gottlieb (Eds.), *Social support measurement and intervention: A guide for health and social scientists* (pp. 53–85). New York: Oxford University Press.

Brown, G. W., & Harris, T. (1978). *Social origins of depression: A study of psychiatric disorder in women.* New York: The Free Press.

Burton, R. P. (1998). Global integrative meaning as a mediating factor in the relationship

between social roles and psychological distress. *Journal of Health and Social Behavior*, *39*(3), 201–15.

Buss, D. M. (1996). The Evolutionary Psychology of Human Social Strategies. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social Psychology: Handbook of Basic Principles* (pp. 3–38). New York: Guilford.

Bygren, L. O., Konlaan, B. B., & Johansson, S. E. (1996). Attendance at cultural events, reading books or periodicals, and making music or singing in a choir as determinants for survival: Swedish interview survey of living conditions. *British Medical Journal*, *313*(7072), 1577–1580.

Carstensen, L. L. (1992). Social and emotional patterns in adulthood: Support for socioemotional selectivity theory. *Psychology and Aging*, *7*(3), 331–338. http://doi.org/10.1037//0882-7974.7.3.331

Cassel, J. (1976). Social science in epidemiology: Psychosocial processes and stress theoretical formulation. In E. L. Struening & M. Guttentag (Eds.), *Handbook of evaluation research* (pp. 537–549). London: Sage.

Centola, D. (2010). The spread of behavior in an online social network experiment. *Science*, *329*(5996), 1194–1197.

Centola, D., & Macy, M. (2007). Complex Contagions and the Weakness of Long Ties. *American Journal of Sociology*, *113*(3), 702–734. http://doi.org/10.1086/521848

Chang, P., Wray, L., & Lin, Y. (2014). Social relationships, leisure activity, and health in older adults. *Health Psychology*, *33*(6), 516–523.

Charles, A. (n.d.). Buddhist faith on serving others. Retrieved August 1, 2017, from http://peopleof.oureverydaylife.com/buddhist-faith-serving-others-3804.html

Cheng, S., Leung, E., & Chan, T. (2014). Physical and social activities mediate the associations between social network types and ventilatory function in Chinese older adults. *Health Psychology*, *33*(6), 524–534.

Chesney, M. A., Neilands, T. B., Chambers, D. B., Taylor, J. M., & Folkman, S. (2006). A validity and reliability study of the coping self-efficacy scale. *British Journal of Health Psychology*, *11*(Pt 3), 421–37. http://doi.org/10.1348/135910705X53155

Chew, Y. (2005). Achieving organisational prosperity through employee motivation and retention: A comparative study of strategic HRM practices in Malaysian institutions. *Research and Practice in Human Resource Management*, *13*(2), 87–104.

Christakis, N. A., & Fowler, J. H. (2007). The spread of obesity in a large social network over 32 years. *The New England Journal of Medicine*, *357*(4), 370–9. http://doi.org/10.1056/NEJMsa066082

Cohen, S. (1988). Psychosocial models of the role of social support in the etiology of physical disease. *Health Psychology*, *7*(3), 269–297.

Cohen, S. (2004). Social relationships and health. *The American Psychologist*, *59*(8), 676–84. http://doi.org/10.1037/0003-066X.59.8.676

Cohen, S., Doyle, W. J., Skoner, D. P., Rabin, B. S., & Gwaltney, J. M. (1997). Social ties and

susceptibility to the common cold. *Journal of the American Medical Association*, *277*(24), 1940–1944.

Cohen, S., Gottlieb, B. H., & Underwood, L. G. (2000). Social Relationships and Health. In S. Cohen, L. G. Underwood, & B. H. Gottlieb (Eds.), *Social Support Measurement and Intervention: A Guide for Health and Social Scientists* (pp. 3–25). New York: Oxford University Press.

Cohen, S., & Syme, S. L. (1985). Issues in the Study and Application of Social Support. In S. Cohen & L. Syme (Eds.), *Social Support and Health* (pp. 3–22). New York: Academic.

Cohen, S., & Wills, T. A. (1985). Stress, Social Support, and the Buffering Hypothesis. *Psychological Bulletin*, *98*(2), 310–357.

Coleman, J. (1990). *Foundations of social theory*. Princeton: Harvard University Press.

Cooper, C. L. (1999). Can we live with the changing nature of work? *Journal of Managerial Psychology*, *14*(7/8), 569–572. http://doi.org/10.1108/02683949910292169

Coward, D. D. (1996). Self-transcendence and correlates in a healthy population. *Nursing Research*, *45*(2), 116–121.

Crittenden, C. N., Pressman, S. D., Cohen, S., Janicki-Deverts, D., Smith, B. W., & Seeman, T. E. (2014). Social integration and pulmonary function in the elderly. *Health Psychology : Official Journal of the Division of Health Psychology, American Psychological Association*, *33*(6), 535–43. http://doi.org/10.1037/hea0000029

Crumbaugh, J. (1968). Cross-validation of purpose-in-life test based on Frankl's concepts. *Journal of Individual Psychology*, *24*(1), 74–81.

Crumbaugh, J. C., & Henrion, R. (1988). The PIL Test: Administration, interpretation, uses theory and critique. *International Forum for Logotherapy*, *11*, 72–88.

Crumbaugh, J. C., & Maholick, L. T. (1964). An experimental study in existentialism: The psychometric approach to Frankl's concept of noogenic neurosis. *Journal of Clinical Psychology*, *20*(2), 200–207. http://doi.org/0.1002/1097-4679(196404)20:2<200::AID-JCLP2270200203>3.0.CO;2-U

Davis, K. G., & Heaney, C. A. (2000). The relationship between psychosocial work characteristics and low back pain: underlying methodological issues. *Clinical Biomechanics*, *15*(6), 389–406. http://doi.org/10.1016/S0268-0033(99)00101-1

Dawson, D. A. (1996). Gender differences in the probability of alcohol treatment. *Journal of Substance Abuse*, *8*(2), 211–225. http://doi.org/10.1016/S0899-3289(96)90260-6

Department of Statistics Malaysia. (2016). Malaysia Current Population Estimates, 2014-2016. Retrieved from https://www.dosm.gov.my/v1/index.php?r=column/ctheme&menu_id=L0pheU43NWJwRWVSZklWdzQ4TlhUUT09&bul_id=OWlxdEVoYlJCS0hUZzJyRUcvZEYxZz09

Dunkel-Schetter, C., & Folkman, S. (1987). Correlates of social support receipt. *Journal of Personality and Social Psychology*, *53*(1), 71–80.

Durkheim, E. (1951). *Suicide: A study in sociology.* (J. A. Spaulding & G. Simpson, Eds.).

Economic Planning Unit. (2014). Household Income and Poverty (Table 3). Retrieved from

http://www.epu.gov.my/en/socio-economic/household-income-poverty

Education First: English proficiency index. (2015). Retrieved June 8, 2016, from http://www.ef.edu/epi/regions/asia/malaysia/

Ell, K., Nishimoto, R., Mediansky, L., Mantell, J., & Hamovitch, M. (1992). Social relations, social support and survival among patients with cancer. *Journal of Psychosomatic Research*, *36*(6), 531–541. http://doi.org/10.1016/0022-3999(92)90038-4

Eng, P. M., Rimm, E. B., Fitzmaurice, G., & Kawachi, I. (2002). Social Ties and Change in Social Ties in Relation to Subsequent Total and Cause-specific Mortality and Coronary Heart Disease Incidence in Men. *American Journal of Epidemiology*, *155*(8), 700–709. http://doi.org/10.1093/aje/155.8.700

ENRICHD Investigators. (2001). Enhancing Recovery in Coronary Heart Disease (ENRICHD) study intervention: Rationale and design. *Psychosomatic Medicine*, *63*(5), 747–755.

Everard, K. M., Lach, H. W., Fisher, E. B., & Baum, M. C. (2000). Relationship of activity and social support to the functional health of older adults. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, *55*(4), S208–S212. http://doi.org/10.1093/geronb/55.4.S208

Fahimi, M., Link, M., Schwartz, D., Levy, P., & Mokdad, A. (2008). Tracking Chronic Disease and Risk Behavior Prevalence as Survey Participation Declines: Statistics From the Behavioral Risk Factor Surveillance System and Other National Surveys. *Preventing Chronic Disease*, *5*(3), 1–16.

Faragher, E. B., Cass, M., & Cooper, C. L. (2005). The relationship between job satisfaction and health: a meta-analysis. *Occupational and Environmental Medicine*, *62*(2), 105–12. http://doi.org/10.1136/oem.2002.006734

Federal Constitution, The Commissioner of Law Revision (2010). Retrieved from http://www.agc.gov.my/agcportal/uploads/files/Publications/FC/Federal Consti (BI text).pdf

Finifter, A. W. (1970). Dimensions of Political Alienation. *American Political Science Review*, *64*(2), 389–410. http://doi.org/10.2307/1953840

Fischer, C. S. (1982). *To Dwell Among Friends: Personal Networks in Town and City*. Chicago: University of Chicago Press.

Fischer, C. S., Jackson, R. M., Steuve, C. A., Gerson, K., Jones, L. M., & Baldassare, M. (1977). *Networks and Places*. New York: Free Press.

Ford, E. S., Loucks, E. B., & Berkman, L. F. (2006). Social integration and concentrations of C-reactive protein among US adults. *Annals of Epidemiology*, *16*(2), 78–84. http://doi.org/10.1016/j.annepidem.2005.08.005

Furukawa, T. A. (2010). Assessment of mood: guides for clinicians. *Journal of Psychosomatic Research*, *68*(6), 581–9. http://doi.org/10.1016/j.jpsychores.2009.05.003

Glass, T. A., Mendes De Leon, C., Marottoli, R. A., & Berkman, L. F. (1999). Population based study of social and productive activities as predictors of survival among elderly Americans. *British Medical Journal*, *319*(7208), 478–483.

Granovetter, M. S. (1973). The Strength of Weak Ties. *American Journal of Sociology*, *78*(6),

1360–1380.

Gulliver, S., Hughes, J., Solomon, L., & Dey, A. (1995). An investigation of self-efficacy, partner support and daily stresses as predictors of relapse to smoking in self-quitters. *Addiction*, *90*(6), 767–772.

Gunzler, D., Chen, T., Wu, P., & Zhang, H. (2013). Introduction to mediation analysis with structural equation modeling. *Shanghai Archives of Psychiatry*, *25*(6), 390–394.

Hair, J., Anderson, R., Tatham, R., & Black, W. (1998). *Multivariate data analysis*. New Jersey: Prentice Hall.

Hamermesh, S., & Stancanelli, E. (2014). *Long workweeks and strange hours* (No. 8423). *IZA Discussion Papers*.

Hanifi, R. (2006). Social, cultural and political participation and trust. In L. Iisakke (Ed.), *Social capital in Finland: Statistical review* (pp. 35–44). Helsinki.

Heaney, C. A., & Israel, B. A. (2008). Social Networks and Social Support. In K. Glanz, B. Rimer, & K. Viswanath (Eds.), *Health Behavior and Health Education: Theory, Research and Practice* (4th ed., pp. 189–210). Jossey-Bass.

Heying, C. (1997). Civic Elites and Corporate Delocalization An Alternative Explanation for Declining Civic Engagement. *American Behavioral Scientist*, *40*(5), 657–668.

Hill, E., Mead, N., & Dean, L. (2006). Researching the 60-hour dual-earner workweek: An alternative to the "opt-out revolution." *American Behavioral Scientist*, *49*(9), 1184–1203.

Hinduwebsite. (n.d.). Practising Charity as a Virtue in Hinduism. Retrieved August 1, 2017, from http://www.hinduwebsite.com/editorial/helping-others.asp

Hirsch, B. J. (1979). Psychological dimensions of social networks: A multimethod analysis. *American Journal of Community Psychology*, *7*(3), 263–277. http://doi.org/10.1007/BF00890691

Hirsch, B. J. (1980). Natural support systems and coping with major life changes. *American Journal of Community Psychology*, *8*(2), 159–172. http://doi.org/10.1007/BF00912658

Holt-Lunstad, J., Smith, T. B., & Layton, J. B. (2010). Social relationships and mortality risk: A meta-analytic review. *PLoS Medicine*, *7*(7). http://doi.org/10.1371/journal.pmed.1000316

House, J. S., Landis, K. R., & Umberson, D. (1988). Social relationships and health. *Science (New York, N.Y.)*, *241*(4865), 540–545. http://doi.org/10.1126/science.3399889

House, J. S., Robbins, C., & Metzner, H. L. (1982). The association of social relationships and activities with mortality: Prospective evidence from the tecumseh community health study. *American Journal of Epidemiology*, *116*(1), 123–140.

Hoyle, R., & Panter, A. (1995). Writing about structural equation models. In R. Hoyle (Ed.), *Structural equation modeling: Concepts, issues, and applications* (pp. 158–176). Thousand Oaks: Sage Publications Inc.

Huckfeldt, R., & Sprague, J. (1995). *Citizens, Politics, and Social Communication: Information and Influence in an Election Campaign*. New York: Cambridge University Press.

Hughes, M., & Gove, W. R. (1981). Living Alone, Social Isolation, and Mental Health.

American Journal of Sociology, *87*, 48–74.

Hyman, H., & Wright, C. (1971). Trends in voluntary association memberships of American adults: Replication based on secondary analysis of national sample surveys. *American Sociological Review*, *36*, 191–206.

Hyyppä, M. T., Mäki, J., Alanen, E., Impivaara, O., & Aromaa, A. (2008). Long-term Stability of Social Participation. *Social Indicators Research*, *88*(2), 389–396. http://doi.org/10.1007/s11205-007-9199-y

Iacobucci, D. (2010). Structural equations modeling: Fit indices, sample size, and advanced topics. *Journal of Consumer Psychology*, *20*(1), 90–98.

Institute for Public Health. (2015a). *National Health & Morbidity Survey 2015. Vol. II: Non-Communicable Diseases, Risk Factors & Other Health Problems*. Kuala Lumpur. Retrieved from http://www.iku.gov.my/images/IKU/Document/REPORT/nhmsreport2015vol2.pdf

Institute for Public Health. (2015b). *National Health and Morbidity Survey 2015: Report on Smoking Status Among Malaysian Adults*. Kuala Lumpur. Retrieved from http://www.iku.gov.my/images/IKU/Document/REPORT/NHMS2015-VolumeV.pdf

Jayaram, S. (2015). Key Insights to Attract, Reward and Retain Talent in Malaysia: Aon Hewitt's Views. Retrieved from http://www.hrinasia.com/recruitment/key-insights-to-attract-reward-and-retain-talent-in-malaysia-aon-hewitts-views/

Johnson, B. R., Jang, S. J., De Li, S., & Larson, D. (2000). The "invisible institution" and black youth crime: The church as an agency of local social control. *Journal of Youth and Adolescence*, *29*(4), 479–498.

Kaplan, G. A., Salonen, J. T., Cohen, R. D., Brand, R. J., Syme, S. L., & Puska, P. (1988). Social connections and mortality from all causes and from cardiovascular disease: Prospective evidence from Eastern Finland. *American Journal of Epidemiology*, *128*(2), 370–380.

Karasek, R. (1997). Labor participation and work quality policy: Requirements for an alternative economic future. *Scandinavian Journal of Work, Environment & Health*, *23*(Supplement 4), 55–65.

Karasek, R. A., Gordon, G., & Peitrokovshy, C. (1985). *Job Content Instrument Questionnaire and User's Guide*. New York: Columbia University.

Karasek, R. A. J. (1976). The Impact of the Work Environment on Life Outside the Job. National Technical Information Service, Springfield, Virginia 22151. Retrieved from https://eric.ed.gov/?id=ED142717

Karasek, R. A., & Theorell, T. (1990). *Healthy work: Stress, productivity, and the reconstruction of working life*. New York: Basic Books.

Kawachi, I., & Berkman, L. (2000). Social cohesion, social capital, and health. In L. Berkman & I. Kawachi (Eds.), *Social epidemiology*. Oxford, New York: Oxford University Press.

Kelly, G. A. (1969). *Clinical Psychology and Personality: The Selected Papers of George Kelly*. (B. Maher, Ed.). New York: Wiley.

Kenny, D. (2016). Mediation. Retrieved January 1, 2017, from http://davidakenny.net/cm/mediate.htm

Khan, K. (2011, June 28). The concept of tolerance in Islam. *The Milli Gazette*, p. 28. Retrieved from http://www.milligazette.com/news/1761-the-concept-of-tolerance-in-islam

Kissman, K., & Torres, O. A. (2004). Incarcerated Mothers: Mutual Support Groups Aimed at Reducing Substance Abuse Relapse and Recidivism. *Contemporary Family Therapy*, *26*(2), 217–228. http://doi.org/10.1023/B:COFT.0000031244.80306.54

Klaas, D. (1998). Testing two elements of spirituality in depressed and non-depressed elders. *The International Journal of Psychiatric Nursing Research*, *4*(2), 452–62.

Kline, A. (1996). Pathways into drug user treatment: The influence of gender and racial/ethnic identity. *Substance Use and Misuse*.

Kline, R. B. (2015). *Principles and practice of structural equation modeling.* (Fourth). Guilford publications.

Knight, D. K., Hood, P. E., Logan, S. M., & Chatham, L. R. (1999). Residential treatment for women with dependent children: One agency's approach. *Journal of Psychoactive Drugs*, *31*(4), 339–351.

Kristal, A. R., Shattuck, A. L., & Henry, H. J. (1990). Patterns of dietary behavior associated with selecting diets low in fat: reliability and validity of a behavioral approach to dietary assessment. *Journal of the American Dietetic Association*, *90*(2), 214–20.

Kroenke, K., & Spitzer, R. L. (2002). The PHQ-9: A new depression diagnostic and severity measure. *Psychiatric Annals*, *32*(9), 509–515.

Lakey, B., & Cohen, S. (2000). Social Support Theory and Measurement. In S. Cohen, L. G. Underwood, & B. H. Gottlieb (Eds.), *Social support measurement and intervention: A guide for health and social scientists* (pp. 29–52). New York: Oxford University Press.

Lang, F. R., & Carstensen, L. L. (1994). Close emotional relationships in late life: Further support for proactive aging in the social domain. *Psychology and Aging*, *9*(2), 315–324. http://doi.org/10.1037//0882-7974.9.2.315

Latane, B., & Darley, J. (1970). *The Unresponsive Bystander: Why Doesn't He Help?* Englewood Cliffs, NJ: Prentice-Hall.

Laumann, E. O. (1973). *Bonds of Pluralism*. New York: Wiley.

Lee, M., & Rotheram-Borus, M. J. (2001). Challenges associated with increased survival among parents living with HIV. *American Journal of Public Health*, *91*(8), 1303–1309.

Leedahl, S., & Chapin, R. (2014). Multilevel examination of facility characteristics, social integration, and health for older adults living in nursing homes. *Journals of Gerontology: Series B*, *70*(1), 111–122.

Li, C., Balluz, L. S., Ford, E. S., Okoro, C. A., Zhao, G., & Pierannunzi, C. (2012). A comparison of prevalence estimates for selected health indicators and chronic diseases or conditions from the Behavioral Risk Factor Surveillance System, the National Health Interview Survey, and the National Health and Nutrition Examination Survey, 2007?2008. *Preventive Medicine*, *54*(6), 381–387. http://doi.org/10.1016/j.ypmed.2012.04.003

Lincoln, C. E., & Mamiya, L. H. (1990). *The Black Church in the African Ameircan Experience*. Durham, NC: Duke University Press.

Lincoln, K. D. (2000). Social Support, Negative Social Interactions, and Psychological Well-Being. *Social Service Review*, *74*(2), 231–252.

Lindström, M. (2004). Psychosocial work conditions, social capital, and daily smoking: A population based study. *Tobacco Control*, *13*, 289–295.

Lindström, M. (2005). Ethnic differences in social participation and social capital in Malmö, Sweden: A population-based study. *Social Science & Medicine*, *60*(7), 1527–1546.

Lindström, M., Hanson, B., & Wirfält, E. (2001). Socioeconomic differences in the consumption of vegetables, fruit and fruit juices. *The European Journal of Public Health*, *11*(1), 51–59.

Lindström, M., & The Malmö Shoulder-Neck Study Group. (2006). Psychosocial work conditions, social participation and social capital: A causal pathway investigated in a longitudinal study. *Social Science & Medicine*, *62*(2), 280–291. http://doi.org/10.1016/j.socscimed.2005.06.005

Litt, J., Soobader, M., & Turbin, M. (2011). The influence of social involvement, neighborhood aesthetics, and community garden participation on fruit and vegetable consumption. *American Journal of Public Health*, *101*(8), 1466–1473.

Lofland, L. (1973). *A World of Strangers: Order and Action in Urban Public Space*. New York: Basic Books.

Loucks, E. B., Berkman, L. F., Gruenewald, T. L., & Seeman, T. E. (2006). Relation of social integration to inflammatory marker concentrations in men and women 70 to 79 years. *The American Journal of Cardiology*, *97*(7), 1010–6. http://doi.org/10.1016/j.amjcard.2005.10.043

Lu, L., & Gilmour, R. (2004). Culture and conceptions of happiness: Individual oriented and social oriented SWB. *Journal of Happiness Studies*, *5*(3), 269–291.

Lyon, D. E., & Younger, J. B. (2001). Purpose in Life and Depressive Symptoms in Persons Living with HIV Disease. *Journal of Nursing Scholarship*, *33*(2), 129–133. http://doi.org/10.1111/j.1547-5069.2001.00129.x

MacCallum, R., Browne, M., & Sugawara, H. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods*, *1*(2), 130–149.

MacKinnon, D., Warsi, G., & Dwyer, J. (1995). A simulation study of mediated effect measures. *Multivariate Behavioral Research*, *30*, 41–62.

Major, B., Cozzarelli, C., & Sciacchitano, A. (1990). Perceived social support, self-efficacy, and adjustment to abortion. *Journal of Personality and Social Psychology*, *59*(3), 452–463.

Marquez, B., Elder, J., & Arredondo, E. (2014). Social network characteristics associated with health promoting behaviors among Latinos. *Health Psychology*, *33*(6), 544–553.

McDonald, R., & Ho, M. (2002). Principles and practice in reporting structural equation analyses. *Psychological Methods*, *7*(1), 64–82.

McFarlane, A., Bellissimo, A., & Norman, G. (1995). The role of family and peers in social self-efficacy: links to depression in adolescence. *American Journal of Orthopsychiatry*, *65*(3), 402–410.

Mendes de Leon, C. F. (2003). Social Engagement and Disability in a Community Population of

Older Adults: The New Haven EPESE. *American Journal of Epidemiology*, *157*(7), 633–642. http://doi.org/10.1093/aje/kwg028

Mendes de Leon, C. F., Gold, D. T., Glass, T., Kaplan, L., & George, L. K. (2001). Disability as a function of social networks and support in elderly African Americans and Whites: The Duke EPESE 1986–1992. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *56*(3), S179–S190.

Mercer. (2016). *Workforce Turnover Around the World- Global Edition*. Retrieved from https://www.imercer.com/uploads/Global/wtaw_countrysample.pdf

Milbrath, L., & Goel, M. (1977). *Political participation*. Chicago: Rand McNally.

Milette, K., Hudson, M., Baron, M., & Thombs, B. D. (2010). Comparison of the PHQ-9 and CES-D depression scales in systemic sclerosis: internal consistency reliability, convergent validity and clinical correlates. *Rheumatology (Oxford, England)*, *49*(4), 789–96. http://doi.org/10.1093/rheumatology/kep443

Mitchell, J. C. (1969). *The concept and use of social networks*. Manchester, UK: Manchester University Press.

Mokdad, A., Stroup, D., & Giles, W. (2003). Public Health Surveillance for Behavioral Risk Factors in a Changing Environment: Recommendations from the Behavioral Risk Factor Surveillance Team. *Morbidity and Mortality Weekly Report: Recommendations and Reports*, *52*(9), 1–12.

Morgan, K., Dallosso, H. M., Arie, T., Byrne, E. J., Jones, R., & Waite, J. (1987a). Mental health and psychological well-being among the old and the very old living at home. *British Journal of Psychiatry*, *150*, 801–807.

Morgan, K., Dallosso, H. M., Arie, T., Byrne, E. J., Jones, R., & Waite, J. (1987b). Mental health and psychological well-being among the old and the very old living at home. *The British Journal of Psychiatry*, *150*(6), 801–807. http://doi.org/10.1192/bjp.150.6.801

Moss, D. L. (2008). Antitrust Versus Regulatory Merger Review: The Case of Electricity. *Review of Industrial Organization*, *32*(3–4), 241–261. http://doi.org/10.1007/s11151-008-9174-z

Nelson, D. E., Holtzman, D., Bolen, J., Stanwyck, C. A., & Mack, K. A. (2001). Reliability and validity of measures from the Behavioral Risk Factor Surveillance System (BRFSS). *Sozial-Und Präventivmedizin*, *46 Suppl 1*, S3-42.

Nelson, D., Powell-Griner, E., Town, M., & Kovar, M. (2003). A comparison of national estimates from the national health interview survey and the behavioral risk factor surveillance system. *American Journal of Public Health*, *93*(8), 1335–1341.

Nie, N. H., Powell, G. B., & Prewitt, K. (1969). Social Structure and Political Participation: Developmental Relationships, Part I. *American Political Science Review*, *63*(2), 361–378. http://doi.org/10.1017/S0003055400262278

Noordin, F., Williams, T., & Zimmer, C. (2002). Career commitment in collectivist and individualist cultures: A comparative study. *International Journal of Human Resource Management*, *13*(1), 35–54.

Office Holidays. (n.d.-a). Federal Holidays in USA 2017. Retrieved June 10, 2017, from http://www.officeholidays.com/countries/usa/index.php

Office Holidays. (n.d.-b). Public Holidays in Malaysia 2017. Retrieved June 10, 2017, from http://www.officeholidays.com/countries/malaysia/index.php

Oliver, J. E. (2000). City Size and Civic Involvement in Metropolitan America. *American Political Science Review*, *94*(2), 361–373. http://doi.org/10.2307/2586017

Olsen, M. (1970). Social and political participation of blacks. *American Sociological Review*, *35*, 682–697.

Orth-Gomer, K., Rosengren, A., & Wilhelmsen, L. (1993). Lack of social support and incidence of coronary heart disease in middle- aged Swedish men. *Psychosomatic Medicine*, *55*(1), 37–43.

Otterbach, S. (2010). Mismatches between actual and preferred work time: Empirical evidence of hours constraints in 21 countries. *Journal of Consumer Policy*, *33*(2), 143–161.

Paoli, P., & Litske, H. (1992). *First European survey on the work environment 1991-1992*.

Pedhazur, E. J. (1982). *Multiple regression in behavioral research*. New York: Holt, Rinehart & Winston.

Phillips, M., & Murrell, S. (1994). Impact of psychological and physical health, stressful events, and social support on subsequent mental health help seeking among older adults. *Journal of Consulting and Clinical Psychology*, *62*(2), 270–275.

Pinquart, M., & Duberstein, P. R. (2010). Associations of social networks with cancer mortality: a meta-analysis. *Critical Reviews in Oncology/hematology*, *75*(2), 122–37. http://doi.org/10.1016/j.critrevonc.2009.06.003

Preacher, K. J., & Coffman, D. L. (2006). Computing power and minimum sample size for RMSEA. Retrieved from http://quantpsy.org/

Putnam, D. (1993). *Making democracy work. Civic traditions in modern Italy*. Princeton: Princeton University Press.

Putnam, R. D. (2000). Bowling Alone: America's Declining Social Capital. In *Culture and Politics* (pp. 223–234). New York: Palgrave Macmillan US. http://doi.org/10.1007/978-1-349-62397-6_12

Reed, D. M., Lacroix, A. Z., Karasek, R. A., Miller, D., & Maclean, C. A. (1989). Occupational strain and the incidence of coronary heart disease. *American Journal of Epidemiology*, *129*(3), 495–502. http://doi.org/10.1093/oxfordjournals.aje.a115160

Reisman, D. (1953). *The Lonely Crowd: A Study of the Changing American Character*. Garden City, NY: Doubleday.

Reitzes, D. C., Mutran, E. J., & Verrill, L. A. (1995). Activities and self-esteem: Continuing the development of activity theory. *Research on Aging*, *17*(3), 260–277. http://doi.org/10.1177/07399863870092005

Richardson, L., & Jones, G. (2009). A review of the reliability and validity of the Edmonton Symptom Assessment System. *Current Oncology*, *16*(1), 53–64.

Rogers, E. (1983). *Diffusion of innovations*. New York: The Free Press.

Rook, K. S. (1997). Positive and negative social exchanges: weighing their effects in later life. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, *52*(4), S167-9. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/9224444

Rook, K. S., & Underwood, L. G. (2000). Social Support Measurement and Interventions: Comments and Future Directions. In S. Cohen, L. G. Underwood, & B. H. Gottlieb (Eds.), *Social Support Measurement and Intervention: A Guide for Health and Social Scientists* (pp. 311–334). New York: Oxford University Press.

Rosenberg, M. (1965). *Society and the adolescent self-image*. New Jersey: Princeton University Press.

Rosenberg, M. (1989). *Society and the adolescent self-image.* (Revised). Middeltown, Connecticut: Wesleyan University Press.

Rosenberg, M., & McCullough, C. B. (1981). Mattering: Inferred Significance and Mental Health among Adolescents. *Research in Community and Mental Health*, *2*, 163–182.

Rowley, C., & Abdul-Rahman, S. (2007). The management of human resources in Malaysia: Locally-owned companies and multinational companies. *Management Revue*, *18*(4), 427–453.

Rowley, C., & Abdul-Rahman, S. (2008a). Introduction. In C. Rowley & S. Abdul-Rahman (Eds.), *The Changing Face of Management in South East Asia* (pp. 1–27). Routledge.

Rowley, C., & Abdul-Rahman, S. (2008b). The Changing Face of Management in Malaysia. In C. Rowley & S. Abdul-Rahman (Eds.), *The Changing Face of Management in Malaysia* (pp. 59–96). Routledge.

Sarvimaki, A., & Stenbock-Hult, B. (2000). Quality of life in old age described as a sense of well-being, meaning and value. *Journal of Advanced Nursing*, *32*(4), 1025–1033. http://doi.org/10.1046/j.1365-2648.2000.01568.x

Schmitt, D. P., & Allik, J. (2005). Simultaneous Administration of the Rosenberg Self-Esteem Scale in 53 Nations: Exploring the Universal and Culture-Specific Features of Global Self-Esteem. *Journal of Personality and Social Psychology*, *89*(4), 623–642.

Schnall, P. L., Landsbergis, P. A., & Baker, D. (1994). Job strain and cardiovascular disease. *Annual Review of Public Health*, *15*, 381–411. http://doi.org/10.1146/annurev.pu.15.050194.002121

Schulenberg, S. E. (2004). A Psychometric Investigation of Logotherapy Measures and the Outcome Questionnaire (OQ-45.2). *North American Journal of Psychology*, *6*, 477–492.

Schwarzer, R., Bäßler, J., Kwiatek, P., Schröder, K., & Zhang, J. X. (1997). The assessment of optimistic self-beliefs: Comparison of the German, Spanish, and Chinese versions of the General Self-Efficacy Scale. *Applied Psychology*, *46*(1), 69–88.

Schwarzer, R., Mueller, J., & Greenglass, E. (1999). Assessment of perceived general self-efficacy on the internet: Data collection in cyberspace. *Anxiety, Stress & Coping*, *12*(2), 145–161. http://doi.org/10.1080/10615809908248327

Schwarzer, R., & Schröder, K. (1997). Effects of self-efficacy and social support on postsurgical

recovery of heart patients. *The Irish Journal of Psychology*, *18*(1), 88–103. http://doi.org/10.1080/03033910.1997.10558131

Seeman, T. E., Bruce, M. L., & McAvay, G. J. (1996). Social network characteristics and onset of ADL disability: MacArthur studies of successful aging. *Journal of Gerontology*, *51B*(4), S191–S200.

Seeman, T., & Kaplan, G. (1987). Social network ties and mortality among tile elderly in the Alameda county study. *American Journal of Epidemiology*, *126*(4), 714–723.

Selye, H. (1946). The general adaptation syndrome and the disease of adaptation. *Journal of Clinical Endocrinology*, *6*, 112–230.

Sieber, S. (1974). Toward a theory of role accumulation. *American Sociological Review*, *39*, 567–578.

Simmel, G. (1969). The Great City and Cultural Life. In R. Sennett (Ed.), *Classic Essays on the Culture of Cities* (pp. 26–42). New York: Appleton Century Crofts.

Skevington, S, M., Lotfy, M., & O'connell, K, A. (2004). The World Health Organization â€™ s WHOQOL-BREF quality of life assessment : Psychometric properties and results of the international field trial A Report from the WHOQOL Group. *Quality of Life Research*, *13*(2), 299–310. http://doi.org/10.1023/B:QURE.0000018486.91360.00

Sneed, R., & Cohen, S. (2014). Negative social interactions and incident hypertension among older adults. *Health Psychology*, *33*(6), 554–565.

Sorkin, D., Mavandadi, S., & Rook, K. (2014). Dyadic collaboration in shared health behavior change: The effects of a randomized trial to test a lifestyle intervention for high-risk Latinas. *Health Psychology*, *33*(6), 566–575.

Stansfeld, S. A., Rael, G. S., Head, J., Shipley, M., & Marmot, M. (1997). Social support and psychiatric sickness absence: A prospective study of British civil servants. *Psychological Medicine*, *27*(1), 35–48.

Stokes, J. P. (1985). The relation of social network and individual difference variables to loneliness. *Journal of Personality and Social Psychology*, *48*(4), 981–990. http://doi.org/10.1037/0022-3514.48.4.981

Stone, K. (1995). Impact of Wal-Mart stores on Iowa communities: 1983-93. *Economic Development Review*, *13*(2), 60. Retrieved from http://search.proquest.com/openview/bcf889f7b923bd34d2f6a28998ceebd1/1?pq-origsite=gscholar&cbl=38209

Stride, C. B., Gardner, S., Catley, N., & Thomas, F. (2015). "Mplus code for the mediation, moderation, and moderated mediation model templates from Andrew Hayes" PROCESS analysis examples. Retrieved from http://www.offbeat.group.shef.ac.uk/FIO/mplusmedmod.htm

Stryker, S. (1980). *Symbolic interactionism: A social structural approach.* New Jersey: Caldwell.

Sun, A.-P. (2007). Relapse among Substance-Abusing Women: Components and Processes. *Substance Use and Misuse*, *42*(1), 1–21.

Susskind, R., & Susskind, D. (2015). *The future of the professions: How technology will*

transform the work of human experts. Oxford University Press. Retrieved from https://books.google.com/books?hl=en&lr=&id=iYpmCgAAQBAJ&oi=fnd&pg=PP1&dq=how+technology+change+the+way+we+work&ots=uruK7ADlxW&sig=51jqrBeIoS6JHgS6MSPNQ-jJ6M4

Syme, L. (1989). Control and health: A personal perspective. In A. Steptoe & A. Appels (Eds.), *Stress, personal control and health*. Chichester: Wiley.

Tarumi, K., & Hagihara, A. (1999). An Inquiry into the Causal Relationship among Leisure Vacation, Depression, and Absence from Work. *Journal of UOEH*, *21*(4), 289–307.

Taylor, J., & Turner, R. J. (2001). A Longitudinal Study of the Role and Significance of Mattering to Others for Depressive Symptoms. *Journal of Health and Social Behavior*, *42*(3), 310–325.

Taylor, S. E., & Stanton, A. L. (2007). Coping resources, coping processes, and mental health. *Annual Review of Clinical Psychology*, *3*, 377–401. http://doi.org/10.1146/annurev.clinpsy.3.022806.091520

The State of American Vacation: How Vacation Became A Casualty of Our Work Culture | Project: Time Off. (n.d.). Retrieved June 11, 2017, from http://www.projecttimeoff.com/research/state-american-vacation-2016

The WHOQOL Group. (1998). Development of the World Health Organisation WHOQOL-BREF Quality of Life Assessment. *Psychological Medicine*, *28*(3), 551–558.

Thoits, P. A. (1983). Multiple identities and psychological well-being: a reformulation and test of the social isolation hypothesis. *American Sociological Review*, *48*(2), 174–187. http://doi.org/10.2307/2095103

Thoits, P. A. (1985). Social Support Processes and Psychological Well-Being: Theoretical possibiliites. In I. G. Sarason & B. Sarason (Eds.), *Social Support: Theory, Research and Applications* (pp. 51–72). The Hague: Martinus Nijhoff.

Thoits, P. A. (1986). Social Support as Coping Assistance. *Journal of Consulting and Clinical Psychology*, *54*, 416–423.

Thoits, P. A. (1995). Stress, coping, and social support processes: Where are we? What next? *Journal of Health and Social Behavior*, (Extra Issue), 53–79.

Thoits, P. A. (2003). Personal Agency in the Accumulation of Multiple Role-Identities. In P. J. Burke, T. J. Owens, R. Serpe, & P. A. Thoits (Eds.), *Advances in Identity Theory and Research* (pp. 179–194). New York: Kluwer Academic/Plenum.

Thoits, P. A. (2011). Mechanisms linking social ties and support to physical and mental health. *Journal of Health and Social Behavior*, *52*(2), 145–61. http://doi.org/10.1177/0022146510395592

Thompson, C., & Prottas, D. (2006). Relationships among organizational family support, job autonomy, perceived control, and employee well-being. *Journal of Occupational Health Psychology*, *11*(1), 100–118.

Tolbert, C. M., Lyson, T. A., & Irwin, M. D. (1998). Local Capitalism, Civic Engagement, and Socioeconomic Well-Being. *Social Forces*, *77*(2), 401. http://doi.org/10.2307/3005533

Tonnies, F. (1988). *Community and Society*. New York: Transaction.

Turijan, I. (2013). Denda dan hukuman minum arak. Retrieved June 12, 2017, from https://www.slideshare.net/ejaturijan/denda-dan-hukuman-minum-arak

Turner, R. J., & Lloyd, D. A. (1999). The stress process and the social distribution of depression. *Journal of Health and Social Behavior*, *40*(4), 374–404.

Turner, R. J., & Roszell, P. (1994). Psychosocial Resources and the Stress Process. In W. R. Avison & I. H. Gottlieb (Eds.), *Stress and Mental Health: Contemporary Issues and Prospects for the Future* (pp. 179–210). New York: Plenum Press.

U.S. Bureau of Labor Statistics. (n.d.). Average paid holidays and days of vacation and sick leave for full-time employees. Retrieved June 11, 2017, from https://www.bls.gov/news.release/ebs.t05.htm

U.S. Bureau of Labor Statistics. (2015). Work and play: What do Americans do all day? Average hours spent in primary activity per day. Retrieved November 5, 2016, from http://www.bls.gov/careeroutlook/2015/data-on-display/work-and-play.htm

U.S. Bureau of the Census. (1991). *1990 Census of Population and Housing*. Washington DC.

Uchino, B. N. (2004). *Social support and physical health: Understanding the health consequences of relationships*. *Social Support and Physical Health: Understanding the Health Consequences of Relationships*. Yale University Press.

Uchino, B. N. (2006). Social support and health: A review of physiological processes potentially underlying links to disease outcomes. *Journal of Behavioral Medicine*, *29*(4), 377–387. http://doi.org/10.1007/s10865-006-9056-5

Umberson, D. (1987). Family status and health behaviors: social control as a dimension of social integration. *Journal of Health and Social Behavior*, *28*(3), 306–19.

Umberson, D., & Montez, J. K. (2010). Social relationships and health: A flashpoint for health policy. *Journal of Health and Social Behavior*, *51*(S), S54–S66.

Undén, A.-L. (1996). Social support at work and its relationship to absenteeism. *Work & Stress*, *10*(1), 46–61. http://doi.org/10.1080/02678379608256784

Unger, J. B., McAvay, G., Bruce, M. L., Berkman, L., & Seeman, T. (1999). Variation in the impact of social network characteristics on physical functioning in elderly persons: MacArthur Studies of Successful Aging. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, *54*(5), S245-51.

Vaglio, J., & Conard, M. (2004). Testing the performance of the ENRICHD Social Support Instrument in cardiac patients. *Health and Quality of Life Outcomes*, *2*(1), 24–28.

Vahtera, J. (2000). Effect of change in the psychosocial work environment on sickness absence: a seven year follow up of initially healthy employees. *Journal of Epidemiology & Community Health*, *54*(7), 484–493. http://doi.org/10.1136/jech.54.7.484

Verba, S., & Nie, N. (1972). *Participation in America*. Chicago: University of Chicago Press.

Verba, S., Schlozman, K., & Brady, H. (1995). *Voice and equality: Civic voluntarism in American politics*. Cambridge, MA: Harvard University Press.

Wang, H.-X. (2002). Late-Life Engagement in Social and Leisure Activities Is Associated with a Decreased Risk of Dementia: A Longitudinal Study from the Kungsholmen Project. *American Journal of Epidemiology*, *155*(12), 1081–1087. http://doi.org/10.1093/aje/155.12.1081

Watts, D. J. (1999). *Small Worlds: The Dynamic of Networks Between Order and Randomness*. Princeton University Press.

Watts, D. J., & Strogatz, S. H. (1998). Collective Dynamics of "Small-World" Networks. *Nature*, *393*(6684), 440–442.

Weber, M. (1958). *The City*. Glencoe, IL: Free Press.

West, S., Taylor, A., & Wu, W. (2012). Model fit and model selection in structural equation modeling. In R. Hoyle (Ed.), *Handbook of structural equation modeling* (pp. 209–231). New York: The Guilford Press.

Wethington, E., & Kessler, R. C. (1986). Perceived Support, Received Support, and Adjustment to Stressful Life Events. In S. Cohen & S. L. Syme (Eds.), *Social Support and Health* (pp. 61–82). New York: Academic Press.

Wilkinson, B., Gamble, J., & Humphrey, J. (2001). The new international division of labour in Asian electronics: Work organization and human resources in Japan and Malaysia. *Journal of Management Studies*, *38*(5), 675–695.

Williams, L., Vandenberg, R., & Edwards, J. (2009). Structural equation modeling in management research: A guide for improved analysis. In J. Walsh & A. Brief (Eds.), *The Academy of Management Annals, Volume 3* (pp. 543–604).

Willis, G. B. (2005). *Cognitive Interviewing: A Tool for Improving Questionnaire Design*. California: Thousand Oaks: Sage Publications.

Wills, T. A. (1985). Supportive functions of interpersonal relationships. In S. Cohen & S. L. Syme (Eds.), *Social support and health* (pp. 61–82). New York: Academic Press.

Wills, T. A., & Cleary, S. D. (1996). How are social support effects mediated: A test for parental support and adolescent substance use. *Journal of Personality and Social Psychology*, *71*, 937–952.

Wilson, C. J., Deane, F. P., Ciarrochi, J., & Rickwood, D. (2005). Measuring help-seeking intentions: Properties of the general help-seeking questionnaire. *Canadian Journal of Counselling*, *39*(1), 15–28.

Wirth, L. (1969). Urbanism as a Way of Life. In R. Sennett (Ed.), *Classic Essays on the Culture of Cities* (pp. 67–83). New York: Appleton Century Crofts.

Wittkampf, K. A., Naeije, L., Schene, A. H., Huyser, J., & van Weert, H. C. (2007). Diagnostic accuracy of the mood module of the Patient Health Questionnaire: a systematic review. *General Hospital Psychiatry*, *29*(5), 388–95. http://doi.org/10.1016/j.genhosppsych.2007.06.004

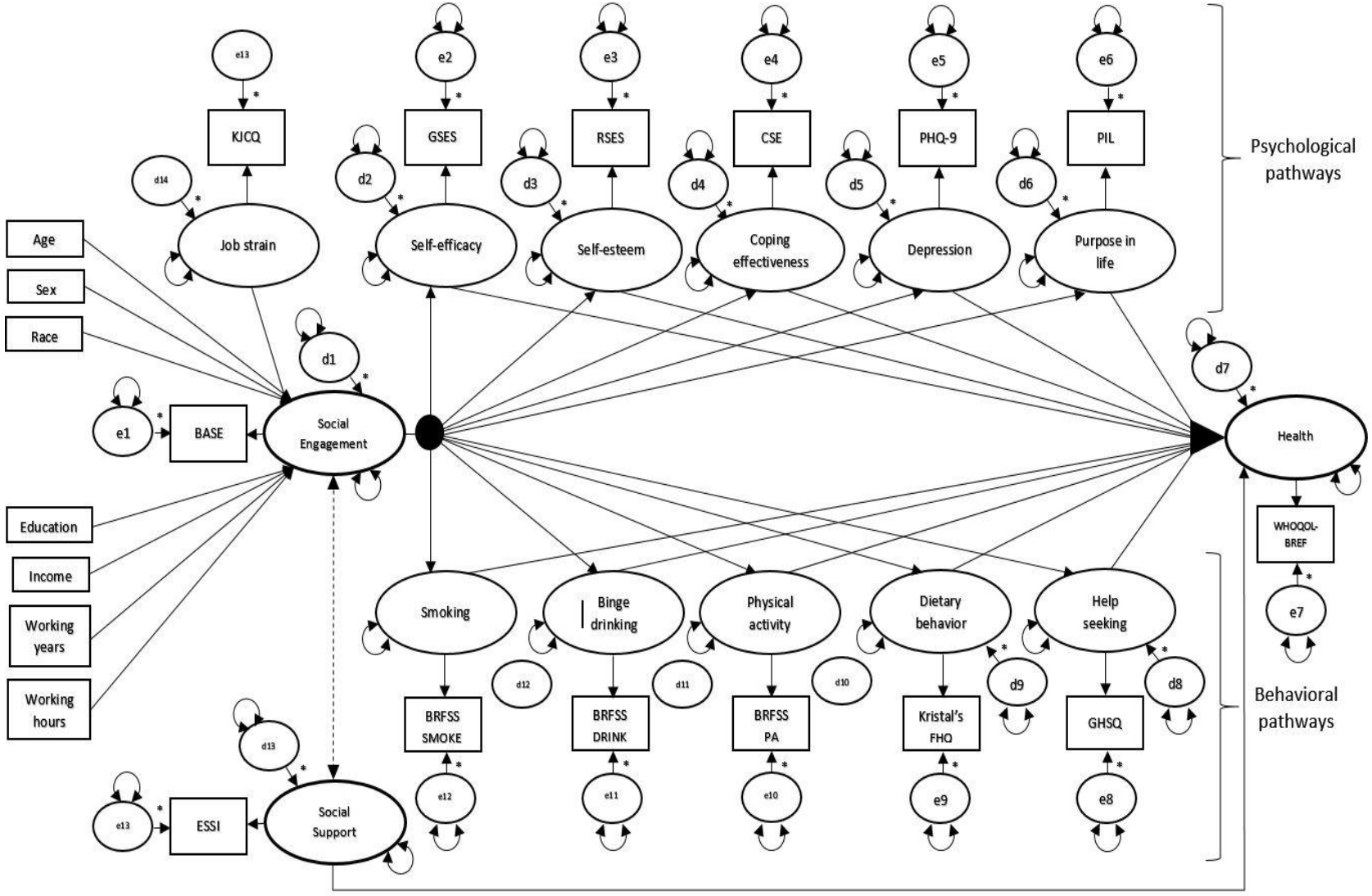
Wood, S. (2002). The Limits to Portfolio Restructuring: Lessons from Regional Consolidation in the US Department Store Industry. *Regional Studies*, *36*(5), 515–529. http://doi.org/10.1080/00343400220137128

Wright, C., & Hyman, H. (1958). Voluntary association memberships of American adults: Evidence from national sample surveys. *American Sociological Review*, *23*, 284–294.

Zika, S., & Chamberlain, K. (1992). On the relation between meaning in life and psychological well-being. *British Journal of Psychology*, *83*(1), 133–145. http://doi.org/10.1111/j.2044-8295.1992.tb02429.x

Zunzunegui, M. V., Koné, A., Johri, M., Béland, F., Wolfson, C., & Bergman, H. (2004). Social networks and self-rated health in two French-speaking Canadian community dwelling populations over 65. *Social Science and Medicine*, *58*(10), 2069–2081. http://doi.org/10.1016/j.socscimed.2003.08.005

Appendix A: Berkman's Analytical Model



Appendix B: IRB Approval Letter

UNIVERSITY of WISCONSIN
UWMILWAUKEE
Department of University Safety & Assurances

Melody Harries
IRB Administrator
Institutional Review Board
Engelmann 270
P. O. Box 413
Milwaukee, WI 53201-0413
(414) 229-3182 *phone*
(414) 229-6729 *fax*

http://www.irb.uwm.edu
harries@uwm.edu

New Study - Notice of IRB Expedited Approval

Date: July 5, 2016

To: Amy Harley, PhD
Dept: Zilber School of Public Health

CC: Ahmad Iqmer Nashriq Mohd Nazan

IRB#: 16.334
Title: Social Engagement and Health: A Structural Equation Modelling Analysis of Downstream Links to Health Outcomes among White-collar Professionals

After review of your research protocol by the University of Wisconsin – Milwaukee Institutional Review Board, your protocol has been approved as minimal risk Expedited under Category 7 as governed by 45 CFR 46.110.

This protocol has been approved on **July 5, 2016** for one year. IRB approval will expire on **July 4, 2017**. If you plan to continue any research related activities (e.g., enrollment of subjects, study interventions, data analysis, etc.) past the date of IRB expiration, a continuation for IRB approval must be filed by the submission deadline. If the study is closed or completed before the IRB expiration date, please notify the IRB by completing and submitting the Continuing Review form found in IRBManager.

Any proposed changes to the protocol must be reviewed by the IRB before implementation, unless the change is specifically necessary to eliminate apparent immediate hazards to the subjects. It is the principal investigator's responsibility to adhere to the policies and guidelines set forth by the UWM IRB, maintain proper documentation of study records and promptly report to the IRB any adverse events which require reporting. The principal investigator is also responsible for ensuring that all study staff receive appropriate training in the ethical guidelines of conducting human subjects research.

As Principal Investigator, it is your responsibility to adhere to UWM and UW System Policies, and any applicable state and federal laws governing activities which are independent of IRB review/approval (e.g., FERPA, Radiation Safety, UWM Data Security, UW System policy on Prizes, Awards and Gifts, state gambling laws, etc.). When conducting research at institutions outside of UWM, be sure to obtain permission and/or approval as required by their policies.

Contact the IRB office if you have any further questions. Thank you for your cooperation and best wishes for a successful project.

Respectfully,
Melody Harries
Melody Harries
IRB Administrator

Appendix C: Recruitment Email

University of Wisconsin – Milwaukee

You are invited to participate in a research study aims at understanding the relationship between social engagement and health. Data gathered from this study will provide critical information on the possible links between social engagement and health.

You have been asked to participate because you are a white-collar professional and/or employee aged 18 years and above whose jobs is done in an office instead of a factory or warehouse, and generally do not involve manual labor.

The surveys will take approximately 30 minutes to complete. However, you are not required to complete the entire survey in one session. A save feature allows you to save what has been entered and return later to continue. To compensate for your time and contribution, you will be offered an RM10 cash reward following completion of all questions.

Please follow the link below to get started.

https://www.surveymonkey.com/r/EngagementAndHealth

You may need to copy and paste the link into a new browser URL window if you receive an error when clicking on the link in this e-mail.

Appendix D: Demographics, Job Content Questionnaire and Path Diagram

Demographics

Gender: (*Circle*): Male / Female Age: _____

Job title/position: _____ Race/Ethnicity: _____

What is the highest level of education you have completed?

- □ SPM or equivalent
- □ Diploma or equivalent
- □ Bachelor's degree or equivalent
- □ Postgraduate degree/ Professional training or equivalent
- □ Refused/ Unknown

Job description

What is your approximate average monthly income: _____

How long have your worked at the current company or organization: _____

In a typical day, about how many hours (not limited to office hours) do you spend doing work related tasks: _____

JCQ3: At work, I have the opportunity to learn new skills

- □ Strongly disagree
- □ Disagree
- □ Agree
- □ Strongly agree
- □ Refused/ Unknown

JCQ4: My work includes some repetitive tasks

- □ Strongly disagree
- □ Disagree
- □ Agree
- □ Strongly agree
- □ Refused/ Unknown

JCQ5: My job requires me to be creative

- □ Strongly disagree
- □ Disagree
- □ Agree
- □ Strongly agree
- □ Refused/ Unknown

JCQ6: My job allows me to make decisions for the company or organization I work with

- □ Strongly disagree
- □ Disagree
- □ Agree
- □ Strongly agree
- □ Refused/ Unknown

JCQ7: My work involves high level of knowledge and skills

- □ Strongly disagree
- □ Disagree
- □ Agree
- □ Strongly agree
- □ Refused/ Unknown

JCQ8: At work, I have a lot of freedom to decide how I will do my job

- □ Strongly disagree
- □ Disagree
- □ Agree
- □ Strongly agree
- □ Refused/ Unknown

JCQ9: My work includes a variety of tasks

- □ Strongly disagree
- □ Disagree
- □ Agree
- □ Strongly agree
- □ Refused/ Unknown

JCQ10: At work, I can openly voice my opinions about the things happening there

- □ Strongly disagree
- □ Disagree
- □ Agree
- □ Strongly agree
- □ Refused/ Unknown

JCQ11: At work, I have the opportunity to develop my knowledge and skills

- □ Strongly disagree
- □ Disagree
- □ Agree
- □ Strongly agree
- □ Refused/ Unknown

JCQ19: My job requires me to work fast

- □ Strongly disagree
- □ Disagree
- □ Agree
- □ Strongly agree
- □ Refused/ Unknown

JCQ20: My job requires me to work hard

- □ Strongly disagree
- □ Disagree
- □ Agree
- □ Strongly agree
- □ Refused/ Unknown

JCQ22: At work, I am required to do excessive amount of task

- □ Strongly disagree
- □ Disagree
- □ Agree
- □ Strongly agree
- □ Refused/ Unknown

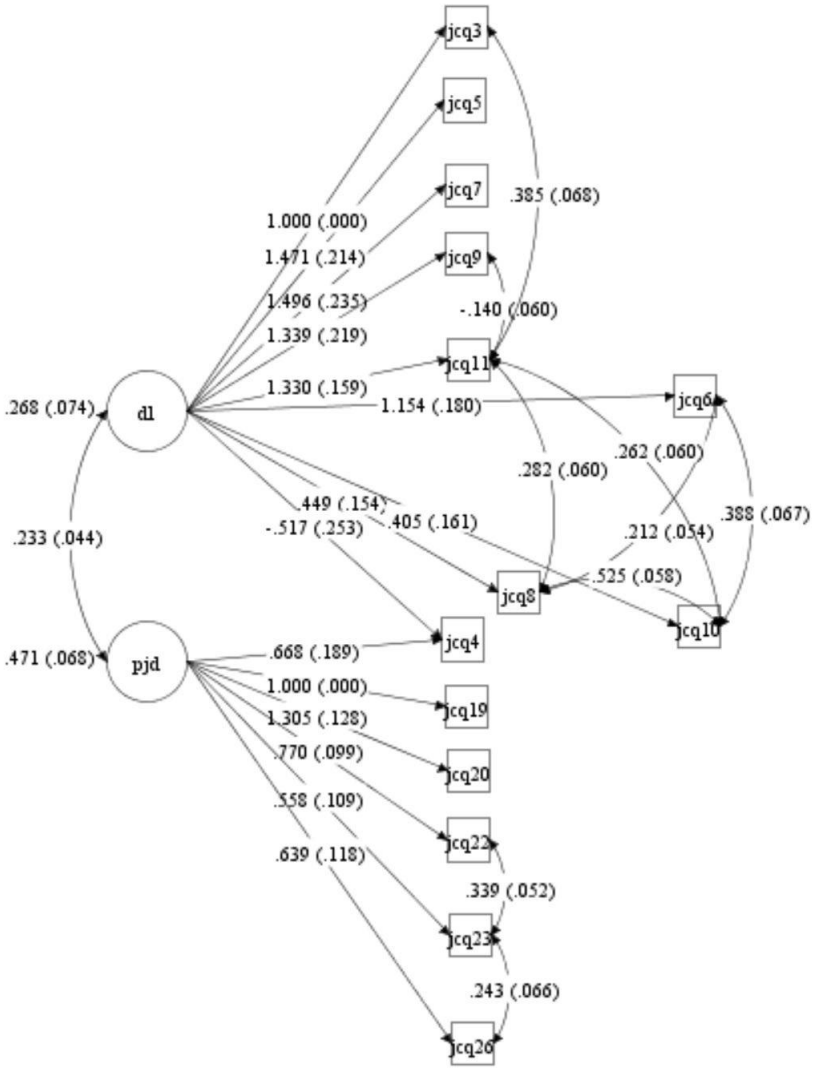
JCQ23: At work, I do not have enough time to finish my job

- □ Strongly disagree
- □ Disagree
- □ Agree
- □ Strongly agree
- □ Refused/ Unknown

JCQ26: At work, I am exposed to conflicting demands from others

- □ Strongly disagree
- □ Disagree
- □ Agree
- □ Strongly agree
- □ Refused/ Unknown

Domain scoring:
Skill Discretion = [JCQQ3 + JCQ5 + JCQ7 + JCQ9 + JCQ11 + (5-JCQ4)] × 2
Decision Authority = [JCQ6 + JCQ10 + (5-JCQ8)] × 4
Decision Latitude = Skill Discretion + Decision Authority
Psychological Job Demands = [(JCQ19 + JCQ20 + JCQ4) × 2 + (15-(JCQ22+JCQ23+JCQ26)) × 2]



JCQ path diagram

Appendix E: World Health Organization Quality of Life Questionnaire and Path Diagram

Physical health

1. To what extent do you feel that physical pain prevents you from doing what you need to do in the last four weeks?
   - □ Not at all
   - □ A little
   - □ A moderate amount
   - □ Very much
   - □ An extreme amount
   - □ Refused/ Unknown

2. How much do you need any medical treatment to function in your daily life in the last four weeks?
   - □ Not at all
   - □ A little
   - □ A moderate amount
   - □ Very much
   - □ An extreme amount
   - □ Refused/ Unknown

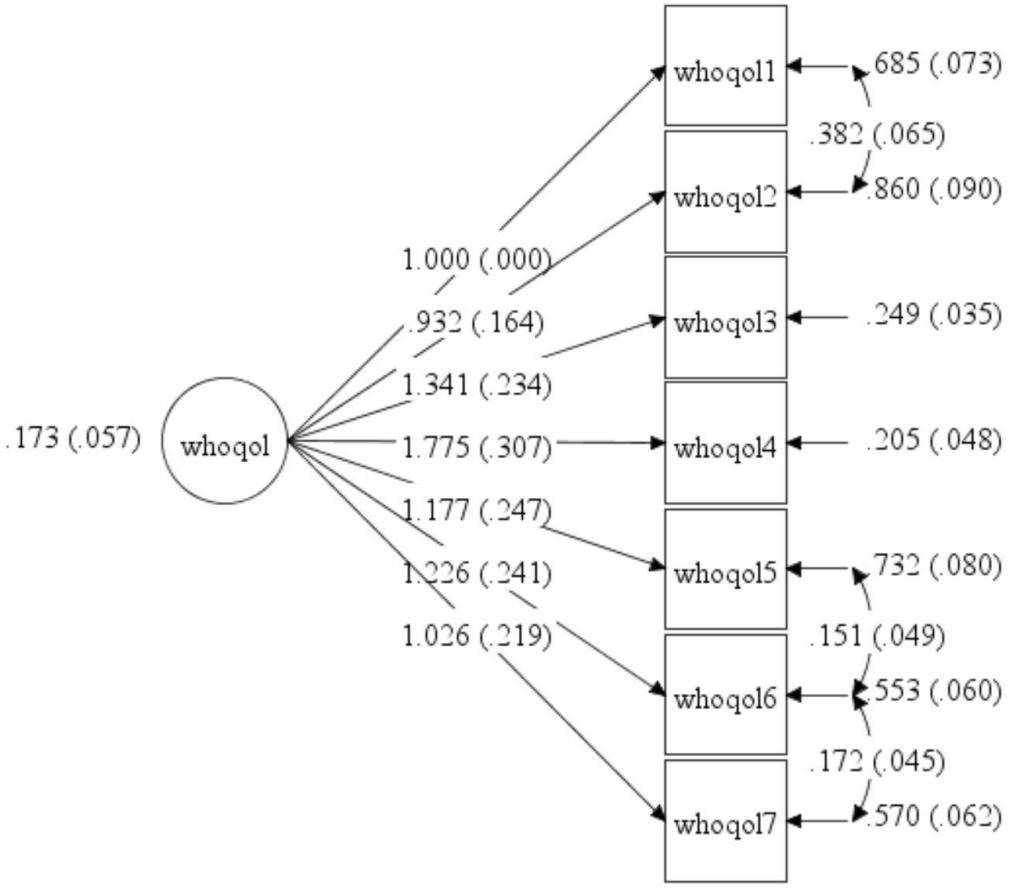
3. Do you have enough energy for everyday life in the last four weeks?
   - □ Not at all
   - □ A little
   - □ A moderate amount
   - □ Very much
   - □ An extreme amount
   - □ Refused/ Unknown

4. How well are you able to get or move around in the last four weeks?
   - □ Very poor
   - □ Poor
   - □ Neither poor nor good
   - □ Good
   - □ Very good
   - □ Refused/ Unknown

5. How satisfied are you with your sleep in the last four weeks?
   - □ Very dissatisfied
   - □ Dissatisfied
   - □ Neither satisfied nor dissatisfied
   - □ Satisfied
   - □ Very satisfied
   - □ Refused/ Unknown

6. How satisfied are you with your ability to perform your daily living activities in the last four weeks?
   - □ Very dissatisfied
   - □ Dissatisfied
   - □ Neither satisfied nor dissatisfied
   - □ Satisfied
   - □ Very satisfied
   - □ Refused/ Unknown

7. How satisfied are you with your capacity for work in the last four weeks?
   - □ Very dissatisfied
   - □ Dissatisfied
   - □ Neither satisfied nor dissatisfied
   - □ Satisfied
   - □ Very satisfied



WHOQOL-BREF path diagram

Appendix F: BRFSS Health Behaviors Questionnaire

Health behavior

Have you smoked at least 100 cigarettes in your entire life? [Note: 1 pack = 20 cigarettes]

- □ Yes
- □ No
- □ Refused/ Unknown

Do you now smoke cigarettes every day, some days, or not at all?

- □ Every day
- □ Some days
- □ Not at all
- □ Refused/ Unknown

During the past 30 days, what is the largest number of alcohol drinks you had on any given occasion?

- □ I don't drink
- □ 1 to 2 drinks
- □ 3 to 4 drinks
- □ 5 or more drinks
- □ Refused/ Unknown

During the past month, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics (gymnastic exercises), golf, gardening, or walking for exercise?

- □ Yes
- □ No
- □ Refused/ Unknown

Appendix G: Kristal's Food Habit Questionnaire and Path Diagram

Fat-Related Diet Habits Questionnaire

NA= not applicable
REF= refused/unknown

Please consider your food choices over the past MONTH
In the past month…

			Usually	Often	Some-times	Rarely or Never	REF
1.	Did you eat chicken?						
	1 YES →	When you ate chicken					
	2 NO	1a. How often was it fried?	1	2	3	4	ref
	3 NA/REF						
		1b. How often did you remove the skin?	1	2	3	4	ref
2.	Did you eat red meat such as beef, or lamb?						
	1 YES →	When you ate red meat					
	2 NO	2a. How often did you trim all					
	3 NA/REF	the visible fat?	1	2	3	4	ref
3.	Did you eat ground meat (e.g. hamburgers, sausages, lasagna's meat sauces)?						
	1 YES →	When you ate ground meat					
	2 NO	3a. How often was it extra lean?	1	2	3	4	ref
	3 NA/REF						
4.	Did you eat fish?						
	1 YES →	When you ate fish					
	2 NO	4a. How often was it fried?	1	2	3	4	ref
	3 NA/REF						
5.	Did you have at least one vegetarian dinner or main meal – that is, without meat, fish, eggs or cheese?						
	1 YES →	5a. How often did you have a					
	2 NO	vegetarian dinner?	1	2	3	4	ref
	3 NA/REF						
6.	Did you eat spaghetti or noodles?						
	1 YES →	When you ate spaghetti or noodles					
	2 NO	6a. How often were they plain (i.e. made					
	3 NA/REF	with just gravy and without meat)?	1	2	3	4	ref
7.	Did you eat cooked vegetables' that is, vegetables that are fried, sautéed etc.?						
	1 YES →	When you ate cooked vegetables					
	2 NO	7a. How often did you add butter,					
	3 NA/REF	margarine or other fat?	1	2	3	4	ref
		7b. How often were they fried?	1	2	3	4	ref

NA= not applicable
REF= refused/unknown

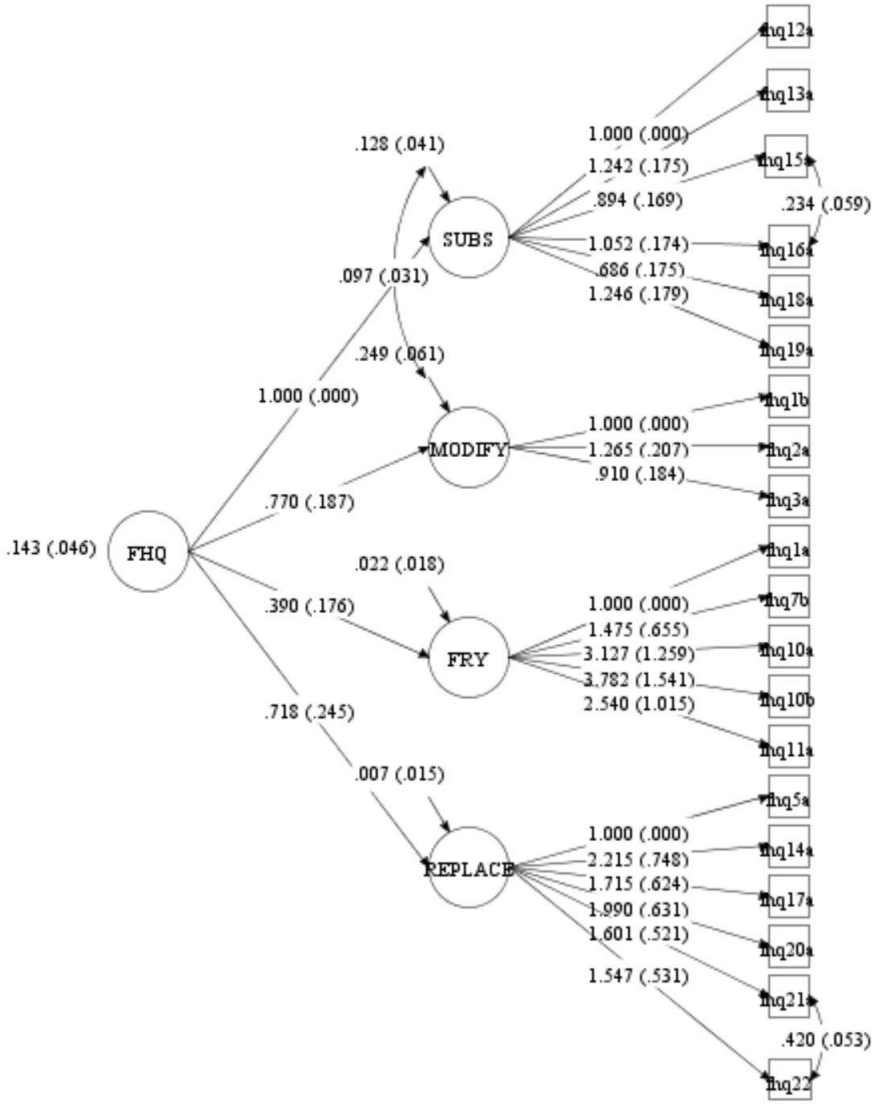
In the past month…

			Usually	Often	Some-times	Rarely or Never	REF
8.	Did you eat rice?						
	1 YES →	When you ate rice?					
	2 NO	8a. How often were they fried	1	2	3	4	ref
	3 NA/REF						
*9.	Did you eat fragrant rice dishes (e.g. nasi lemak, briyani, minyak)?						
	1 YES →	9a. How often did you eat					
	2 NO	those dishes?					
	3 NA/REF		1	2	3	4	ref
10.	Did you eat green salads?						
	1 YES →	When you ate green salads					
	2 NO	10a. How often did you use no					
	3 NA/REF	dressing?	1	2	3	4	ref
		10b. How often did you use low-fat					
		or non-fat dressing?	1	2	3	4	ref
11.	Did you eat bread, rolls or muffins?						
	1 YES →	When you ate bread, rolls or muffins					
	2 NO	11a. How often did you eat them					
	3 NA/REF	without butter or margarine?	1	2	3	4	ref
12.	Did you drink fresh/powdered milk or use milk on cereal						
	1 YES →	When you had milk					
	2 NO	12a. How often was it low-fat or non-fat					
	3 NA/REF	milk?	1	2	3	4	ref
13.	Did you eat cheese, including on sandwiches or in cooking?						
	1 YES →	When you ate cheese					
	2 NO	13a. How often was it specially-made					
	3 NA/REF	low-fat cheese??	1	2	3	4	ref
14.	Did you eat dessert?						
	1 YES →	When you ate dessert					
	2 NO	14a. How often did you eat only	1	2	3	4	ref
	3 NA/REF	fruit?					

NA= not applicable
REF= refused/unknown

In the past month…

			Usually	Often	Some-times	Rarely or Never	REF
15.	Did you eat cookies, cakes or pies baked at home? 1 YES → When you ate cookies, cakes or pies baked at home 2 NO 3 NA/REF	15a. How often were they made with less butter, margarine or oil than the recipe called for?	1	2	3	4	ref
16.	Did you eat frozen desserts like ice cream or sherbet (frozen fruit juice)? 1 YES → When you ate frozen desserts 2 NO 3 NA/REF	16a. How often did you choose yogurt, sherbet or low-fat or non-fat ice cream	1	2	3	4	ref
17.	Did you eat snacks between meals? 1 YES → When you ate snacks between meals 2 NO 3 NA/REF	17a. How often did you eat raw vegetables or fresh fruit?	1	2	3	4	ref
18.	Did you sauté or pan fry any foods? 1 YES → When you sautéed or pan fried foods 2 NO 3 NA/REF	18a. How often did you use non-stick spray instead of oil, margarine or butter?	1	2	3	4	ref
19.	Did you use mayonnaise or mayonnaise-type spread? 1 YES → When you used mayonnaise or mayonnaise type spread 2 NO 3 NA/REF	19a. How often did you choose low-fat or nonfat types?	1	2	3	4	ref
20.	Did you eat breakfast? 1 YES → When you ate breakfast 2 NO 3 NA/REF	20a. How often did you have fresh fruit?	1	2	3	4	ref
21.	Did you eat lunch? 1 YES → When you ate lunch 2 NO 3 NA/REF	21a. How often did you have one or more vegetables, not including potatoes or salad?	1	2	3	4	ref
22.	At dinner (or your main meal), how often did you have two or more vegetables, not including potatoes or salad?		1	2	3	4	ref

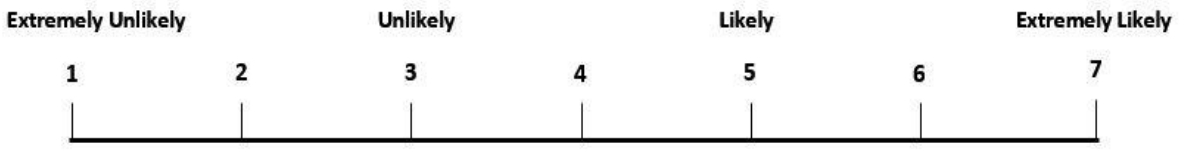


FHQ path diagram

Appendix H: General Help Seeking Questionnaire and Path Diagram

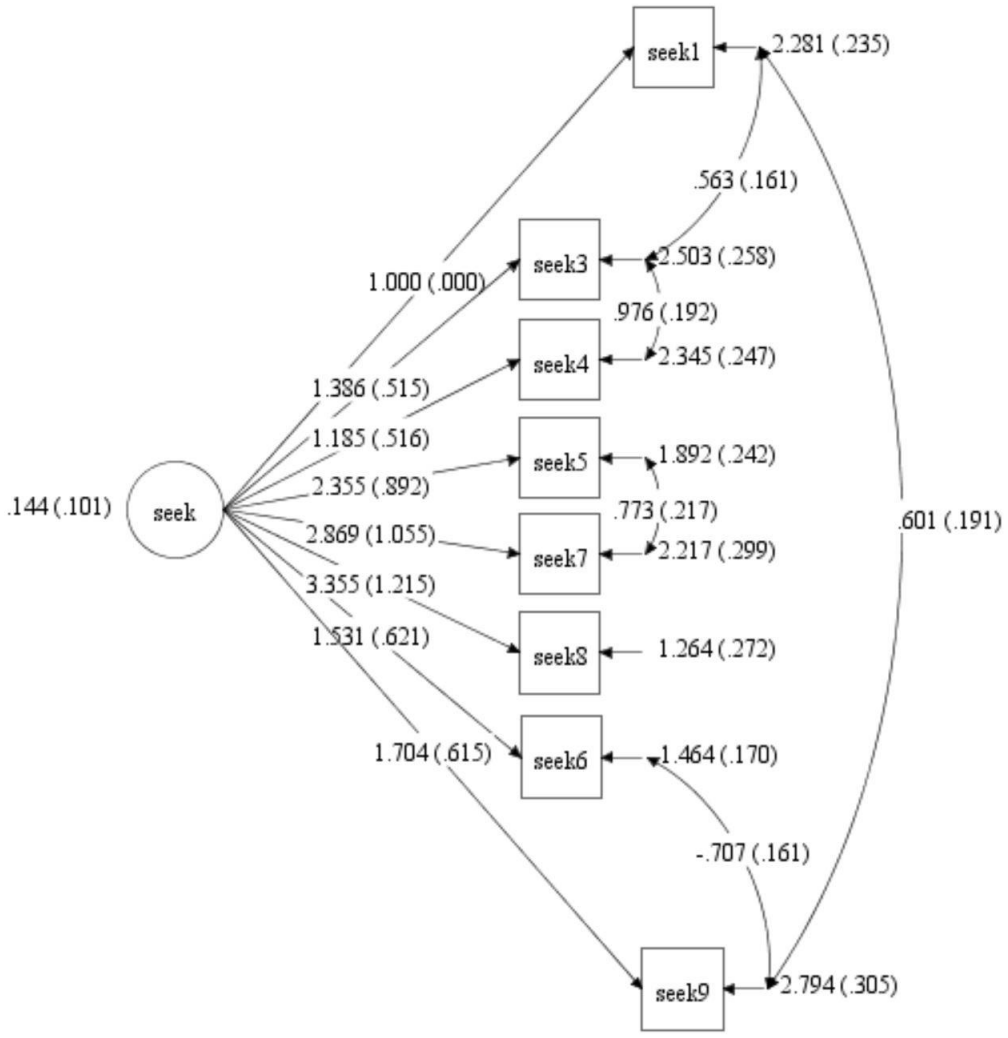
Help-seeking behavior

Please indicate your response by putting the number that best describes your intention to seek help from each help source that is listed.



If you were having a personal or emotional problem, how likely is it that you would seek help from the following people?

1. Intimate partner (e.g., girlfriend, boyfriend, husband, wife, domestic partner)…….. _____
2. Friend (not related to you)…….. _____
3. Parent…… _____
4. Other relative/family member…… _____
5. Mental health professional (e.g. psychologist, social worker, counsellor)…… _____
6. Phone helpline (e.g. Befrienders)…….. _____
7. Doctor/General Practitioner…… _____
8. Religious leader (e.g. Imam, Priest, Swami, Abbot, Gurus)…… _____
9. I would not seek help from anyone…… _____
10. I would seek help from another not listed above (please list in the space provided, (e.g., work colleague. If no, leave blank): _____…….. _____



GHSQ path diagram

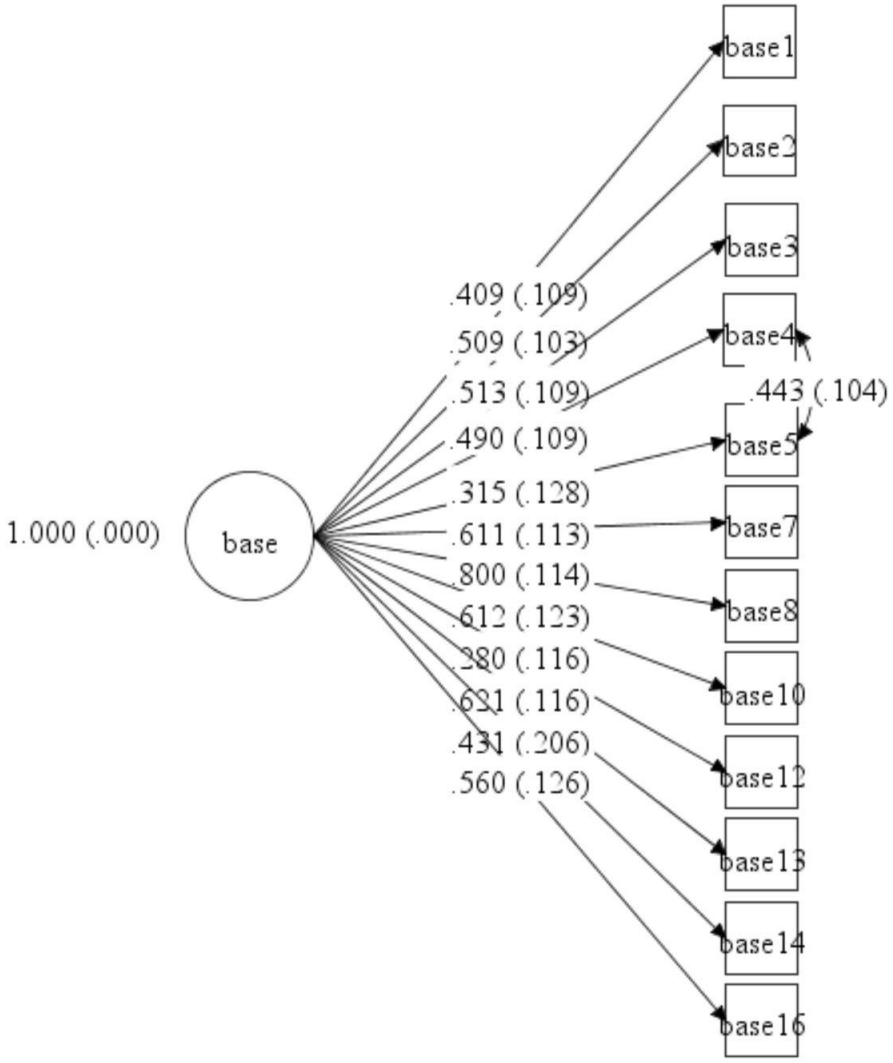
Appendix I: Brief Assessment of Social Engagement Questionnaire and Path Diagram

Social engagement

The following questions asks about your social engagement. Please read the following questions and choose the response that most closely describes your current situation.

		Yes	No	Refused
1.	Are you married?.....	□	□	□
	~~Do you have access to a telephone or mobile phone?~~ [1].....	□	□	□
2.	Have you made a personal phone call in the last week?.....	□	□	□
	~~Do you read or watch the news?~~ [1].....	□	□	□
3.	Do you currently attend religious services, gatherings, or meetings (e.g. congregational prayer, church sermon)?.....	□	□	□
4.	Do you currently attend meetings of any clubs or societies such As social or work group, self-help group, charity, public service, or community group?.....	□	□	□
5.	Are you engaged in voluntary work?.....	□	□	□
6.	Did you vote in the last general and/or local election?.....	□	□	□
7.	Have you been away on holiday in the last year?.....	□	□	□
8.	Are you planning to go on holiday within the next year?.....	□	□	□
9.	Do you use library?.....	□	□	□
10.	Do you have access to a vehicle?.....	□	□	□
11.	Do you have access to public transportations?.....	□	□	□
	~~Do you have access to television, radio or internet?~~ [1].....	□	□	□
12.	Do you get out and about as much as desired?.....	□	□	□
13.	Are you frequently lonely?.....	□	□	□
14.	Do you know at least one person to approach for help?.....	□	□	□
15.	Do you currently share accommodation (i.e. house, apartment) with individuals other than your family members?.....	□	□	□
16.	Do you have one or more friends/family members/relatives in the district?.....	□	□	□
17.	Do you have sufficient contact/communication with friends/ family members/relatives?.....	□	□	□
18.	Do you have any physical limitations that prevent you from moving around?*.....	□	□	□

[1] Dropped due to zero variance responses. Only "yes" responses were recorded.

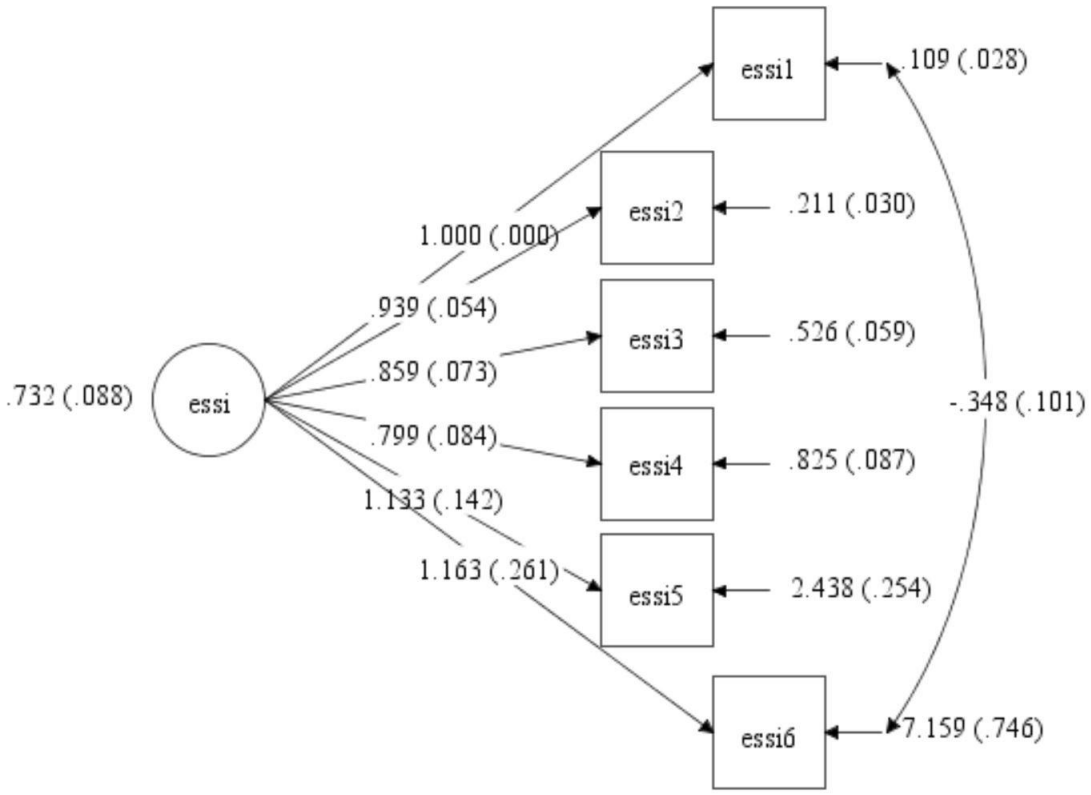


BASE path diagram

Appendix J: ENRICHD Social Support Instrument and Path Diagram

Social support

	None of the time	A little of the time	Some of the time	Most of the time	All of the time
1. Is there someone available to whom you can count on to listen to you when you need to talk? …….	□	□	□	□	□
2. Is there someone available to you to give you good advice about a problem? ……	□	□	□	□	□
3. Is there someone available to you who shows you love and affection? ……	□	□	□	□	□
4. Is there someone available to help with daily chores? ……..	□	□	□	□	□
5. Can you count on anyone to provide you with emotional support (talking over problems or helping you make a difficult decision)? ……..	□	□	□	□	□
6. Do you have as much contact as you would like with someone you feel close to, someone in whom you can trust and confide in? ……	□	□	□	□	□

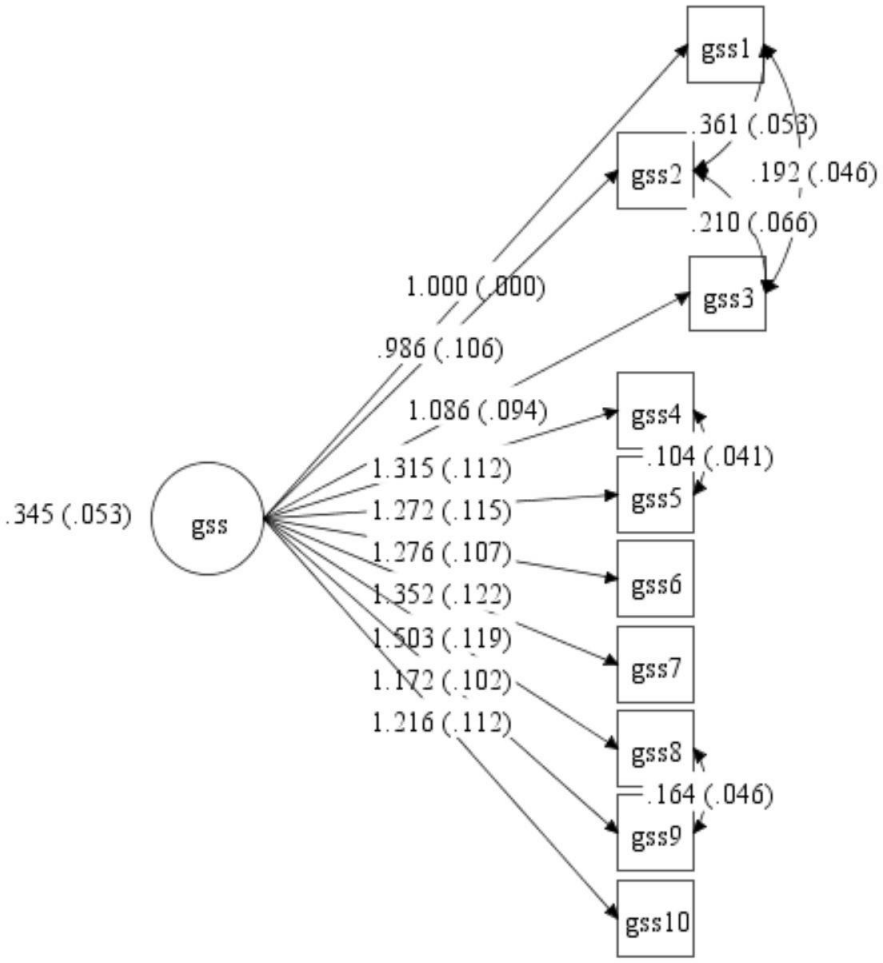


ESSI path diagram

Appendix K: General Self-Efficacy Scale and Path Diagram

Generalized perceived self-efficacy

	Not at all true	Hardly true	Almost true	Very true
1. I can always manage to solve difficult problems if I try hard enough	□	□	□	□
2. If someone opposes me, I can find means and ways to get what I want	□	□	□	□
3. It is easy for me to stick to my aims and accomplish my goals	□	□	□	□
4. I am confident that I could deal efficiently with unexpected events	□	□	□	□
5. Thanks to my resourcefulness, I know how to handle unforeseen situations	□	□	□	□
6. I can solve most problems if I invest the necessary effort	□	□	□	□
7. I can remain calm when facing difficulties because I can rely on my coping abilities	□	□	□	□
8. When I am confronted with a problem, I can usually find several solutions	□	□	□	□
9. If I am in trouble, I can usually think of something to do	□	□	□	□
10. No matter what comes my way, I am usually able to handle it	□	□	□	□



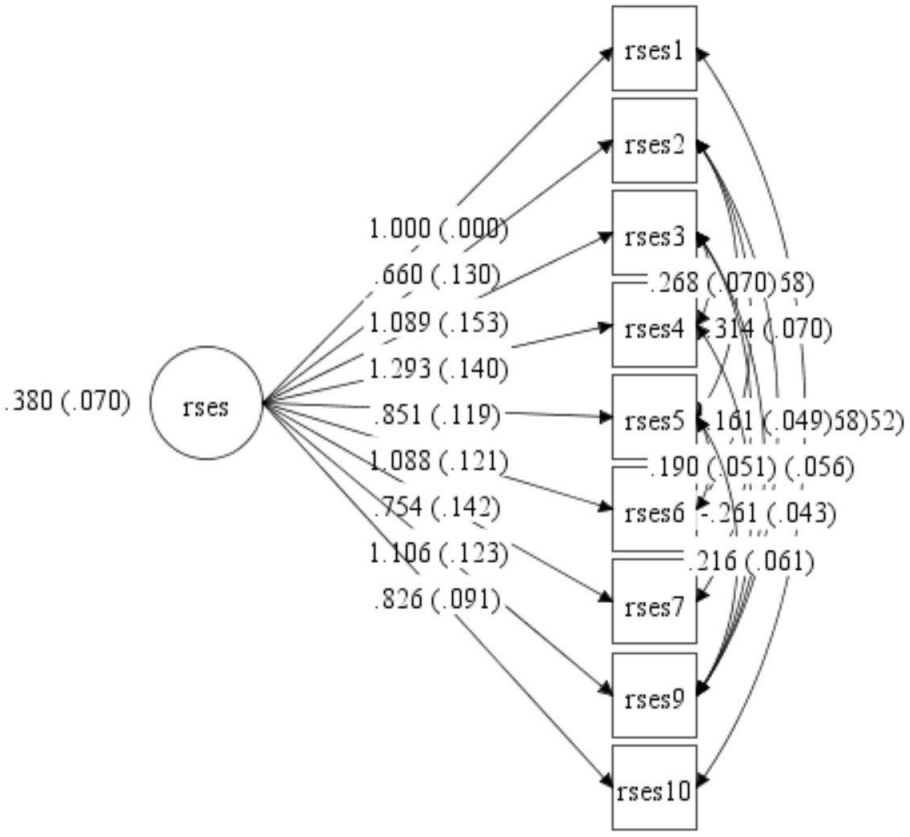
GSS path diagram

Appendix L: Rosenberg Self-Esteem Scale and Path Diagram

Self-esteem

Below is a list of statements dealing with your general feelings about yourself. Please indicate how strongly you agree or disagree with each statement.

	Strongly Agree	Agree	Disagree	Strongly Disagree
1. On the whole, I am satisfied with myself.....	□	□	□	□
2. At times I think I am no good at all.....	□	□	□	□
3. I feel that I have a number of good qualities.....	□	□	□	□
4. I am able to do things as well as most other people.....	□	□	□	□
5. I feel I do not have much to be proud of.....	□	□	□	□
6. I certainly feel useless at times.....	□	□	□	□
7. I feel that I'm a person of worth, at least on an equal plane with others.....	□	□	□	□
8. I wish I could have more respect for myself.....	□	□	□	□
9. All in all, I am inclined to feel that I am a failure.....	□	□	□	□
10. I take a positive attitude toward myself.....	□	□	□	□

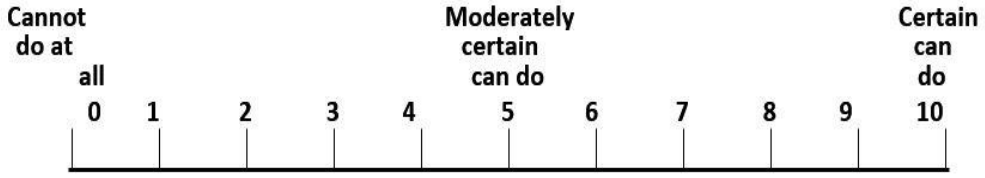


RSES path diagram

Appendix M: Coping Self-Efficacy Scale and Path Diagram

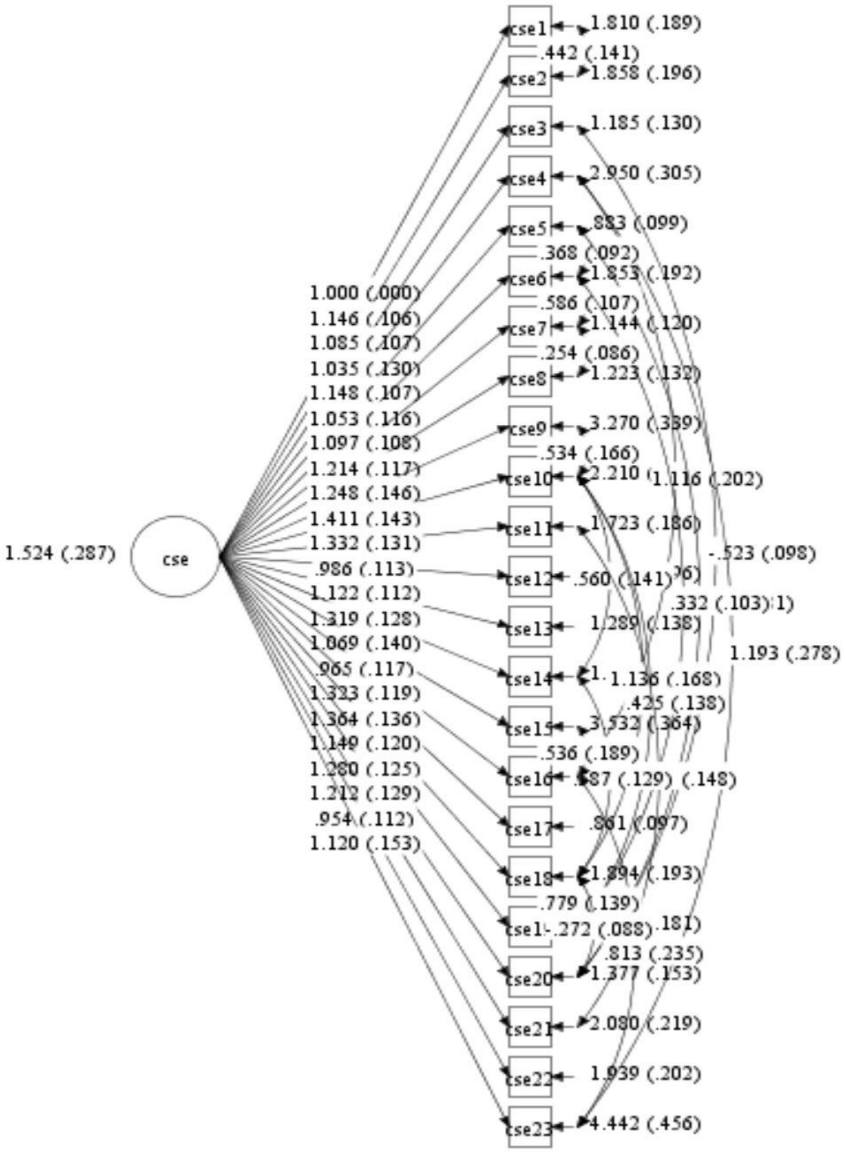
Coping effectiveness

For each of the following items, write a number from 0-10, using the scale below.



When things aren't going well for you, how confident are you that you can:

1. Bounce back from feeling sad or discouraged..... _____
2. Talk positively to yourself..... _____
3. Sort out what can be changed, and what cannot be changed..... _____
4. Get emotional support from friends and family..... _____
5. Find solutions to your most difficult problems..... _____
6. Break an upsetting problem down into smaller parts..... _____
7. Leave options open when things get stressful..... _____
8. Make a plan of action and follow it when confronted with a problem. ..... _____
9. Develop new hobbies or recreations..... _____
10. Take your mind off unpleasant thoughts..... _____
11. Look for something good in a negative situation..... _____
12. See things from the other person's point of view during a heated argument..... _____
13. Try other solutions to your problems if your first solutions don't work..... _____
14. Stop yourself from being upset by unpleasant thoughts..... _____
15. Make new friend..... _____
16. Get friends to help you with the things you need. ..... _____
17. Do something positive for yourself when you are feeling discouraged..... _____
18. Make unpleasant thoughts go away..... _____
19. Think about one part of the problem at a time. ..... _____
20. Visualize a pleasant activity or place. ..... _____
21. Keep yourself from feeling lonely. ..... _____
22. Pray or meditate. ..... _____
23. Get emotional support from community organizations or resources. ..... _____
24. Stand your ground and fight for what you want. ..... _____
25. Resist the impulse to act emotionally when under pressure..... _____



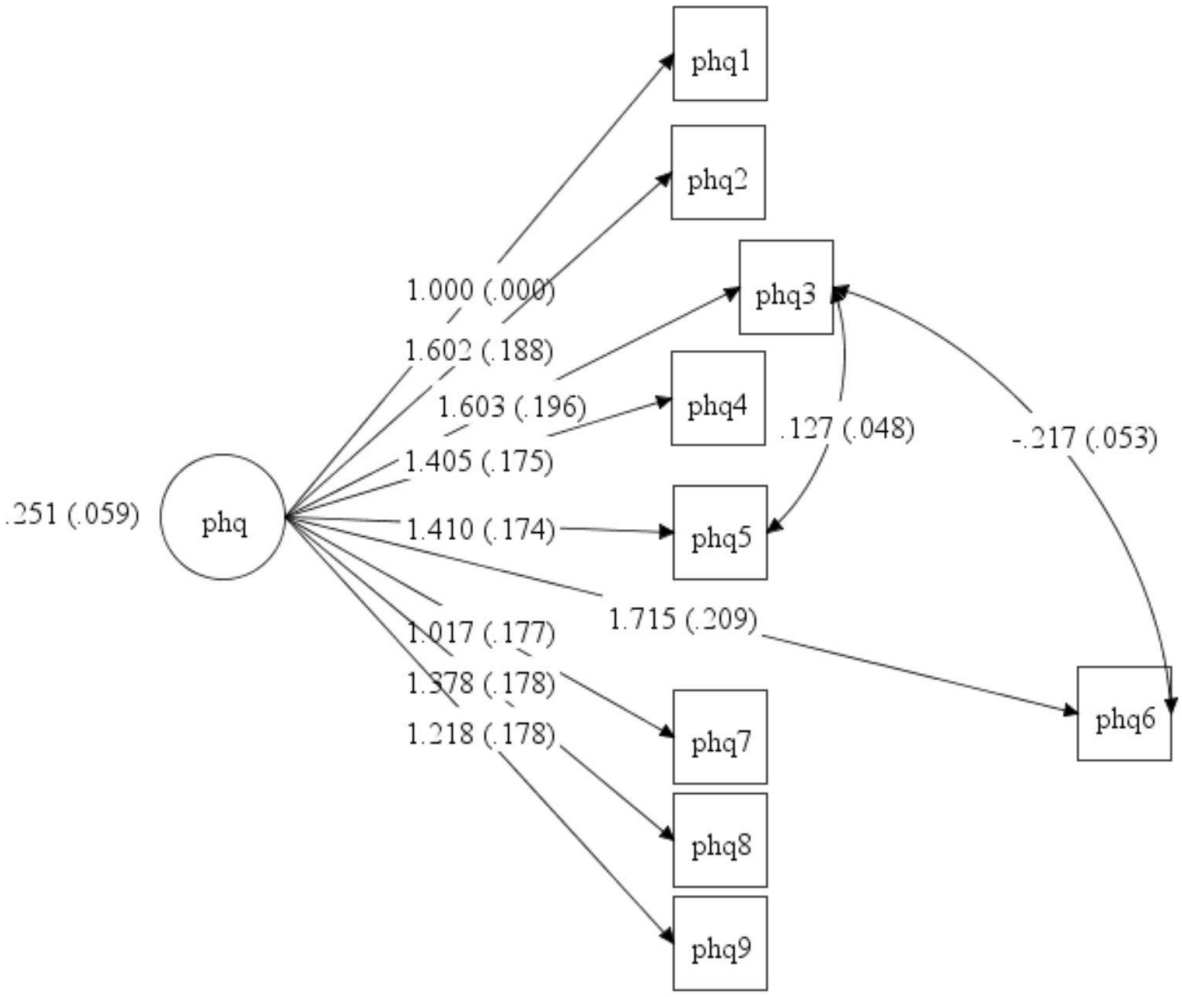
CSE path diagram

Appendix N: Patient Health Questionnaire Depression Scale and Path Diagram

Depression scale

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

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



PHQ9 path diagram

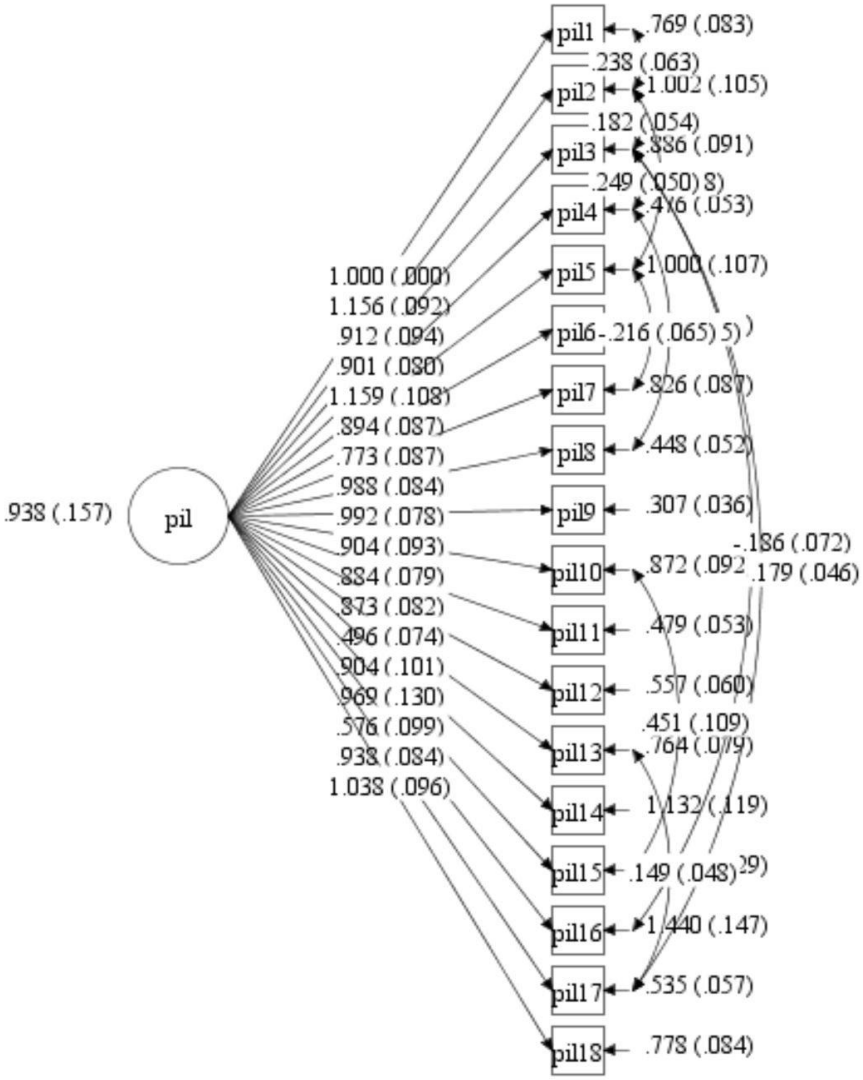
Appendix O: Purpose in Life Scale and Path Diagram

Purpose in life scale

Instructions: Circle the number (1 to 7) next to each statement that is most true for you right now.

1.	I am usually:	1 2 3 4 5 6 7 bored	enthusiastic
2.	Life to me seems:	1 2 3 4 5 6 7 completely routine	always exciting
3.	In life, I have:	1 2 3 4 5 6 7 no goals or aims	clear goals and aims
4.	My personal existence is:	1 2 3 4 5 6 7 utterly meaningless, without purpose	purposeful and meaningful
5.	Every day is:	1 2 3 4 5 6 7 exactly the same	constantly new and different
6.	If I could choose, I would:	1 2 3 4 5 6 7 prefer never to have been born	want 9 more lives just like this one
7.	After retiring, I would:	1 2 3 4 5 6 7 loaf completely the rest of my life	do some of the exciting things I`ve always wanted to
8.	In achieving life goals, I have:	1 2 3 4 5 6 7 made no progress whatever	progressed to complete fulfillment
9.	My life is:	1 2 3 4 5 6 7 empty, filled only with despair	running over with exciting things
10.	If I should die today, I'd feel that my life has been:	1 2 3 4 5 6 7 completely worthless	very worthwhile
11.	In thinking of my life, I:	1 2 3 4 5 6 7 often wonder why I exist	always see reasons for being here
12.	As I view the world in relation to my life, the world:	1 2 3 4 5 6 7 completely confuses me	fits meaningfully with my life
13.	I am a:	1 2 3 4 5 6 7 very irresponsible person	very responsible person
14.	Concerning freedom to choose, I believe humans are:	1 2 3 4 5 6 7 completely bound by limitations of heredity and environment	totally free to make all life choices
15.	With regard to death, I am:	1 2 3 4 5 6 7 unprepared and frightened	prepared and unafraid
16.	Regarding suicide, I have:	1 2 3 4 5 6 7 thought of it seriously as a way out	never given it a second thought

17. I regard my ability to find a purpose or mission in life as:	1 2 3 4 5 6 7 practically none	very great
18. My life is:	1 2 3 4 5 6 7 out of my hands and controlled by external factors	in my hands and I`m in control of it
19. Facing my daily tasks is:	1 2 3 4 5 6 7 a painful and boring experience	a source of pleasure and satisfaction
20. I have discovered:	1 2 3 4 5 6 7 no mission or purpose in life	a satisfying life purpose



PIL path diagram

Curriculum Vitae

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Area of Specialization	Community and Behavioral Health Promotion
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Academic Qualification

Master of Public Health (MPH), 2012
Concentration in Health Behavior and Promotion
University of Illinois at Urbana Champaign, USA
CGPA 3.80

Bachelor of Optometry (Hons.), 2009
International Islamic University Malaysia, Malaysia
CGPA 3.34

Professional Experiences

Junior Faculty Member
Faculty of Medicine and Health Sciences, Universiti Putra, Malaysia.
December 2010 - present

Intern
Illinois Campaign for Better Health Care, Champaign, IL.
January – May 2012

Research Assistant
Faculty of Human Ecology, Universiti Putra Malaysia
April – August 2009

Intern
Eye Specialist Clinic, Department of Ophthalmology, Ampang Hospital, Selangor, Malaysia.
May – June 2008

Intern
Spectacles and Contact Lenses Centre, Syam Optical Centre, Kuala Lumpur Malaysia
July – August 2008

Language Proficiency

Bahasa Melayu	Malaysian Certificate of Education 1A
English	Malaysian Certificate of Education 2A, TOEFL iBT: 120
Advanced Arabic	Malaysian Certificate of Education 3B

Research Experience

2015-2017	Social Engagement and Health: A Structural Equation Modelling Analysis of Downstream Links to Health Outcomes Among White-Collar Professionals
2011-2012	Impact of Obesity and Weight Changes on Disability and Mortality in Brazilian Elderly
2008-2009	Comparison of Van Herick Measurement Outcome with Actual Anterior Chamber Angle Using Pentacam

Publications

Kim, S. Y., Fouad, N., Maeda, H., Xie, H., & **Nazan, N**. (2017). Midlife Work and Psychological Well-Being: A Test of the Psychology of Working Theory. *Journal of Career Assessment*, 1-12.

Drumond Andrade, F. C., **Mohd Nazan, A. I. N**., Lebrão, M. L., & Oliveira Duarte, Y. A. D. (2013). The impact of body mass index and weight changes on disability transitions and mortality in Brazilian older adults. *Journal of Aging Research*, Article ID 905094, 11 pages.

Conferences, Seminars, and Professional Development Courses

Conference

2015	Presenter, American Public Health Association 2015 Annual Meeting and Expo, Chicago, Illinois, USA.
2014	Presenter, Education Malaysia Postgraduate Colloquium, Chicago, Illinois, USA.

Memberships in Professional Societies

2013-present	American Public Health Association