The Relationship of Employee Chronotypes, Personality Dimensions, Job Satisfaction and Work Engagement among White Collar Workers in Taiwan

by

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ABSTRACT

The influence of morningness on important work-related variables among employees remains largely unexplored. Consequently, the aim of this study was to examine the relationship of the concept with an increasingly important business variable for employees, namely work engagement. To get a clearer understanding of the relationship, it was additionally examined, whether job satisfaction mediates, and the big five personality dimensions moderate the relationship. Morningness was calculated by using the reduced morningness-eveningness questionnaire (rMEQ). Data was collected in form of a self-report questionnaire from 200 individuals, employed in the local private industry. One-way ANOVA revealed, that morning-chronotype employees experience significantly higher levels of work engagement and job satisfaction. Further, mediation analysis demonstrated, that job satisfaction acts as a mediator in the relationship between morningness and work engagement. Lastly, hierarchical regression analysis showed, that the big five personality dimensions do not moderate the relationship. The findings of the present study highlight the potential far-reaching impacts of chronotypes on employee's subjective perception of their job. As variables like job satisfaction and work engagement play an increasingly important role for employees in today's working world, the findings of this study should be carefully considered by organizations. Simultaneously, further research surrounding morningness and work-related variables is needed, to obtain a clearer understanding of its significance and impact in organizational work settings.

Keywords: morningness, chronotype, work engagement, job satisfaction, big five personality dimensions

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CHAPTER I INTRODUCTION

Background

During the course of the current century, the landscape of the modern business world has drastically changed. Due to megatrends like Globalization, Digitalization and Talent Shortage, businesses face ever increasing competition and are constantly looking for ways to gain a competitive edge. Especially since the intellectual capital of a company is becoming increasingly valuable (Demediuk, 2002; Hormiga, Batista-Canino, & Sánchez-Medina, 2011; O'Donnell, O'Regan, Coates, Kennedy, Keary, & Berkery, 2003), companies try to gain an advantage by focusing on attracting and retaining highly qualified talent (Michaels, Handfield-Jones, & Axelrod, 2001; Sommer, Heidenreich, & Handrich, 2017). Companies therefore have to make sure to create appealing and engaging jobs in order to do so.

Recently, particularly the concept of work engagement has attracted more research interest, since it has been shown to be directly correlated with important business variables, such as job performance and job satisfaction(Bakker, Tims & Derks, 2012; Demerouti & Bakker, 2008; Halbesleben & Wheeler, 2008). Work engagement can be defined as a mental state including vigor, dedication, and absorption(Demerouti & Bakker, 2008). Most of the present research examining work engagement focuses around certain situations or behaviors, which occur at the workplace (Babcock-Roberson & Strickland, 2010; Bakker, Hakanen, Demerouti & Xanthopoulou, 2007; Giallonardo, Wong & Iwasiw, 2010). However, it might very well be the case that work engagement might be just as much if not even to a bigger proportion influenced by universal factors that don't originate at the office but in employee's personal lifes (LaMotte, 2015; Sonnentag, 2003). This could also hold true for another staple variable of human resource centered research, namely job satisfaction. Due to the tremendous importance of both of these variables, such potential factors require closer investigation as they influence almost the entirety of employee behavior at the workplace.

One such possible influencing factor, which is increasingly gaining attention across various disciplines, is an individuals' circadian rhythm or chronotype. The circadian rhythm describes individual's tendency to sleep and be active during certain time frames throughout a 24-hour window (Tankova, Adan, & Buela-Casal, 1994; Turek, 1985). Through analyzing peoples preferences for certain circadian rhythms, three distinct chronotypes have been established, which help to classify if an individual is a morning, neutral or evening person(Adan, Archer, Hidalgo, Milia, Natale, & Randler, 2012). Research in various different directions has shown, that an individual's chronotype has a significant influence on life habits and

performance capability (Gau, Shang, Merikangas, Chiu, Soong, & Cheng, 2007, p. 217; Preckel, Lipnevich, Schneider, & Roberts, 2011, p. 487-488; Randler, 2011; Randler, & Frech, 2009). However, only very little research exists investigating individual's chronotypes and their influence on an individual's working life (Randler, 2010). It should therefore be deemed important to start filling this research gap, as this concept could have far reaching impacts on an individual's career and provide valuable insights into how to allow an employee to perform better at their job.

Consequently, the research at hand aims to investigate the relationship between employee's circadian rhythm and work engagement with the addition of also examining the moderating role of employee's personality dimensions and the mediating effect of job satisfaction. Past research, has already repeatedly demonstrated the connection and effect of certain personality dimensions with both main concepts (Adan, 1994; Bakker~~, Tims,~~ et al., 2012; Carciofo, Yang, Song, Du, & Zhang, 2016; Randler, 2008b). Similarly, job satisfaction has been linked to both variables (Giallonardo, Wong, & Iwasiw, 2010; Lu, Lu, Gursoy, & Neale, 2016; Moreno, Marqueze, Lemos, Soares, & Lorenzi-Filho, 2012; Wheatley, 2017). Followingly, by including personality dimensions and job satisfaction in the present research, it allows for a more complete and in-depth analysis of the related concepts.

The research shall be conducted among white collar office workers in Taiwan. A Reason for this choice, is that typical office work in Taiwan is characterized by long working hours (Huang, 2018). Workdays typically start around 8 to 9 a.m., which theoretically should clearly favor morning persons. Consequently, if evening persons are discriminated against when it comes to levels of work engagement, it should be clearly shown in the collected data.

Additionally, looking at prior research regarding chronotypes in Taiwan, it is notable that most research was conducted among adolescent populations (Gau et al., 2007; Gau & Soong, 2003). It should therefore be deemed important, to add to these research findings by focusing on an adult working population in the same country. The research findings will not only provide general insights on adult populations but also information for local HR managers on how to more effectively deal with the human capital at their disposal.

Problem Statement

The problem this study aims to address is the lack of research examining how employees' circadian rhythms affects their work engagement and how this relationship is influenced by their various personality dimensions and job satisfaction. The research gap constitutes a serious problem as an increasing body of research suggests, that employees benefit or suffer

significantly in their careers due to the constraints of their individual chronotype in combination with fixed company's office hours (Yam, Fehr, & Barnes, 2014).

Additionally, the mentioned concepts are closely linked to critical business variables, such as performance and productivity. Thus, if a business wants its business unit and its employees to perform to their fullest potential, it is essential to know and understand the scientific background information closely related to this. Consequently, the discovered research gap requires closer attention.

Research Purpose & Questions

The purpose of this study is to examine whether an employee's chronotype significantly impacts their work engagement and how an employee's various personality dimensions moderate and job satisfaction mediates the relationship. The independent variable will be morningness, which indicates the degree to which an individual classifies as a morning or in contrast as an evening or neutral person. The dependent variable, work engagement, is defined as an employee experiencing a mental state regarding their work, which is characterized by vigor, dedication and absorption. The moderating variable will be the basic personality dimensions derived from the Big Five Model. The mediating variable will be job satisfaction, which expresses the degree to which employees like their jobs.

Research questions include

- Are there statistically significant differences in levels of work engagement and job satisfaction between people belonging to different chronotypes?
- Do the Big Five personality dimensions (Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness to new experience) moderate the relationship between employee chronotypes and work engagement?
- Does job satisfaction mediate the relationship between employee chronotypes and work engagement?

Significance of the Study

Recently, more and more research has been conducted, which indicated that being a morning person is connected to better physical, academic and cognitive performance (Randler

& Frech, 2009; Thun, Bjorvatn, Flo, Harris, & Pallesen, 2015; Vollmer, Pötsch, & Randler, 2013). However, these advantages are not solely limited to sports and academia.

Evidence emerged that being a morning person can also have significant advantages when it comes to an individual's career, since belonging to mentioned chronotype is linked to career boosting personality traits such as proactivity(Bakker~~, Tims,~~ et al., 2012; Randler, 2009). Morning people are also perceived to be better employees and evening persons could quite possibly be discriminated against by morning person supervisors (Yam, Fehr, & Barnes, 2014).

Especially nowadays, where human capital increasingly represents one of the most valuable assets a company can have, it is more important than ever to not only treat employees fairly but also in a supportive manner. Therefore, the above-mentioned findings should be considered alarming. If there is the possibility for a company to be more supportive towards its employees and enable them to perform better by simply adjusting working times or helping employees understand the relationship between their physiology and work performance, then that is definitely a research gap worth exploring.

Further, it is assumed, that the study at hand has the potential to help the researched subjects in a number of ways. Firstly, it can help raise awareness of employee's chronotypes and its relation to their personal career. Due to the topic being largely under-researched, most people aren't even aware of its potential impacts and significance. Additionally, it can lead to employees trying to adjust their sleeping schedule in an effort to match their chronotype to their specific line of work. This could translate into higher levels of work engagement, job satisfaction and last but not least career success.

These mentioned variables however should not only be of interest to the researched employees but also to the employer. In today's working world, with constantly shrinking competitive advantages, it is crucial to enable your employees to perform to the best of their abilities. Followingly, realizing the opportunities and limitations of the setting in which an employer lets their employee perform, such as work schedule, is of tremendous importance. In order to help employees, perform better and feel more comfortable at work, employers could consider alternative approaches to their work schedules, such as later start times or flexible working hours to accommodate individual differences.

Definition of Terms

Chronotype / Circadian Rhythm

The circadian rhythm or chronotype is a biological process occurring in every human being. This process describes an individual's tendency to sleep and be active during certain time frames throughout a 24-hour window (Tankova et al., 1994; Turek, 1985). Through analyzing peoples preferences for certain circadian rhythms, three distinct chronotypes have been established, which help to classify if an individual classifies as a morning, neutral or evening person(Adan et al., 2012).

Morning-Type & Morningness

Morning-Type people are individuals with lifestyles characterized by early wake up and early going to bedtimes. As a result, these individuals experience their highest mental and physical performance in the morning and early noon(Adan et al., 2012). In chronotype self-assessment questionnaires, these individuals score high on the dimension called Morningness.

Evening-Type & Eveningness

Contrarily to Morning-Types, Evening-Type people are individuals with lifestyles characterized by late wake up and late going to bedtimes. Consequently, Evening-Types peak in terms of mental and physical performance starting in the late afternoon up until the advanced part of the evening(Adan et al., 2012).

Work Engagement

As outlined in the next chapter, there exists no universally agreed upon definition for the term Work Engagement as of today. However, certain themes constituting the term are widely acknowledged and incorporated in the following definition, which will therefore be used for the remainder of this work. Work Engagement describes "a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption" (Demerouti & Bakker, 2008; Schaufeli, Salanova, González-romá, & Bakker, 2002, p.74).

Big Five Personality Dimensions

The big five personality dimensions, incorporated in the Big Five Model introduced and popularized by John, Costa & McCrae (1990; 1992), are Extraversion, Conscientiousness, Agreeableness, Emotional Stability and Openness to Experience.

Extraversion is a personality dimension describing the degree to which an individual experiences and publicly displays "positive affect, assertive behavior, decisive thinking, and desires for social attention" (Wilt & Revelle, 2017, p.57).

The personality dimension **Conscientiousness** is defined as the propensity to follow socially prescribed norms for impulse control, to be goal directed, to plan, and to be able to delay gratification (Roberts, Jackson, & Fayard, 2009).

Agreeableness is a dimension that emphasizes a person's motivation and need to maintain harmonious relationships with the surrounding persons and to minimize or avoid conflicts (Gleason et al., 2004). Agreeableness is characterized by traits "such as altruism, tender-mindedness, trust, and modesty" (John, 1990, p. 121).

The personality dimension **Neuroticism** is concerned with the emotional stability or instability of a person. People with high levels of Neuroticism are characterized by "negative emotionality, such as feeling anxious, nervous, sad and tense (John, 1990, p. 121).

Lastly, the personality dimension **Openness to Experience** "describes the breadth, depth, orgininality and complexity of an individual's mental and experiential life" (John, 1990, p. 121).

CHAPTER II LITERATURE REVIEW

To lay the theoretical foundation for the present research, an extensive literature review for all the involved concepts and variables shall be conducted. It is necessary to do so, to clarify what is meant with each term and also illustrate the results of prior research efforts in the respective domains. Firstly, the dependent variable will be looked at and followingly the independent variable will be talked about. In a next step, the two variables will be looked at together, meaning it will be reviewed if and how previous research combined both elements in a single study and what these findings imply for the research at hand. As a result of this review, first hypotheses can be established. Followingly, the mediator variable will be introduced, which will enable us to further add to our hypothesis. Next, the moderator variables will be illustrated, which will allow for a further hypotheses. Lastly, drawing from past research, we will introduce control variables, which will help us to eventually achieve more concise research findings.

Work Engagement

It was not until the recent decade, that the concept of work engagement has started to attract increasing research interest (Sonnentag, 2011). The rising interest is likely to be explained twofold. Firstly, it can be explained by the increased focus on research surrounding "Positive Psychology" instead of negative concepts. For example, prior research focus was directed more on "engagement's" negative counterpart issue, burnout (Schaufeli, Salanova, González-romá, & Bakker, 2002). Second, the rising importance of employee's psychological connection with their job, created a need for more research in the field. In the modern economy, companies rely heavily on this connection, to foster the full potential and capabilities of their employees, and ultimately gain a competitive edge (Bakker & Leiter, 2010).

Connected to the above-mentioned rise in research, is the emergence of a wide variety of different takes on the specifics of the concept "engagement". Therefore, although the term engagement has become quite popular and is widely used throughout various literature, it is important to note that there exists no universally agreed-upon definition for the term.

The first time the concept "engagement" in a business context, received a scholarly definition was towards the end of the last century. Kahn (1990) defined engagement at work as the "harnessing of organization members' selves to their work roles: in engagement, people employ and express themselves physically, cognitively, emotionally and mentally during role performances"(p. 694). The above definition emphasizes that engaged employees identify with

their job on several layers, which allows them to perform without any cognitive dissonance. The importance of this psychological connection, is once again emphasized by Kahn in a later publication, where he elaborates that engagement can be considered as a result of psychological presence at work. (Kahn, 1992) It is important to highlight that Khan examined engagement in relation to an employee's job role. Later scholars, who still draw on Kahn's work, changed their perspective and focus specifically on an employee's work activity (Maslach, Schaufeli, & Leiter, 2001; Schaufeli et al., 2002). These scholars examine work engagement as the counterpart of burnout and accordingly consider engaged employees "characterized by energy, involvement, and efficacy."(Maslach et al., 2001, p. 416) Three distinct dimensions, constituting work engagement were established, which have proven to be widely agreed upon to be vital to constitute the term. These three aspects are vigor, dedication and absorption (Schaufeli et al., 2002; Schaufeli & Bakker, 2010). Therefore, for the remainder of this work, the following definition of the term work engagement is utilized. Work engagement describes "a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption" (Demerouti & Bakker, 2008; Schaufeli et al., 2002, p. 74).

Studies about work engagement have found compelling evidence for the importance of the construct in today's business world. Employees with high levels of work engagement were repeatedly found to perform better at their job (Halbesleben & Wheeler, 2008; Salanova et al., 2005). More specifically, further studies found, that engaged employees tend to exhibit higher levels of creativity and productivity as well as commitment to their organization (Demerouti & Bakker, 2008). Additionally, it was found, that work engagement has not only benefits of temporary nature, such as allowing employees to perform better in the present, but also valuable long term consequences, such as higher life satisfaction and a decrease in ill-health (Shimazu, Schaufeli, Kamiyama, & Kawakami, 2015).

Employee Chronotypes / Morningness

Although research interest and initiatives about the concept of Morningness-Eveningness or Chronotypes has only started to increasingly gain popularity in the recent decade, the concept itself was already discovered and started to be examined in the second half of the 20th century. Both the above mentioned terms refer to individual's circadian rhythm, or in other words, biological clock. The circadian rhythm is a biological process describing an individual's tendency to sleep and be active during certain time frames throughout a 24-hour window (Adan et al., 2012; Tankova et al., 1994; Vink, Vink, Groot, Kerkhof, & Boomsma, 2001). Depending on when an individual experiences the highest levels of alertness throughout

the day he is classified to belong to a specific chronotype or morningness-eveningness dimension. Generally, three distinct categories are differentiated which are used to classify an individual as either a morning, neutral or evening person (Adan et al., 2012). Since these chronotypes are typically assessed by utilizing a continuous scale, scholars also refer to the degree of morningness in a person. The higher the degree of morningness, the more clearly the person can be classified as a morning person.

One of the first tools created to measure these dimensions is the Morningness-Eveningness Questionnaire (MEQ), which was developed in the 1970s by Horne and Östberg. (Horne & Ostberg, 1976) The developed questionnaire for the first time allowed to scientifically assess these dimensions and conduct research on the topic. Since then also other measurement tools have been developed, which are commonly used to conduct research in this field, such as the Munich Chronotype Questionnaire (MCTQ) and the Composite Scale of Morningness (CSM) (Roenneberg, Wirz-Justice, & Merrow, 2003; Smith, Reilly, & Midkiff, 1989). While all these tools represent valid methods to measure individuals' circadian rhythms, there exist some difference between the different measurement tools. For instance, the MCTQ was found to collect additional information on sleep-wake behavior under natural conditions. (Zavada, Gordijn, Beersma, Daan, & Roenneberg, 2005).

Most of the present research involving individuals' preferences for certain sleeping patterns, focuses on topics belonging to the fields of medicine or psychology. Several studies have found links between chronotypes and behavioral problems as well as general life satisfaction and physical health. (Gau et al., 2007; Randler, 2008a, 2011b; Susman, Dockray, Schiefelbein, Herwehe, Heaton, & Dorn, 2007) However, with the increasing popularity of research surrounding chronotypes, more studies emerge inspecting general and transferable traits such as cognitive performance or academic and career success.(Beşoluk, Önder, & Deveci, 2011; Preckel, Lipnevich, Schneider, & Roberts, 2011; Randler & Frech, 2009; Vollmer et al., 2013) Additionally, few studies try to explore how a chronotype could affect the role of individuals as employees. However, mentioned research only examined general perceived employability of individuals (Sõõru, Hazak, & Rebane, 2018)

The above-mentioned traits are naturally of particular interest to businesses, since they are closely related to employee performance and therefore potential monetary gains for a company. While some first research links certain chronotypes or more specifically morningness, to career boosting personality traits such as proactivity (Bakker et al., 2012; Randler, 2009), the specific influence of chronotypes on employees at the workplace remains largely unresearched.

Work Engagement & Sleeping Patterns

Research examining the relationship between sleep patterns and work engagement remains very little to almost non-existent. While a validation study of work engagement discovered a moderate relationship between sleep disturbances and work engagement (Hallberg & Schaufeli, 2006), the specific reasons behind this correlation were not explored. Another study focused on examining a link between sleep hygiene and work engagement, but didn't put its focus on employee's chronotypes (Barber, Grawitch, & Munz, 2013). Consequently, there still exists a big need for research combining the concepts of work engagement and employee chronotypes.

The relationship between employee chronotypes and work engagement is particularly interesting to research, as it might be able to explain how employees with a morning chronotype achieve higher levels of success at the workplace, as discovered in prior research (Yam et al., 2014). Work engagement could constitute the missing link between the belongingness to a certain chronotype and performance at the workplace. The suspected higher level of work engagement among morning chronotype employees could be explained by morning people reaching their peak cognitive performance early in the day during the traditional work hours, whereas evening employees reaching their peak cognitive performance levels only after traditional work times have already ended (Dijk, Duffy, & Czeisler, 1992).

Since work engagement and morningness are both linked to similar personality traits, such as proactivity (Bakker et al., 2012; Randler, 2009), the relationship between the two variables is highly likely to be positive.

Consequently, H1 and H2 can be stated as follows:

H1: Morningness is positively related to work engagement.
H2: Employees with a Morningness-Chronotype experience higher levels of work engagement than Evening-chronotype employees.

Job Satisfaction

With the backing of a large body of research, job satisfaction is considered one of the most comprehensively researched concepts in industrial and organizational psychology (Spector, 1997). While this notion indicating the importance of the concept already held true towards the end of the last century, it still continues to play an important role in human resource

related research today. This can be largely attributed to the construct's self-explanatory nature as well as clear importance for companies looking to retain their human capital. While the term job satisfaction is readily understood by people in and outside of academia, its academic definition and understanding used in this study, should still be pointed out. Originally, job satisfaction was defined as "the pleasurable emotional state resulting from the appraisal of one's job as achieving or facilitating the achievement of one's job values" (Locke, 1969, p. 316). To further simplify, job satisfaction expresses the degree to which employees like their jobs (Spector, 1997). As research surrounding the concept increased, several causing factors for the occurrence of job satisfaction (Connolly & Viswesvaran, 2000; Judge, Thoresen, Bono, & Patton, 2001; Loher, Noe, Moeller, & Fitzgerald, 1985) as well as work behaviors resulting out of the existence of job satisfaction have been established (Bakotić, 2016; Judge et al., 2001; Lu et al., 2016; Tett & Meyer, 1993).

Morningness, Job Satisfaction & Work Engagement

Similarly, to work engagement, job satisfaction has only been researched very scarcely in relation to morningness. However, due to job satisfaction being a concept positively correlated to work engagement (Alarcon & Edwards, 2011; Lu et al., 2016; Yeh, 2013), similar conclusions can be drawn. As hypothesized above, people high in morningness are personality and behavior wise more likely to experience high levels of work engagement. Consequently, people with high levels of morningness should also be more likely to exhibit higher levels of job satisfaction. To support this notion, a previous study already found that the higher the morningness among employees, the higher the job satisfaction (Moreno et al., 2012). Considering the implications of this finding, evening-type employees should experience significantly lower levels of job satisfaction compared to their morning-type employee counterparts.

Consequently, H3 can be stated as follows:

H3: Employees with a Morningness-Chronotype experience higher levels of job satisfaction than Evening-type employees.

The relationship between job satisfaction and work engagement remains unclear. While the positive relationship between the two constructs is well-established (Alarcon & Lyons, 2011; Garg, Dar, & Mishra, 2018; Lu et al., 2016; Yeh, 2013), it isn't clear which concept precedes which in a work setting. Reason for that is likely the close relationship found between those

concepts. The close relationship even led to research examining if the two concepts are in fact separate constructs (Alarcon & Lyons, 2011), which was confirmed. While previous research generally followed the notion, that job satisfaction is the result of work engagement (Alarcon & Edwards, 2011; Andrew & Sofian, 2012; Lu et al., 2016; Maslach et al., 2001; Saks, 2006; Yeh, 2013) , other studies discovered, that job satisfaction could very well also be a predictor for work engagement (Abraham, 2012; Johnson, 2000; Macey, Schneider, Barbera, & Young, 2011; Singh, 2017). Since the possible predictive nature of job satisfaction on work engagement is a rather counterintuitive finding, it has led to a call for more research across different populations and backgrounds to gain a clearer understanding. The present research aims to follow this call and therefore wants to examine whether job satisfaction acts as a mediator in the relationship between morningness and work engagement.

Consequently, H4 can be stated as follows:
H4: Job satisfaction mediates the relationship between morningness and work engagement.

Big Five Personality Dimensions

The big five personality dimensions shall be used as a moderator in the investigation of the relationship between employee chronotypes and work engagement. The big five personality dimensions, stemming from the Big Five Model introduced and popularized by John, Costa & McCrae (1990; 1992), are Extraversion, Conscientiousness, Agreeableness, Neuroticism and Openness to Experience. Some earlier studies have already started to investigate potential connections between the “Big Five” personality dimensions and chronotypes (DeYoung, Hasher, Djikic, Criger, & Peterson, 2007; Hogben, Ellis, Archer, & Schantz, 2009; Randler, 2008b). While mentioned studies were conducted in different countries with different populations and naturally produced different results, all of those studies found convincing evidence, that Morningness was associated with higher levels of Agreeableness and Conscientiousness.

Further, Agreeableness is likely to positively influence high levels of work engagement, as a person high in Agreeableness tends to avoid conflicts and is motivated to maintain harmonious relationships with their peers (Gleason, Jensen-Campbell, & Richardson, 2004). Consequently, mentioned persons are likely to fully dedicate themselves to their tasks at work. As a result, Agreeableness should act as a moderator that strengthens the positive relationship between morningness and work engagement.

Especially Conscientiousness could constitute an interesting moderator for the research at hand as it was not only repeatedly found to be linked to morningness but also traits closely related to work engagement. Conscientiousness was found to be a consistent predictor for performance across various situations at work (Barrick, 2005). Employees with high levels of Conscientiousness tend to exhibit positive work related behavioral traits such as being well-organized, goal oriented, hard-working and highly motivated (Costa & McCrae, 2008). Since these behavioral traits are highly indicative of high levels of work engagement, it can be assumed that Conscientiousness is likely to significantly impact mentioned concept. Previous conducted research supports this notion, by finding that Conscientiousness contributes to higher levels of performance by boosting work engagement (Bakker, Demerouti, & ten Brummelhuis, 2012)

Conscientiousness linking the two previously unrelated concepts of employee chronotypes and work engagement should therefore result in being a moderator that is strengthening the positive relationship between morningness and work engagement.

Also, the personality dimension Neuroticism, is likely to have a significant impact on the relationship between morningness and work engagement. Previous research indicated, that people with low scores in the Neuroticism dimension, or in other terms with high emotional stability, are morning people (DeYoung et al., 2007). Additionally, it should be assumed that people, who are considered to be emotionally stable, find it easier to enter a positive, work-related state-of mind, which constitutes the basis of high levels of work engagement (Demerouti & Bakker, 2008; Schaufeli et al., 2002). This is congruent with previous findings in this area of research, that state that low level of Neuroticism are connected to higher levels of work engagement (Langelaan, Bakker, van Doornen, & Schaufeli, 2006). Consequently, the personality dimension Neuroticism should act as a moderator that is weakening the positive relationship between morningness and work engagement.

The impact of the personality dimension, Extraversion, is a bit more challenging to hypothesize, due to mixed findings surrounding the concept. While older research has found links between Extraversion and eveningness (Adan, 1992; Neubauer, 1992), more recent research couldn't replicate these findings (DeYoung et al., 2007; Jackson & Gerard, 1996; Randler, 2008b). However, looking at previous studies, investigating the links between Extraversion and work engagement, credible support for a positive association between the two concepts has been found (Langelaan et al., 2006). Consequently, Extraversion should constitute a moderator, which strengthens the positive relationship between morningness and work engagement.

Similar, to Extraversion, Openness to new experience also hasn't been consistently linked to either the dependent or independent variable of this study. While some prior research simply couldn't detect a significant relationship with chronotype or work engagement (Kim, Shin, & Swanger, 2009; Randler, 2008b), other more recent research did find a positive association between Openness to new experience and work engagement (Woods & Sofat, 2013; Zaidi, Wajid, Zaidi, Zaidi, & Zaidi, 2013). Although not consistently found, this connection seems reasonable, as people scoring high in this dimension are often connected to traits such as being intelligent and creative in their problem solving approach (John, 1990), which should allow them to easily reach a mental state as described under work engagement. Consequently, Openness should constitute a moderator, which strengthens the positive relationship between morningness and work engagement.

Consequently, H4 to H8 can be stated as follows:

H5: Agreeableness strengthens the positive relationship between morningness and work engagement.
H6: Conscientiousness strengthens the positive relationship between morningness and work engagement.
H7: Neuroticism weakens the positive relationship between morningness and work engagement.
H8: Extraversion strengthens the positive relationship between morningness and work engagement.
H9: Openness to new experience strengthens the positive relationship between morningness and work engagement.

It is important to note, that the above-mentioned studies, examining the connections between the "Big Five" personality domains and chronotypes, were almost completely conducted in western cultures and populations. Thus, the research at hand, which is focusing on an Asian population, will provide valuable insights on whether there exist any cultural differences or if the previous found results can also be confirmed in the present sample.

Control Variables

To be able to draw a true, cause-effect relationship about the above outlined variables, certain control variables in the hierarchical regression analysis will be used. Firstly, the variable age will be controlled for. A large body of research has found evidence for the effect of age on

an individual's chronotype. More specifically, there exists a well-observed correlation between increasing age and morningness (Adan et al., 2012; Kim, Lee, Kim, Cho, Lee, & Cho, 2010; Merikanto, Kronholm, Peltonen, Laatikainen, Lahti, & Partonen, 2012). Gender will serve as a second control variable for the present investigation. Throughout several studies a difference between men and women has been observed regarding their chronotype (Adan & Natale, 2002; Caci, Deschaux, Adan, & Natale, 2009; Randler, 2011b). Women were more frequently found to belong to a morning chronotype while men belong more often to an evening chronotype. Lastly, when testing the moderating effect of personality dimensions on the relationship between morningness and work engagement, with the help of a hierarchical regression, job satisfaction is controlled for to avoid any confounding effect. At this point, it is important to point out, that the variable job satisfaction is both used as a control variable as well as a mediator. This can be done, since Moderation and Mediation analysis in this study are run separately.

CHAPTER III RESEARCH METHODS

The following chapter will illustrate the various research methods used in the study. Firstly, the reader will be given an overview of the final research framework and the hypotheses resulting of the previous chapters. After explaining the reasons behind choosing the quantitative research design of the study, nearer information about the specific sample will be outlined. In a next step, the research instrument, which is the questionnaire, will be illustrated. In order to do so, the various dimensions measured in it, will be named and also the ways in which to measure them validly and reliably. Followingly, the way in which the data will be collected and analyzed will be discussed. Lastly, the research procedure will be outlined which summarizes the process the study at hand followed.

Research Framework

The research framework of this study is based on the research purpose and research questions outlined in Chapter I. Consequently, the research framework at hand consists of one independent variable (Employee Chronotype) and one dependent variables (Work Engagement). The mediator (job satisfaction) will be examined, in regards to whether it significantly effects the relationship between independent and dependent variable. The moderator (Big Five Personality Dimensions), consisting of five dimensions, will be examined in regard to whether or not Conscientiousness and Agreeableness strengthens the relationship between dependent and independent variable. Additionally, it will be looked at if there exists any significant relationship between the remaining personality dimensions and the relationship between morningness and work engagement.

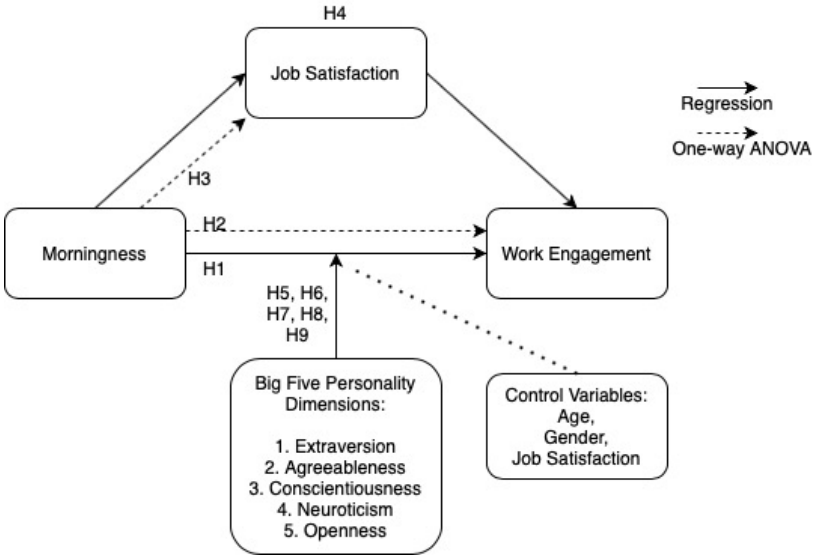

Figure 3.1. Research Framework

Research Hypotheses

Based on the presented literature, the research questions and the research purpose, the following hypotheses were formulated:

H1: Morningness is positively related to work engagement.
H2: Employees with a Morningness-Chronotype experience higher levels of work engagement than Evening-chronotype employees.
H3: Employees with a Morningness-Chronotype experience higher levels of job satisfaction than Evening-chronotype employees.
H4: Job satisfaction mediates the relationship between morningness and work engagement.
H5: Agreeableness strengthens the positive relationship between morningness and work engagement.
H6: Conscientiousness strengthens the positive relationship between morningness and work engagement.
H7: Neuroticism weakens the positive relationship between morningness and work engagement.
H8: Extraversion strengthens the positive relationship between morningness and work engagement.
H9: Openness to new experience strengthens the positive relationship between morningness and work engagement.

Research Design

The study at hand aims to investigate whether or not there exists a statistical significance in the relationship between the above outlined variables. The data necessary to conduct such an analysis, will be collected in forms of numbers, using a survey questionnaire, from an adult working population. Since the research at hand requires the collection of answers from a large number of respondents and follows a linear research path. Studies characterized by these elements are recommended to follow a quantitative research design (Neuman, 2014).

Sample

To examine the relationship between employee chronotypes and work engagement, a sample was chosen which is subject to fixed work times and which starts their workday comparably early. The sample, which fulfills such criteria is found among white-collar office

workers in Taiwan. Workdays in Taiwanese service industry typically start around 8 a.m., regardless of the department in the company. Therefore, this sample is supposed to provide clear differences in the measurement results between the two different chronotypes.

Another reason for choosing a sample from this industry, is that organizational processes, such as employee evaluations and promotion decisions tend to follow a rather traditional approach, which is suspected to favor morning persons. Consequently, the insights gained from this research could additionally provide valuable insights into the fairness and effectiveness of current employee evaluation practices across this industry.

The sampling approach utilized in this research constitutes a mix of judgement sampling and convenience sampling (Lewis-Beck, Bryman, & Futing Liao, 2004). The majority of respondents was attained by having professional contacts, from companies fitting the target criteria, share the questionnaire, throughout the company via exclusive messaging channels. By doing so, it can be assumed that the respondents in fact meet the sampling criteria. In a second step, some respondents were recruited through an online forum. Due to the sample being predominantly recruited through direct professional contacts, the final sample consisted of a demographic closely matching the actual workforce composition. As such, this should be considered a strength of the sample of the present study and will allow for actionable insights gained from the statistical analyses.

The specific sampling criteria for respondents were as follows:

- Respondent is working full-time and has been with the current company for at least 3 months
- Respondent is working in an office environment and is performing predominantly intellectual labor
- Respondent is subject to a fixed starting work time in the morning

Instrument

The research instrument used in this study was a self-reported survey questionnaire. The participants filled out the questionnaire, by choosing an answer option that most closely matched their feeling or attitude towards a given question. The utilized instrument consists of 48 items, which are subdivided in four sections, which are:

I. Chronotype
II. Work Engagement
III. Big Five Personality Dimensions
IV. Job Satisfaction
V. Demographic data

The various measures used in section I to IV of this questionnaire, were taken from the work of established researchers, which have been peer-reviewed and proven to possess good reliability and validity.

Chronotype

To assess an employee's chronotype and to see whether if he or she classifies as a morning or evening person, the reduced version of the Morningness-Eveningess Questionnaire (rMEQ) shall be used. The rMEQ is based on the widely used and accepted Morningness-Eveningness Questionnaire (MEQ), developed by Horne and Östberg (Horne & Ostberg, 1976). The MEQ, consisting of 19 items questioning individuals sleeping timeframes and preferred time for activities, is commonly used to assess individuals' chronotypes. It has been found to be valid across various populations and countries (Lee, Kim, Lee, Jang, Kim, & Duffy, 2014; Roveda, Vitale, Montaruli, Galasso, Carandente, & Caumo, 2017; Taillard, Philip, Chastang, & Bioulac, 2004). Due to concerns about length and general structure a reduced 5-item version has been developed (rMEQ). The shorter version developed by Adan and Almirall (1991), only uses five items of the original MEQ and has been widely adopted due to its simplicity and convenience. Further it has been evaluated across various countries (Adan & Almirall, 1991; Randler, 2013; Raoof, Asaad, & Al-Hadithi, 2014). Evaluations of the rMEQ have found Cronbach's alpha values between 0.68 and 0.78 (Caci et al., 2009; Danielsson, Sakarya, & Jansson-Fröjmark, 2019; Jankowski, 2013) The original Chinese translation used in this study was created by Li et al. (2011). The Cronbach α coefficient for mentioned translation was assessed to be 0.769.

Work Engagement

The measurement tool used to assess work engagement is a short questionnaire called Utrecht Work Engagement Scale (UWES). The UWES is a self-report questionnaire that assesses the three core dimensions of work engagement an individual experiences: "vigor, dedication, and absorption" (Schaufeli et al., 2002, p. 74; Schaufeli & Bakker, 2010). Studies researching work engagement across different countries ran confirmatory factor analysis and were able to confirm the hypothesized three-factor structure to the data (Rothmann, 2003; Schaufeli et al., 2002; Yi-wen & Yi-qun, 2005). However, some other studies failed to reproduce these results (e.g. Sonnentag, 2003). Since the three dimensions, constituting work engagement, have been repeatedly found to have moderate to high correlations, Schaufeli and Bakker (2003) proposed that in some cases, it might be beneficial to just utilize the total score for work engagement. The scale, which will be used to assess work engagement in this study, also developed by Schaufeli et al. (Schaufeli, Bakker, & Salanova, 2006), incorporates the three engagement dimensions, which were found to be moderately strong related.

The UWES questionnaire, developed by Schaufeli and Bakker (2003) consists of 17 items but has been subject to revisions, which resulted in a UWES-9 version consisting of only 9 items. With confirmed factorial validity and good internal consistency ($\alpha = .89$) as well as test-retest reliability (Schaufeli, Bakker, & Salanova, 2006), the UWES-9 represents a valuable tool to measure levels of work engagement. Due to its comparably short and simple nature it should also be easily accepted by respondents.

The Chinese translation used in this study, stems from the official UWES test manual (Schaufeli & Bakker, 2003, p. 59).

Big Five Personality Dimensions

To assess an employee's score across the various personality dimensions, the 10-item version of the Big Five Inventory (BFI) shall be used. The original BFI (John, 1990) is a widely adopted as well as validated questionnaire to assess the Big Five factors of personality. With a Cronbach alpha value of ($\alpha = .83$) and good convergent validity with corresponding scales (Denissen, Geenen, Aken, Gosling, & Potter, 2008; Goldberg, 1992; McCrae & John, 1992), it should be deemed a solid tool to assess the various personality dimensions. To be able to collect data on individual's personality dimensions even quicker and in a more convenient way for the respondent, a shorter version of the BFI has been developed(Gosling, Rentfrow, & Swann,

2003). This ten-item version of the BFI has been found to be valid and reliable across different populations and cultures (Kim et al., 2010; Rammstedt, Kemper, Klein, Beierlein, & Kovaleva, 2013, 2017). However, it needs to be pointed out that low alpha values are quite common when working with the Chinese version of this measure and should therefore be expected (Carciofo et al., 2016;Li et al., 2015; Yu et al., 2017). The low alpha values are most likely due to the low number of items per personality dimension. In order to address this potential reliability issue, previous studies performed test-retests of the BFI-10 and its extended BFI-44 version (Carciofo et al., 2016; Rammstedt & John, 2007), as well as confirmatory factor analysis to confirm the construct validity of the measure and received satisfactory results (X. Li et al., 2015).

Job Satisfaction

To assess the levels of job satisfaction among employees, the Michigan Organizational Assessment Questionnaire Job Satisfaction Subscale (MOAQ-JSS) (Cammann et al., 1979) was utilized. The MOAQ-JSS is a five-point Likert-type scale comprising only three items. This is in sharp contrast to alternative job satisfaction measures, which are typically much longer. However, for the scope of the research at hand, this measure was deemed a good fit, as quick completion times of the questionnaire are assumed to translate into higher completion rates of the survey questionnaire. For the present research, the completion time factor was specifically considered as the sample are all practicing professionals, which take extra time out of their workday to provide their responses.

The MOAQ-JSS was examined and found to be a reliable and construct-valid measure of job satisfaction (Bowling & Hammond, 2008). The Chinese translation used for this questionnaire, was developed by Jiang et al. (2012).

Data Collection

The data from the sample was collected through an online questionnaire, to facilitate the accessibility and timing for the respondents. These two issues were of particular concern, as the sample consists entirely of actively practicing professionals. Since respondents belonging to this category, are usually short on time for non-direct work-related activities, it was attempted to create the answering process in a convenient way. The questionnaire was made available through the google forms platform and was available to be answered for a window of around three months. The usage of an online questionnaire further made sure that the gained data was transferred without fault to the utilized statistics software. The majority of respondents were

recruited through personal contacts in companies fitting the sampling criteria. Followingly, the access link to the questionnaire, was shared with professional contacts via LINE app and email, which then was forwarded throughout the companies via exclusive messaging channels. As a result, the researcher should be confident, that the questionnaire was predominantly accessed by individuals meeting the sample criteria. To further ensure the sample fit, the questionnaire contained several screening questions. Since gathering enough data from working professionals is always challenging, another data collection approach was utilized. Some respondents were recruited through an online forum. To prevent against the potentially lower sample criteria fit emerging from such an approach, the questionnaire contained a series of a screening questions, making sure the respondents met the agreed upon sample criteria.

In total, the questionnaire received 283 responses, of which 200 were evaluated to be valid.

Data Analysis

The collected data shall be analyzed with the help of the statistics software SPSS 23.0.

Exploratory Data Analysis (EDA)

Firstly, to gain an overview of the collected data, the descriptive statistics will be computed. By doing so, insights will be gained among the gender, age and chronotype distribution of the sample. This will allow to establish an understanding of how the workforce in the targeted industry is composited.

Additionally, Means, Standard Deviations, Correlations and Cronbach alpha values of the employed scales will be compiled to further visualize the data and gain insights over the reliability of the data set.

Correlation Test

In order to examine the relationships between the various variables inspected in the research at hand, the Pearson product-moment correlation test will be utilized. While the main focus lies, in determining the relationships between independent and dependent variables, also possible correlations with and between the remaining variables will be explored. This is mainly due to the explorative nature of the study.

The results of the Pearson product-moment correlation will also reveal whether or not Hypothesis H1 is supported.

ANOVA

Next, a one-way analysis of variance will be used to determine whether or not H2 & H3 are supported or not. Since both of these hypotheses are concerned with statistically significant differences between the means of different groups, a one-way ANOVA will be the most suitable analysis. If any statistically significant differences between the groups' levels of work engagement and job satisfaction are found, a Tukey post hoc test will be used to determine which specific groups differ from each other. To have three distinct groups to compare, the respondents are coded into three different chronotype groups according to their score on the rMEQ.

Mediating Analysis

To check, whether or not job satisfaction acts as a mediator in the relationship between morningness and work engagement, a mediation analysis with the help of PROCESS in SPSS will be run. Version 3.5. of PROCESS will be used for this purpose. The result of the mediation analysis will allow us to check whether or not H4 is supported.

Hierarchical Regression Analysis

To test if and how the five personality dimensions, Conscientiousness, Agreeableness, Neuroticism, Extraversion and Openness function as a moderator in the relationship between chronotypes and work engagement, a hierarchical multiple regression analysis will be utilized. Therefore, this analysis will serve as a way to test if H5, H6, H7, H8 & H9 are supported or not.

The Issue of Common-Method Variance (CMV)

Common-Method Variance (CMV) is "variance that is attributable to the measurement method rather than to the constructs the measures represent" (Podsakoff, Mackenzie, & Lee, 2003, p. 879) This is a common issue that can occur when utilizing self-report questionnaires for data collection, especially when measuring more than one construct in the same instrument. A possible negative consequence is, that correlations between variables might be created, simply by the respondents tendency to answer in a consistent manner throughout the questionnaire (Chang et al., 2010).

To avoid this issue in the present study, several steps have been taken as suggested in previous research(Chang et al., 2010; Podsakoff, 2003). Firstly, the instrument is composed of several independent and widely proven to be reliable and valid research instruments. Secondly,

the potential of CMV is minimized by using different scales for each measured dimension in the instrument. Consequently, respondents aren't tempted to answer in the same fashion throughout the questionnaire. Lastly, after the data collection, a post-hoc Harman one-factor analysis will be used to make sure whether or not the occurring variance can be attributed to a single factor.

Research Procedure

Initially, on the basis of the researcher's interest, the research topic was identified through extensive literature review. After having identified the specific research topic, the theoretical framework for the study was created. As a next step, the different scales to assess the measures have been compiled, combined and adjusted to create the measurement instrument used in this study. As a next step, sample participants received the questionnaire with additional information on the topic of the study and the time it will take them to complete it. The questionnaire included all the scales to measure the various researched dimensions. Participants were given a timeframe of around three months to complete the questionnaire. After the data was collected and assessed, it was analyzed with the help of SPSS. After analyzing the collected data, the results and potential implications of the findings were be discussed. Lastly, the researcher arrived at a conclusion and provided possible suggestions for future research. The research process is illustrated below:

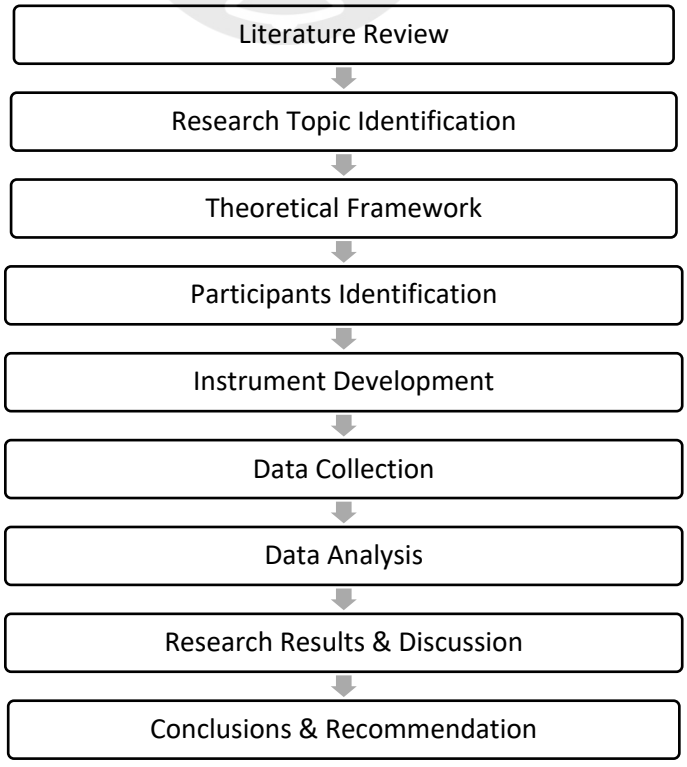

Figure 3.2. Research Procedure

CHAPTER IV RESULTS AND DISCUSSION

Descriptive Statistics

As a first step, the descriptive characteristics of the participants were assessed and compiled in Table 4.1. The descriptive characteristics were broken down in three categories, namely gender, age and chronotype.

The assessment showed, that out of the total 200 respondents, 129 (64,5%) were male and 71 (35,5%) were female. The age distribution of respondents was broken down into four groups. Out of the four age groups, the groups containing the majority of respondents, were age group 31-40 years old (57,5%) and age group 41-50 years old (23.5%). The analysis of the morningness scores, emerging from the rMEQ, among respondents revealed, that 36 (18%) participants classified as morning chronotype, 134 participants as neutral chronotype and 30 (15%) participants as evening chronotype.

Table 4.1.

Descriptive Characteristics of Participants

Variable	Category	Frequency	Percentage %
Gender	1. Male	129	64,5%
	2. Female	71	35,5%
Age	1. 20-30 years	32	16%
	2. 31-40	115	57.5%
	3. 41-50	47	23.5%
	4. 50-64	6	3%
Chronotype	1. Morning	36	18%
	2. Neutral	134	67%
	3. Evening	30	15%

Validity and Reliability

To assess the reliability of the utilized scale, Cronbach Alpha values for each construct scale were computed. The rMEQ scale, which was used to measure the independent variable Morningness, consisted of five items and delivered a cronbach alpha value of 0.622. The dependent variable, work engagement, was measured with the UWES scale, which had a cronbach alpha value of 0.933. The scale used for measuring the control variable job satisfaction, provided a cronbach alpha value of 0.821. The personality dimensions, which were used as a moderator in the analysis, were all measured with the BFI-10 scale, which utilizes 2 items per personality dimension. Cronbach alpha values for each dimension were as follows: Extraversion (0,614), Agreeableness (0.209), Conscientiousness (0.234), Neuroticism (0.4749), Openness (0.443). As outlined in chapter III, these low alpha values were anticipated.

Looking at the reliability values of the scales utilized to measure each construct, it becomes apparent, that the cronbach alpha values for the rMEQ as well as the BFI-10 are either slightly or in some cases significantly lower than usually accepted. For example, the rMEQ scale returned an alpha value of 0.622. Although this value is slightly lower than the usual accepted threshold of 0.7(George & Mallery, 2003), it is important to point out that a lower than 0.7 value is no exception when working with the Chinese version of the rMEQ (Carciofo et al., 2012, 2016; Qu et al., 2015). Possible explanations for these repeating occurring values could be the low number of items that make up the scale as well as the limited sample size of studies. However, these low alpha values shouldn't necessarily be considered as a sign for a lack of reliability of the utilized scale, since earlier research found significant test-retest correlations between the original MEQ and the reduced MEQ scores as well as chronotype classifications (Carciofo et al., 2012). Consequently, established researchers in the field do see merit in using the reduced scale and continue to do so in their research(Carciofo, 2019; Carciofo et al., 2016; Qu et al., 2015). Additionally, it is necessary to point out that some scholars make the case that alpha values between .5 and .7 demonstrate moderate reliability and can therefore be accepted (Dall'Oglio et al., 2010; Field, 2009; Hinton, 2004). Lastly, in the present study the scale was also inspected in light of the inter-item correlations. The average of inter-item correlations is 0.25, which provides further support for the reliability of the scale (Piedmont, 2014).

The low alpha values of the BFI-10 were anticipated, since the scale measures each of the five-personality dimension with only two items. Since the amount of items in a scale have a significant influence on the Cronbach alpha values, it is common to find low alpha values when utilizing mentioned scale (Furnham, 2008; Gosling et al., 2003). The alpha values found

in the present study actually were in line with those of a previous large-scale study also utilizing the Chinese BFI-10 (Carciofo et al., 2016). Due to the low number of items in the scale, alpha values might not be a good indicator for the reliability of the measurement instrument. Previous research therefore often conducted test-retests with good results, providing support for the use of the utilized instrument (Carciofo et al., 2016; Rammstedt & John, 2007). The alternative scale, which could have been utilized is the BFI-44, which consists of 44 items. While this scale typically produces higher reliability values, the time needed to complete mentioned scale is significantly longer. Since the aim of this study was to research practicing professionals, which usually won't have as much time at their disposal to participate in a low-scale research, the BFI-10 was the preferred choice.

Common Method Variance

Since the data collection method utilized in this study, was a self-report questionnaire, it was necessary to address the potential problem of common method variance. For this purpose, besides the usage of different kind of scales and amount of point Likert scales, Harman's single factor test was run. The result of mentioned test revealed, that in the present dataset the maximum variance that is explained by a single factor is 27.38%. Consequently, it can be concluded, that this dataset doesn't suffer from Common Method Bias issue (Podsakoff, Mackenzie, & Lee, 2003)

Variable Correlations

To explore the correlations among the examined variables, Pearson's Correlation Analysis was run. The mean, standard deviation, correlation and reliability values were compiled in Table 4.2.

Pearson's correlation analysis revealed, that the independent variable (morningness) was statistically significantly correlated to Conscientiousness (r=.297*, p<.01*), job satisfaction (r=.298, *p<.05*) and work engagement (r=.252, *p<.01*). Consequently, H1 is supported. The dependent variable (work engagement), besides the above mentioned correlation to morningness, was also statistically significantly correlated to Extraversion (r=.252, *p<.01*), Conscientiousness (r=.316, *p<.01*), Neuroticism (r=-.288, p<.01), Openness (r=.225, *p<.01*) and lastly Job Satisfaction (r=.598, *p<.01*).

Table 4.2.

Means, Standard Deviations, Correlations and Reliability of Variables

	Mean	S.D.	1	2	3	4	5	6	7	8
1. M	14.7	3.01	(0.622)							
2. E	3.2	.89	.072	(0.614)						
3. A	3.57	.65	.039	.048	(0.209)[a]					
4. C	3.46	.70	.297**	.177*	.095	(0.234)[b]				
5. N	2.84	.79	-.100	-.362**	-.260**	-.245**	(0.474)[c]			
6. O	3.31	.79	-.062	.295**	.015	.107	-.060	(0.443)[d]		
7. WE	3.2	.79	.252**	.252**	.091	.316**	-.288**	.225**	(0.933)	
8. JS	3.58	.77	.298*	.162*	.232**	.301**	-.284	.174*	.598**	(0.821)

Note. **p<.05; **p<.01*
M= Morningness; E= Extraversion; A= Agreeableness; C= Conscientiousness; N= Neuroticism; O= Openness; WE= Work Engagement; JS= Job Satisfaction
Numbers in parenthesis is Cronbach alpha value
Note: The Cronbach alpha issue of a, b, c, d is explained in Validity and Reliability section

Analysis of Mean Differences among Work Engagement and Job Satisfaction

To analyze, whether there exist any significant differences in levels of work engagement among employees belonging to different chronotypes, one-way ANOVA was run.

Results demonstrated, that there was a statistically significant difference in levels of work engagement among employees belonging to different chronotypes ($F(2,197) = 5.970$, $p = .003$). A Tukey post hoc test revealed that work engagement was significantly lower among evening-type employees ($2.8 \pm .75$, $p = .002$) compared to morning-type employees ($3.5 \pm .92$). There was no statistically significant difference in levels of work engagement between neutral-type employees and other chronotype employees. Consequently, H2 is supported.

Next, a one-way ANOVA was run to determine, whether or not there exist any significant differences in levels of job satisfaction among employees belonging to different chronotypes. The result was an observed statistically significant difference between morning-type and evening type employees ($F(2,197)=4.462$, $p=0.013$). A Tukey post hoc test revealed that job satisfaction among morning-type employees was statistically significantly higher (3.8 ± 0.7, $p= .009$) compared to evening-type employees (3.2 ± 0.9). There was no statistically significant difference between neutral-type employees and other chronotype employees. Followingly, H3 is supported.

Table 4.3.

One-way ANOVA of Work Engagement and Job Satisfaction

	Sum of Squares	df	Mean Square	F	p
Work Engagement					
Between Groups	7.209	2	3.605	5.970	.003
Within Groups	118.947	197	.604		
Total	126.156	199			
Job Satisfaction					
Between Groups	5.169	2	2.584	4.462	.013
Within Groups	114.109	197	.579		
Total	119.278	199			

Mediating Effect of Job Satisfaction

For mediation to be supported, four conditions must be met: 1) the independent variable must be related to the dependent variable, 2) the independent variable must be related to the mediator variable, 3) the mediator must be related to the dependent variable, while in the presence of the independent variable, and 4) the independent variable should no longer be a significant predictor of the dependent variable in the presence of the mediator variable (Baron & Kenny, 1986). In Step one of the mediation model, the direct effect of morningness on work engagement, ignoring the mediator, was positive and significant (β =.0664, t(198)=3.65, *p=<.001*), indicating that people high in morningness are more likely to experience high levels of work engagement. Step two showed that the direct effect of morningness on the mediator, job satisfaction, was also positive and significant (β =.0765, t(198)=4.39, *p=<.001*), indicating that people high in morningness, are more likely to experience high levels of job satisfaction. Step three of the mediation process showed that the mediator (job satisfaction), controlling for morningness, was significant, (β =.5903, t(198)=9.64, *p=<.001)*. Step four of the analyses revealed that, controlling for the mediator (job satisfaction), the degree of morningness was not a significant predictor of work engagement, (β =.0212, t(198)=1.35*, p=.1785*). The indirect effect of morningness on work engagement was tested using non-parametric bootstrapping. In the present case the indirect effect (IE=.0452) is statistically significant: 95% CI=(.0212, .0731). Consequently, it is confirmed that job satisfaction fully mediates the relationship between morningness and work engagement. As a result, H4 is supported. Further, the analyses revealed, that the proportion of the total effect of morningness on work engagement that operates indirectly is 68%. Followingly, 32% of the effect operates directly. Therefore, morningness accounts for 32% of the outcome of work engagement, while 68% is managed through employee's job satisfaction.

Table 4.4.

Mediation Results

Dependent	Independent	β	SE	t	p	95% CI [LL, UL]
Step 1: Work Engagement	Morningness	0.0664	.0181	3.65	< .001	[.0306, .1021]
Step 2: Job Satisfaction	Morningness	0.0765	.0174	4.39	< .001	[.0422, .1108]
Step 3: Work Engagement	Morningness	0.0212	.0157	1.35	.1785	[-.0098, .0522]
	Job Satisfaction	0.5903	.0612	9.6377	< .001	[.4695, .7111]

Moderating Effect of Personality Dimensions

To assess the potential moderating effect of the big five personality dimensions on the relationship between morningness and work engagement, hierarchical multiple regression analysis was conducted. As a result, five regression tables were obtained, which each consisted of three models. The first model was utilized to control for the effect of study's control variables, gender, age and job satisfaction. The second model goes further by adding the two independent variables, Morningness and one of the five personality dimensions, which is examined for a moderating effect. Lastly, in Model three the interaction of the independent variable and moderator was added to understand if and how the examined personality dimension moderates the relationship between morningness and work engagement. The regression analysis models are presented in Table 4.5, 4.6, 4.7, 4.8, 4.9.

As visible in Table 4, Extraversion (β=.173, $p<.01$) is positively correlated with work engagement, however looking at the interaction term of morningness and Extraversion, there is no support for a moderation effect of Extraversion. Similarly, Conscientiousness (β=.143, $p<.05$) and Openness (β=.147, $p<.05$) were also both found to be positively correlated to work engagement, but after considering the interaction term with morningness, were not found to have any moderating effect on the relationship between morningness and work engagement. The same holds true for Neuroticism (β=-.121, $p<.05$), which in contrast, however, was negatively correlated with work engagement. There was no statistically significant correlation found between Agreeableness and work engagement. Consequently, H5 to H9 were rejected.

Table 4.5.

Results of Hierarchical Regression Analysis – Extraversion as the Moderator (N=200)

Variables	Model 1	Model 2	Model 3
Controls			
Gender	-.100	-.113	-.113
Age	.016	.012	.012
Job Satisfaction	.591***	.549***	.555
Independent Variables			
Morningness		.045	.037
Extraversion		.173**	.175**
Independent Variables			
M x E			-.083
R^2	.369	.400	.407
Adjusted R^2	.359	.385	.389
ΔR^2	.369	.031	.007
F	38.180	25.897	22.072
Δ F	38.180	5.057	2.223

Note. **p<.05; **p<.01; ***p<.001*; Two-tailed tests of significance

Table 4.6.

Results of Hierarchical Regression Analysis – Agreeableness as the Moderator (N=200)

Variables	Model 1	Model 2	Model 3
Controls			
Gender	-.100	-.088	-.083
Age	.016	.012	.014
Job Satisfaction	.591***	.587***	.579***
Independent Variables			
Morningness		.055	.054
Agreeableness		-.047	-.053
Independent Variables			
M x A			-.036
R^2	.369	.374	.375
Adjusted R^2	.359	.357	.355
ΔR^2	.369	.005	.001
F	38.180	23.139	19.282
Δ F	38.180	.733	.372

Note. **p<.05; **p<.01; ***p<.001*; Two-tailed tests of significance

Table 4.7.

Results of Hierarchical Regression Analysis – Conscientiousness as the Moderator (N=200)

Variables	Model 1	Model 2	Model 3
Controls			
Gender	-.100	-.100	-.090
Age	.016	-.005	-.001
Job Satisfaction	.591***	.544***	.547***
Independent Variables			
Morningness		.024	.014
Conscientiousness		.143*	.137*
Independent Variables			
M x C			-.048
R^2	.369	.389	.391
Adjusted R^2	.359	.373	.372
ΔR^2	.369	.020	.002
F	38.180	24.712	20.665
Δ F	38.180	3.215	.651

Note. **p<.05; **p<.01; ***p<.001*; Two-tailed tests of significance

Table 4.8.

Results of Hierarchical Regression Analysis – Neuroticism as the Moderator (N=200)

Variables	Model 1	Model 2	Model 3
Controls			
Gender	-.100	-.083	-.073
Age	.016	-.016	-.018
Job Satisfaction	.591***	.544***	.542***
Independent Variables			
Morningness		.061	.059
Neuroticism		-.121*	-.127*
Independent Variables			
M x N			.078
R^2	.369	.384	.390
Adjusted R^2	.359	.368	.371
ΔR^2	.369	.016	.006
F	38.180	24.222	20.591
Δ F	38.180	2.442	1.883

Note. **p<.05; **p<.01; ***p<.001*; Two-tailed tests of significance

Table 4.9.

Results of Hierarchical Regression Analysis – Openness as the Moderator (N=200)

Variables	Model 1	Model 2	Model 3
Controls			
Gender	-.100	-.108	-.106
Age	.016	.001	-.006
Job Satisfaction	.591***	.546***	.556***
Independent Variables			
Morningness		.072	.071
Openness		.147*	.157**
Independent Variables			
M x O			.064
R^2	.369	.392	.396
Adjusted R^2	.359	.376	.377
ΔR^2	.369	.023	.004
F	38.180	25.011	21.067
Δ F	38.180	3.687	1.212

Note. **p<.05; **p<.01; ***p<.001*; Two-tailed tests of significance

Discussion

Relationships

As expected, the found correlation between morningness and work engagement turned out to be positive. While both concepts have been previously linked to the same personality traits (Bakker, Tims, et al., 2012; Randler, 2009), the revealed correlation now confirms a direct connection between the two constructs in a scientific fashion. After reviewing relevant literature, only one other study was found, linking morningness to one sub-dimension of work engagement (Waleriańczyk, Pruszczak, & Stolarski, 2019). The finding of the run ANOVA test further solidifies this correlation, by demonstrating, that morning-type employees experience significantly higher levels of work engagement than their evening-type employee counterparts. Consequently, it can be assumed that employees are heavily influenced by their circadian rhythm in whether or not they feel vigorous, dedicated and absorbed in performing work tasks.

The same holds true for the found strong significant correlation between morningness and job satisfaction. As the connection between morningness and job satisfaction has been found before (Moreno et al., 2012), the finding of this study further provides support for the correlation. Further, the findings of the run ANOVA demonstrate that evening-type employees experience significantly lower levels of job satisfaction. The implications of the above findings have to be carefully considered, as they could propose, that a large proportion of working individuals feel unsatisfied with their job, not necessarily because of its contents or tasks, but simply because they aren't allowed to perform during their peak cognitive performance time frame. Lastly, the finding that job satisfaction acts as a mediator in the examined relationship further contributes towards previous findings, indicating that job satisfaction can be a predictor for work engagement(Abraham, 2012; Johnson, 2000; Macey et al., 2011; Singh, 2017) and can act as a mediator in research examining work engagement (Rayton & Yalabik, 2014). Looking at the large proportion of the effect of morningness on work engagement that is managed by job satisfaction, the close relationship between the two concepts once more becomes apparent.

The correlations found between the big five personality dimensions and the independent as well as dependent variable of the study were mostly in line with previous research findings as outlined in Chapter II. Solely, the finding surrounding Agreeableness differed, which in the present study didn't show any correlation between said personality dimension and neither morningness nor work engagement. As anticipated, and in line with previous research (Bakker et al., 2012; Hogben et al., 2009), Conscientiousness was positively correlated with both

morningness and work engagement. Therefore, it was surprising to find that Conscientiousness does not act as a moderator in the relationship between morningness and work engagement. In general, it was unexpected to find that neither of the big five personality dimension constitute a moderator in the present research. However, this finding also implies that no matter the individual personality of an employee, they are all more or less equally affected by their circadian rhythm when it comes to work engagement. Consequently, the organizational implications of the far-reaching impacts of the morningness construct, should be even more carefully considered.

Additional Finding

Another significant correlation to highlight is the one found between morningness and age. To gain further insight into the correlation, another one-way ANOVA was run, to explore whether there exist any significant differences in levels of morningness among different age groups. As a result, it has been found, that there was a statistically significant difference between groups as determined by one-way ANOVA ($F(2,197) = 6.831, p = .001$). A Tukey post hoc test revealed that Morningness was significantly lower among respondents up to 30 years old ($13.8 \pm 2.9, p = .005$) and respondents up to 40 years old ($14.3 \pm 3.0, p = .004$) compared to respondents aged above 40 years old (15.9 ± 2.7). There was no statistically significant difference between the age groups 20-30 years and 31-40 years ($p=.638$).

While this observed correlation isn't novel, it still further contributes to previous findings surrounding the concept of morningness in context with physiological conditions (Adan et al., 2012; Kim et al., 2010; Merikanto et al., 2012).

CHAPTER V CONCLUSIONS AND IMPLICATIONS

Conclusion

The objective of this study was to examine whether an employee's chronotype significantly impacts their work engagement and the mediating effect of job satisfaction as well as the moderating effect of employee's various personality dimensions. Table 5.1 once again lists the hypothesis and also gives an overview of the results.

Table 5.1.

Summary of Hypotheses Results

Hypothesis	Description	Result
H1	Morningness is positively related to work engagement	Supported
H2	Employees with a Morningness-Chronotype experience higher levels of work engagement than Evening-chronotype employees.	Supported
H3	Employees with a Morningness-Chronotype experience higher levels of job satisfaction than Evening-chronotype employees.	Supported
H4	Job satisfaction mediates the positive relationship between morningness and work engagement	Supported
H5	Agreeableness strengthens the positive relationship between morningness and work engagement.	Not Supported
H6	Conscientiousness strengthens the positive relationship between morningness and work engagement.	Not Supported
H7	Neuroticism weakens the positive relationship between morningness and work engagement.	Not Supported
H8	Extraversion strengthens the positive relationship between morningness and work engagement.	Not Supported
H9	Openness to new experience strengthens the positive relationship between morningness and work engagement.	Not Supported

Although the majority of hypotheses in this study were not supported, many interesting insights into the concept of morningness at the workplace were gained. Firstly, it was scientifically established that morningness is indeed significantly positively correlated with

work engagement. Secondly, it was established that morning-type employees experience significantly higher levels of work engagement and job satisfaction compared to their evening-type coworkers. Further, it was found that job satisfaction mediates the relationship between morningness and work engagement. Regarding the lack of support surrounding the moderator hypotheses, it needs to be pointed out that the research surrounding the construct morningess and its effects at the workplace is still in a very early stage. After the extensive review of related literature, only one other study was found, linking morningness to a sub-dimension of work engagement (Waleriańczyk et al., 2019). Consequently, it should be considered very challenging to previously correctly predict a possible moderating factor influencing the relationship. Therefore, the explorative nature of this study should be kept in mind when evaluating its results.

Theoretical Implications

The findings of the present study should be considered an intriguing contribution towards research surrounding chronotypes in an organizational context. Previously, the majority of research in mentioned context looked at shift-work settings (Dickerman et al., 2016; Juda, 2010; Juda, Vetter, & Roenneberg, 2013; Leung, Tranmer, Hung, Korsiak, Day, & Aronson, 2016; Papantoniou et al., 2015). As the findings of the research at hand point out significant links between morningness and critical business variables occurring during traditional working hours, a need for more research in a traditional work setting is warranted. Especially so, since the correlated variables are nowadays important predictors for employee retention and therefore of the outmost importance for the success of a company in the modern business world.

Since the findings of the current study further demonstrate the close relationship of work engagement and job satisfaction, researchers conducting studies on only one of the two concepts, should be advised to also look at the other variable, to gain further insights or avoid any confounding effects.

Further, it is important to mention, that although previous research. as for example in behavioral sciences, might have found links between morningness and certain behaviors or personality dimensions, it is not guaranteed to replicate these findings in a business context. As a result, careful research approaches are required, and it should be avoided to draw quick conclusions based on previous findings in unrelated settings.

Lastly, the slightly low Cronbach alpha value of the Chinese version of the rMEQ appears to be a recurring theme in eastern chronotype research. Since higher values are typically

found when working with other language translations, it would be interesting to explore the reasons behind this phenomenon. While depending on the scope and scale of the research the Chinese rMEQ should still be considered a solid measure for chronotypes, there might be room for improvements or alternatives, which could return even more reliable data.

Organizational Implications

The findings of the study at hand provide various organizational implications.

Raising Awareness

Firstly, it becomes evident that an employee's chronotype can have far-reaching impacts on their subjective experience at work. Since most employees however are likely not even aware of the significant relationship between their physiology, work engagement and job satisfaction, organizations should consider educating their employees to raise awareness around this issue. As a result, employees can better reflect on their feelings regarding work and consider whether their circadian rhythm might be what is preventing them from feeling more engaged and satisfied with their job.

Training Interventions

In a second step, organizations could provide training programs or information material for their employees, which lays out methods on how to adjust their chronotype according to their working times. Previous research has demonstrated, that a considerable adjustment of an individual's chronotype is possible, by utilizing simple interventions, such as adjusting meal times, caffeine intake, exercise and targeted light exposure (Facer-Childs, Middleton, Skene, & Bagshaw, 2019).

Flexible Working Hours

Lastly, organizations should also consider allowing for flexible working hours if the business model allows for it. An increasing body of research already found compelling evidence for the benefits of flexible working hours, such as higher productivity, better perceived work-life balance and job satisfaction (Galea, Houkes, & Rijk, 2014; Shagvaliyeva & Yazdanifard, 2014; Wheatley, 2017). The impact of employee's circadian rhythm on their work attitude should represent a further argument for such an organizational arrangement.

Workforce Assessment

Besides these practical implications, organizations should also reflect on the results of this study in regard to the assessment of their workforce. Considering the findings of the study

at hand, organizations could very likely have a multitude of employees at their disposal which are not performing to the organization's desired level, simply because they are not allowed to perform in the right setting. As a result, these employees are not performing to their fullest potential, resulting in sub-ideal working attitudes as well as potential financial losses on behalf of the organization. In today's working world, where organizations face a multitude of challenges and ever-increasing competition, companies have to avoid such outcomes at all costs. Simultaneously, organizations should be constantly focused on how to enable their employees to perform to their fullest potential. As in doing so, companies are not only helping the employee to feel more engaged and satisfied with their job but also increasing overall productivity and profitability of the firm.

Limitations

As the research was conducted in Taiwan, with a traditional Chinese measurement instrument, the findings of this study are likely only able to provide insights for companies and work settings in Taiwan, with predominantly local employees. The same study in another cultural setting could produce different results. Further research in this domain is needed to solidify found connections.

Another limitation of the research at hand is, that data was collected through an online self-report questionnaire. Although, at the start of the online questionnaire all the respondents were screened to fit the sample requirements, it cannot be completely ruled out, that some respondents were making false claims, in order to participate in the survey.

Suggestions for Future Research

As the research surrounding morningness effects on the workplace is still in its infant stage, there is a multitude of possible directions for future research in this domain. Firstly, further research surrounding critical business variables, which translate directly into organizational performance and profitability, and employees' perceptions in regard to morningness would be interesting to conduct, as this would allow to check and solidify the findings of the present study.

Another possible research direction could be to explore, if belongingness of an employee to a certain chronotype could lead to stereotyping or unjust performance appraisals by a direct supervisor. Previous research indicated such a potential (Gilmer, 2018; Yam et al., 2014), and if confirmed would represent a serious discrimination against certain employees, which would have to be addressed.

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APPENDICES

Moderated Mediation

Additionally, to the outlined statistical analyses described in the study, a moderated mediation analyses via PROCESS v3.5 was run to gain even more detailed insights into the relationship between the variables. As before job satisfaction constituted the mediator while the big five personality dimensions were tested as a moderator. During these analyses, two personality dimensions were found to moderate the relationship between morningness and job satisfaction. The two personality dimensions affecting the relationship were Openness and Agreeableness. The interaction term of morningness and Openness was negative and significant (β =-.0429, t(196)=-2.1887, p=<.05). Similarly, the interaction term of morningness and Agreeableness was found to be negative and significant (β =-.0660, t(196)=-2.6509, p=<.01). These results indicate, that the personality dimensions, Agreeableness and Openness, negatively influence the relationship between morningness and job satisfaction. A possible explanation for this observation could be, that people high in Agreeableness more often try to avoid conflicts and maintain harmonious relationships, although they feel unhappy with a certain situation at work. Consequently, their job satisfaction could be lower than the one among peers who try to actively resolve an unpleasant work conflict. Similarly, employees high in Openness could experience lower levels of job satisfaction compared to their peers, since these individuals potentially feel limited in their creativity and problem-solving approach by a highly hierarchical company structure, as commonly found in the present sample. However, further research is needed to solidify and expand upon the present findings.

Appendix A: Instrument

Part I

這裡有一些特徵可能適合用來描述你，請在「我認為我...」之後針對每一 題勾選您同意的程度。(1=非常不同意， 2=有點不同意，3=既不同意也不反對，4=有點同意，5=非常同意)

我認為我：...

1)___ 話不多
2)___ 整體而言是信任他人的
3)___ 懶惰
4)___ 抗壓能力強，容易放鬆
5)___ 對藝術不怎麼感興趣
6)___ 開朗，社交能力強
7)___ 喜歡尋找別人的缺點
8) ___ 工作細緻周到
9)___ 容易緊張或焦慮
10)___ 想像力豐富

Part II

在每項問題中，請選出最能形容你在過去幾星期的感受的句子。

1. 如果你能夠完全自由地計劃白天的時間，你希望大約在什麼時間起床?
[ ] 早上5 點至6 點半(05:00-06:30 h)
[ ] 早上6 點半至7 點45 分(06:30-07:45 h)
[ ] 早上7 點45 分至9 點45 分(07:45-09:45 h)
[ ] 早上9 點45 分至11 點(09:45-11:00 h)
[ ] 早上11 點至正午12 點(11:00-12:00 h)

2. 清晨起床後的半小時內，你的感覺如何?
[ ] 非常疲倦
[ ] 稍為疲倦
[ ] 一般清醒
[ ] 非常清醒

3. 在夜晚你大約到什麼時候你會感到疲倦，而且需要睡覺?
[ ] 晚上8 點至9 點(20:00-21:00 h)
[ ] 晚上9 點至10 點15 分(21:00-22:15 h)
[ ] 晚上10 點15 分至12 點45 分(22:15-00:45 h)
[ ] 凌晨12 點45 分至 2 點 (00:45-02:00 h)
[ ] 凌晨2 點至3 點(02:00-03:00 h)

4. 一天之中以下哪個時段是你的最佳時間?
[ ] 早上5 點至8 點(05:00-08:00 h)
[ ] 早上8 點至10 點(08:00-10:00 h)
[ ] 早上10 點至下午5 點(10:00-17:00 h)
[ ] 下午5 點至10 點(17:00-22:00 h)
[ ] 晚上10 點至凌晨5 點(22:00-05:00 h)

5. 人可分為 “清晨” 型和 “夜晚” 型,你認為你自己屬於哪一類型?
[ ] 絕對 “早晨” 型
[ ] “清晨” 型多過 “夜晚” 型
[ ] “夜晚” 型多過 “早晨” 型
[ ] 絕對 “夜晚” 型

Part III

以下的 9 個句子是有關您在工作中的感受的陳述。請仔細閱讀，並確定您是否曾在工作中有過這樣 的感覺。如果您從未有過這樣的感受，請在該題目左端的橫線上填入 “0” 。如果曾有過這樣的感受，請您 在橫線上填入相應最能夠描述您的感受的頻繁程度的數字（從 1 到 6）。

幾乎沒有過	很少	有時	經常	十分頻繁	總是
0	1	2	3	4	5	6

1. ____在工作中，我感到自己散發出能量
2. ____工作時，我感到自己強大並且充滿活力
3. ____ 我對工作富有熱情
4. ____工作激發了我的靈感
5. ____早上一起床，我就想要去工作
6. ____ 當工作緊張的時候，我會感到快樂
7. ____我為自己所從事的工作感到自豪
8. ____ 我沉浸於我的工作當中。
9. ____我在工作時會達到忘我的境界

請針對每一 題勾選您同意的程度 。(1=非常不同意， 2=有點不同意，3=既不同意也不反對，4=有點同意，5=非常同意)

10.____ 總體而言，我喜歡在這個單位工作
11.____ 總體而言，我不喜歡我目前的工作
12.____ 總體而 言，我對自己的工作是滿意的

關於你：

Q1: 性別： 男 女

Q2:年齡： _____

Appendix B: Instrument (English)

Part I

Instruction: How well do the following statements describe your personality? Please write a number next to each statement to indicate the extent to which you *agree or disagree with that statement*. (1= Disagree strongly, 2= Disagree a little, 3= Neither agree nor disagree, 4 = Agree a little, 5= Agree strongly)

I see myself as someone who…

1. ___ is reserved
2.____ is generally trusting
3.____ tends to be lazy
4.____ is relaxed, handles stress well
5.____ has few artistic interests
6.____ is outgoing, sociable
7.____ tends to find fault with others
8.____ does a thorough job
9.____ gets nervous easily
10.____ has an active imagination

Part II

Instruction: Answer each question as honestly as possible by marking the most suitable answer. Do not go back and check your answers. Your first response is usually the most accurate.

1. What time would you get up if you were entirely free to plan your day?
[ ] 5:00 – 6.29 am
[ ] 6:30 – 7:44 am
[ ] 7:45 – 9:44 am
[ ] 9:45 – 10:59 am
[ ] 11:00 – 11:59 am

2. During the first half-hour after you wake up in the morning, how tired do you feel?
[ ] Very tired
[ ] Fairly tired
[ ] Fairly refreshed
[ ] Very refreshed

3. At what time of day do you feel you become tired as a result of need for sleep?
[ ] 8:00 – 8:59 pm
[ ] 9:00 – 10:14 pm
[ ] 10:15 pm – 12:44 am
[ ] 12:45 – 1:59 am
[ ] 2:00 – 3:00 am

4. At what time of the day do you think that you reach your "feeling best" peak?
[ ] 5:00 – 7:59 am
[ ] 8:00 – 9:59 am
[ ] 10:00 am – 4:59 pm
[ ] 5:00 – 9:59 pm

5. One hears about "morning" and "evening" types of people. Which ONE of these types do you consider yourself to be?
[ ] Definitely a „morning" type
[ ] Rather more a „morning" than "evening" type
[ ] Rather more an "evening" type than a "morning" type
[ ] Definitely an "evening" type

Part III

Instruction: The following 9 statements are about how you feel at work. Please read each statement carefully and decide if you ever feel this way about your job. If you have never had this feeling, cross the "0" in the space after the statement. If you have had this feeling, indicate how often you feel it by crossing the number (from 1 to 6) that best describes how frequently you feel that way. (0= never, 1= Almost never, 2= Rarely, 3= Sometimes, 4= Often, 5= Very often, 6= Always)

1.___ At my work, I feel bursting with energy
2.___ At my job, I feel strong and vigorous
3.___ I am enthusiastic about my job
4.___ My job inspires me
5.___ When I get up in the morning, I feel like going to work
6.___ I feel happy when I'm working intensely
7.___ I'm proud of the work that I do
8.___ I'm immersed in my work
9.___ I get carried away when I'm working

10. All in all, I am satisfied with my job.
11.In general, I don't like my job.
12. In general, I like working here.

General Information:

Q1: Gender: Male Female

Q2: Age: ___