DEVELOPMENT OF THE INSTRUMENT FOR MEASURING PSYCHOSOCIAL WORK ENVIRONMENT IN THAI GARMENT WORKERS

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ABSTRACT

This study aimed at developing an instrument to measure the characteristics of the psychosocial work environment and describe its key domains. The study was divided into two phases: instrument development and a cross-sectional survey. In the first phase, the initial version of the instrument was developed through a process of translation and back-translation of two existing questionnaires, the Effort-Reward Imbalance Questionnaire (ERIQ) and the recommended version of Job Content Questionnaire (JCQ) which had not previously been translated into Thai. These were then combined with new questions on organizational factors which were developed through a review of the literature. Content validity was examined by five experts and found to be acceptable the Content Validity Index. Face validity was also examined by twelve key informants. The initial psychometric properties were tested with 35 workers and resulted in acceptable Cronbach's alpha coefficients.

In the second phase, the study was tested with 828 workers randomly selected from 6 medium- and large-sized garment factories in Bangkok, Samut Prakan, and Samut Sakorn provinces. Data were collected through self-administered questionnaires from April to July 2007. Tests for internal consistency and stability proved for the instrument's reliability. Cronbach's alpha coefficients showed satisfactory values for ERIQ scales and the new organizational factors whereas some of the JCQ subscales showed only marginal values. Construct validity was tested by exploratory factor analysis and revealed factor solutions that were consistent with the theoretical models. Predictive validity was assessed by logistic regression analysis through the relationships between the psychosocial work environment and psychological outcomes, including psychosomatic symptoms, anxiety, depression, and job satisfaction.

Results revealed that the reward scale demonstrated significant relationships with all psychological outcomes whereas the new organizational factors scale proved able to assess important contributions to job satisfaction. Test-retest stability was examined 2 to 4 weeks later with data from a subsample (n=408). Correlation coefficients showed acceptable values, for a changing work environment, at greater than .3 for all scales of ERIQ, JCQ, and organizational factors, with the exception of the psychological job demand scale of the JCQ. Psychosocial work characteristics were mostly correlated with psychological outcomes. Effort, reward, job demands, emotional demand, job control, total social support, policies and practices, organizational climate, and environmental and physical work conditions represented the key domains in explaining psychological outcomes.

Findings suggest that the developed instrument has adequate validity and reliability to investigate the psychosocial work environment and could be applied to other Thai working populations, particularly manufacturing workers. Further research is required to further test these findings in different populations of Thai workers.

KEYWORDS: INSTRUMENT DEVELOPMENT/PSYCHOSOCIAL WORK ENVIRONMENT/THAI GARMENT WORKERS

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การพัฒนาเครื่องมือประเมินสิ่งแวดล้อมในการทำงานด้านจิตสังคมในพนักงานโรงงานตัดเย็บเสื้อผ้าในประเทศไทย (DEVELOPMENT OF THE INSTRUMENT FOR MEASURING PSYCHOSOCIAL WORK ENVIRONMENT IN THAI GARMENT WORKERS)

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บทคัดย่อ

การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อพัฒนาเครื่องมือสำหรับประเมินปัจจัยสิ่งแวดล้อมในการทำงานด้านจิตสังคม และเพื่อศึกษาคุณลักษณะที่สำคัญของปัจจัยดังกล่าว โดยแบ่งการศึกษาออกเป็น 2 ระยะ คือ ระยะแรกเป็นการพัฒนาแบบสอบถามและทดสอบคุณสมบัติเบื้องต้น และระยะที่สองเป็นการสำรวจในกลุ่มประชากรเป้าหมายคือพนักงานโรงงานตัดเย็บเสื้อผ้า ระยะแรกของการพัฒนาเครื่องมือใช้วิธีการแปลและแปลย้อนกลับแบบสอบถามมาตรฐานคือ ERIQ และ JCQ ส่วนข้อคำถามของปัจจัยด้านองค์กรพัฒนาจากการทบทวนวรรณกรรมทั้งในและต่างประเทศ ความตรงตามเนื้อหาได้รับการตรวจสอบจากผู้เชี่ยวชาญ 5 คนและกลุ่มผู้ให้ข้อมูลหลัก 12 คนได้ค่าดัชนีความตรงของเนื้อหาอยู่ในระดับสูง คุณสมบัติเบื้องต้นของเครื่องมือทำการทดสอบกับกลุ่มตัวอย่างจำนวน 35 คน ได้ค่าความเที่ยงเชิงความสอดคล้องภายในอยู่ในระดับที่ดีและยอมรับได้

ในการศึกษาระยะที่สองได้ทำการทดสอบกับพนักงานกลุ่มตัวอย่างจำนวน 828 คนของโรงงานตัดเย็บเสื้อผ้าขนาดกลางและขนาดใหญ่ 6 แห่งของจังหวัดกรุงเทพมหานคร สมุทรปราการ และสมุทรสาคร เก็บข้อมูลโดยใช้แบบสอบถามที่ตอบด้วยตนเองระหว่างเดือนเมษายนถึงเดือนกรกฎาคมพ.ศ.2550 ความเที่ยงของเครื่องมือทดสอบโดยค่าความเที่ยงเชิงความสอดคล้องภายในและความคงที่ของเครื่องมือ ผลการศึกษาพบว่า ERIQ และปัจจัยด้านองค์กรมีค่าความเที่ยงเชิงความสอดคล้องภายในค่อนข้างสูง ส่วน JCQ มีค่าอยู่ในระดับที่ยอมรับได้ ผลการทดสอบความตรงตามโครงสร้างพบว่าตัวแปรส่วนใหญ่มีความสอดคล้องกับโครงสร้างตามทฤษฎี ส่วนการทดสอบความตรงเชิงทำนายใช้การวิเคราะห์ความสัมพันธ์กับความเจ็บป่วยทางกายที่สัมพันธ์กับความเครียดทางจิตใจ ภาวะวิตกกังวล ภาวะซึมเศร้า และความพึงพอใจในงาน โดยพบว่าปัจจัยด้านผลตอบแทน มีความสัมพันธ์อย่างมีนัยสำคัญทางสถิติกับภาวะสุขภาพจิตทุกด้าน สำหรับปัจจัยด้านองค์กรพบความสัมพันธ์กับความ พึงพอใจในงาน นอกจากนี้ได้ทำการทดสอบซ้ำเพื่อดูความคงที่ของเครื่องมือหลังการเก็บข้อมูลครั้งแรก 2-4 สัปดาห์กับกลุ่มตัวอย่าง 408 คน พบว่าค่าความเที่ยงเชิงความคงที่และค่าความสัมพันธ์ของแบบสอบถามเกี่ยวกับการเปลี่ยนแปลงสิ่งแวดล้อมด้านจิตสังคมในงานมีค่าที่น่าพอใจคือมากกว่า 0.3 ยกเว้นการวัดข้อเรียกร้องจากงานด้านจิตใจของแบบสอบถาม JCQ ผลการศึกษายังพบว่าสิ่งแวดล้อมด้านจิตสังคมในการทำงานส่วนใหญ่มีความสัมพันธ์กับภาวะสุขภาพจิต ทั้งนี้คุณลักษณะที่สำคัญที่สามารถอธิบายความสัมพันธ์กับภาวะสุขภาพจิต ได้แก่ความพยายามในการทำงาน ข้อเรียกร้องจากงาน ข้อเรียกร้องทางด้านอารมณ์จากงาน การควบคุมงาน การสนับสนุนจากงาน นโยบายและการปฏิบัติขององค์กร บรรยากาศภายในองค์กร และสภาพการทำงานด้านสิ่งแวดล้อมและกายภาพ

ผลการศึกษาครั้งนี้ให้ข้อเสนอแนะว่าแบบสอบถามที่พัฒนาขึ้นนี้มีคุณสมบัติที่เหมาะสม และสามารถนำไปใช้ในการศึกษาปัจจัยสิ่งแวดล้อมในการทำงานด้านจิตสังคมในกลุ่มประชากรวัยแรงงานต่างๆโดยเฉพาะพนักงานในโรงงานอุตสาหกรรมของไทย การวิจัยครั้งต่อไปควรมีการศึกษาเพื่อทดสอบคุณสมบัติของเครื่องมือซ้ำในกลุ่มอาชีพต่างๆของ คนงานไทย เพื่อขยายผลของการศึกษาการใช้เครื่องมือประเมินสิ่งแวดล้อมในการทำงานด้านจิตสังคมต่อไป

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CHAPTER I
INTRODUCTION

1.1 Background and Significance

Psychological health is the foundation for well-being and effective functioning for both the individual and the community (World Health Organization [WHO], 2004). The determinants of psychological health are factors related to individual actions and to society and the environment, including working conditions (WHO, 2002). Psychological health problems also can lead to disease and disability, for example, new cases of work-related disease, included psychological illnesses, have been estimated to be 160 millions occurring worldwide (WHO, 1999, 2002). The WHO has stated that an increasing number of workers in industrialized countries, such as the United States, Sweden, and the United Kingdom, complain about job stress and overwork (Gray, 2000). Increasingly, trade unions, employers, and government policy makers are realizing that the social and economic costs of these problems in the workplace cannot be ignored (International Labour Organization [ILO], 2000).

There is a close relationship between psychological and social variables, which can influence human psychosocial well-being and behavior (Derose, 2004). The adjective “psychosocial” involves aspects of both social and psychological behavior. In general, psychosocial variables are psychological, social, and interrelated factors connected with the individual (Derose, 2004). Sometimes, the word refers to “psychosocial factors,” which may be defined as a measurement that potentially relates psychological phenomena to the social environment and pathophysiological changes (Hartvigsen, Lings, Leboeuf-Yde, & Bakketeig, 2004; Hemingway & Marmot, 1999).

The term “psychosocial work environment” has been used to explain the range of sociocultural work-related opportunities that are available to the individual worker

to meet his or her needs regarding well-being, positive self-experience, and organizational productivity (Siegrist & Marmot, 2004). “Psychosocial work strain” or “mental workstrain” is described as a job situation characterized by negative or stressful psychosocial work environment factors that initially may be manifested as short-term apprehension or emotional stress (Elsass & Veiga, 1997). Anxiety frequently is used as a measure of job strain and as a measure of psychological health and well-being, as a measure of accumulated strain (Karasek & Theorell, 1990, p. 103).

The nature and organization of work and working conditions are accepted as determinants of health and well-being (WHO, 2002). The psycho-social dimension of the workplace is an aspect of work conditions, for example, job stress, role-conflict, and job control. Due to employee health and well-being are influenced by a multiplicity of these factors in the workplace, psychosocial factors in the work environment are among the most important predictors of employee well-being and are considered to be among the most important work environment issues in contemporary and society (Kristensen, Smith-Hansen, & Jansen, 2003). The psychosocial problems of employees and their impact on enterprise productivity and medical costs have become critical human resource issues (ILO, 2000).

Studies have shown that the psychosocial work environment is a key element that influences on both the organization and the employee. It can have both positive (e.g., job satisfaction, good work performance) and negative outcomes (e.g., adverse health effects). When negative, potential stressors can cause serious consequences, not only for the individual but also for the productivity of the enterprise. Investigators believe that work organization and psychosocial factors in the workplace can lead to psychological stress (Carayon, Smith, & Haims, 1999). Employee performance, job dissatisfaction, burnout, rates of illness, absenteeism, presenteeism, accidences, injuries, and staff turnover are all affected by the psychosocial work environment (Borritz, Bultmann, Rugulies, Christensen, Villadsen, & Kristensen, 2005; Gimeno, Benavides, Amick, Benach, & Martinez, 2004; Langlieb & Kahn, 2005; Shamansky, 2002; Smith, 1997; Vaananen et al., 2003). Previous studies have shown a strong association between psychosocial factors at work and disorders, such as cardiovascular disease (Collins, Karasek, & Costas, 2005; Danelia & Trapaidze, 2005; Kristensen, 1996), mental health problems (e.g., depression, anxiety), psychological stress (Bourbonnais, Comeau, & Vezina, 1999; Ylipaavalniemi,

Kivimaki, Elovainio, Virtanen, Keltikangas-Jarvinen, & Vahtera, 2005), and musculoskeletal disorders (Carayon, Smith, & Haims, 1999; Dunnagan, Peterson, & Haynes, 2001; Faucett & Rempel, 1994).

Changes in the work environment, work structure, and work organization have caused increased psychosocial stress among almost all employees during their working life (Kawakami, 2000). As a result, work-related psychological problems are becoming more prevalent (Ekpanyaskul & Jiamjarasrangsi, 2004). “Occupational psychosocial factors” have been expressed as part of “work organization factors” that relate to task-and/or organizational–level aspects of the work process that heighten to stress and potential adverse health outcomes (Huang, Feuerstein, & Sauter, 2002). Over the last few decades, impacts of the psychosocial work environment on employee health, performance of workers, and organization has been acknowledged (Kompier, 2005). The evidence-based literature has demonstrated that work organization must be changed in order to reduce psychological distress, improve health, and reduce lost costs (Cahill, 1996; Lavoie-Tremblay et al., 2005). Psychosocial elements also increasingly need to be incorporated into the design of workplace interventions to improve both the health and the overall quality of working life (Cahill, 1996). Eventually, this will affect organizational productivity.

Similarly, developing countries, such as China, Korea, and Thailand, are confronted with problems associated with the need to adapt to rapid changes in working and living conditions that result from industrialization and mechanization (Kalimo, El-Batawi, & Cooper, 1987; Levy, Kjellstrom, Forget, Jones, & Pollier, 1992; Kawakami, 2000; Wasinarom, 1991). The changing nature of work lead to increased exposure to psychosocial risk, while there has been decreased exposure to physical and chemical agents (de Croon, Blonk, de Zwart, Ffings-Dresen, & Broersen, 2002; Paoli, 1997). Job stress, for example, is a concern not only in the European Union, Japan and the U.S. but also many other countries in the world, both developing and industrialized. Kawakami (2000) indicated that job stress and its adverse health effects have been an increasing worldwide concern and are one of the major causes of work-related health problems in the twentieth century. In the past decade, East-Asian countries such as China, Korea, and Taiwan have demonstrated concern about job stress and its adverse effect on worker health.

Thailand is a recently industrialized country in Southeast Asia that is regarded as one of the most successful economies in Asia through its transformation from an agricultural-based society to a manufacturing/industrialized economy (Kuasirikun & Sherer, 2004). Government development planning has tended to concentrate on industrial development. The Thai textile and garment industry, for example, is one of the largest industries in the country but has confronted increased competition from other garment-producing countries and struggling to compete in the international workplace (Kaufman, Tiantubtim, Pussayapibul, & Davids, 2004). Thai manufacturers also have been forced to increase operational efficiency and to reduce costs, and some factory owners have introduced cost-cutting measures that adversely affect working conditions. In such situations, workers inevitably encounter new and critical changes in the work environment and the challenges of adaptation. Too much stress imposed by the type of work, personal susceptibility, or both can result in absenteeism or psychological and psychosomatic disturbances, as well as job stress, which is one of the important psychosocial problems of the work environment (ILO, 1992; Kalimo, El-Batawi, & Cooper, 1987).

In addition to the potential risks from environmental hazard exposure, such as cotton dust, light, heat, noise, and awkward positions, the study conducted by Sothornpitakul (1991) revealed that Thai textile workers have score on negative mental health status higher than average, which was indicating a tendency toward impaired mental health clearly in somatization and phobic anxiety. Results showed the association between negative mental health status with work-related factors. For example, depression and anxiety, were found to be associated with environmental condition (i.e., light and heat), working over time schedule, working with lesser years, and working in examining clothing section. This is consistent with the study by Watcharanon (1996). The researcher stated that prior focus group study showed female workers in garment industry have experienced work-related stress relating to working conditions, relationship with supervisors and co-workers, welfare and benefits, and economic status. These situations guide for population of interest in the present study. Garment industry is one of the well-established industry in Thailand, which is a key resource of national income and employment.

According to the Thai Workmen's Compensation Fund, there is no evidence-based report on the incidence of work-related psychosocial problems and job stress (Social Security Office, 2003). A national mental health survey of Thai workers conducted by Siriwanarangsun, Baulek, Suriya, and Rujirachakorn (2004) showed that the prevalence of stress at high and severe level was 23.9% and depression was 32.8%. Other studies confirmed the prevalence of stress in Thai industrial manufacturing workers, e.g., Nimanong, Sanprasert, Sujirarat, and Tantrapsiri (1991), 15.0%; Netrpukka (1993), 17.8%; Kamolrattanakul (1995), 53.2%; Watcharanon (1996), 14.2%; Samuthsin (1998), 41.2%; Boonleum (2000), 56.1%; and Buranatrevedh and Jirapramukpitak (2002), 19.3%, respectively. Records indicated that the Thai population has increasingly suffered from stress and higher work-related psychosocial problems (Office of Public Health Policy and Planning, 2002; Thai Health Reports, 2004). This is consistent with a prior study by Wasinarom (1991) that Thai workers in industrial factories reported fatigue symptoms and work-related mental strain.

Chailarb (2000) conducted a study of analytical research and knowledge of job stress which was conducted in Thailand from 1989 to 1999. At that time, there were only showed a few studies on occupational stress and it still was little awareness of the subject. These findings corresponded to Shain and Kramer (2004), who found that although a substantial amount had been written on the effects of the physical work environment in terms of occupational health and safety, the literature on the psychosocial aspects of work organization still were in their infancy.

A number of previous studies have been conducted among health care providers and white- and blue-collar workers in occupational health and safety. Most have focused on work-related stress and the improvement of the environment and safety in the workplace to reduce physical health problems (Hanchenlash, 1999; Khamhlom, 2005; Kompayak, 2004; Lahfahroengron, 2002; Nilsaeng, 1999; Phanjaroensri, 1996; Tontithavornwat, 2005). Some have studied about work-related stress and psychological health problems (i.e., depression) and quality of working life (Boonliam, 2000; Eeaim-Yingpanich, 2001; Jirapattarasakul, 2003; Kittiraksanon et al., 1996; Samuthsin, 1998; Poblarp, 2001; Siriwanarangsun, Baulek, Suriya, & Rujirachakorn, 2004; Sornprasit, 2001; Teppornborisuthi & Chanprasert, 2003; Thipakam, 2000; Yingrattanasuk, Serikhajornkitjaroen, & Phusapakdeephop, 2001),

as well as job satisfaction, primarily among health professionals (Apirakkit, 2003; Chatkaew, 2001; Mikio, 2005; Penthisarn, 1997; Poonenong, 2000; Sitinjak, 2001; Tangpitaksamer, 2002).

These studies have shown that work environments directly and indirectly influence employee health and well-being and directly impact the organization. Nevertheless, psychosocial problems are still be an important issue due to lack of consensus on this issue and lack of accurate instrument for measuring its characteristics. These prior studies have shown inconsistency of tool measurement that resulted in solving these psychosocial problems ineffectively. More recently, there have been attempts to study employee health and health promotion in the workplace, such as developing healthy workplace indicators (Sithisarankul, Punpeng, Boonchoo, & Baikrai, 2003) and determining global standard series (known as ISOs). Although these efforts have improved working conditions, the psychosocial work environment still is disregarded (Siriwanarangsun, Baulek, Suriya, & Rujirachakorn, 2004; Sithisarankul, Punpeng, Boonchoo, & Baikrai, 2003).

Work-related studies are few in number and little is known regarding psychosocial factors at work in Thailand, particularly among industrial manufacturing workers, who confront multiple risk factors in the workplace. Additionally, the major instruments used in Thailand to study these phenomena have been translated and modified from those originating in the U.S. or Europe (Kaewthummanukul, 2003; Phakthongsuk & Apakupakul, 2006; Tuntiseranee, Olsen, Chongsuvivatwong, & Limbutara, 1999; Yingrattanasuk, Serikhajornkitjaroen, & Phusapakdeephop, 2001). These studies mostly used self-reported questionnaires regarding the various outcomes of stress, including job satisfaction, quality of life, coping skills, personalities, fatigue, and burnout. The questionnaires usually were developed by either the researchers or were standardized tools, such as the General Health Questionnaire, General Stress Questionnaire of the Department of Mental Health, Ministry of Public Health, Thailand, and the modified Job Content Questionnaire (Boonliam, 2000; Boonruang, 1998; Buranatrevedh & Jirapramukpitak, 2002; Phoothonggate, 1994; Saengmuang, 1997; Sornprasit, 2001; Thanomwong, 1997; Theerawit, 1998). Psychometric properties, however, were rarely reported. These questionnaires also have shown to be inconsistent usage.

Studies reveal a lack of unified knowledge of the psychosocial work

environment and the specific instruments needed to measure this phenomenon. The need for research in Thailand on the psychosocial of the work environment, therefore, is all the more important. It cannot begin, however, until there are instruments that take into account the uniqueness of the cultural characteristics of Thai workers. The inconsistency of tool measurement is a major problem that can be resulted in minimal knowledge on psychosocial work environment in Thailand, lack of accurate instrument for measuring its characteristics, lack of consensus on this issue, and ineffectiveness of intervention to solve psychosocial problems in the workplace. It is needed to develop an instrument to measure the characteristics of the psychosocial work environment for Thai workers due to the existing tools are well-established in western countries that may not be appropriate for Thais, and inadequate its aspects. This is consistent with the research framework of Thai Workmen's Compensation Fund (2006) for preventing and promoting employee health. It indicates that the priority should be in the improvement of psychosocial factors at work and work-related stress, and the development of the instrument for measuring health risk behaviors in the workplace.

To develop the instrument, it is important to consider about its accuracy. Two characteristics of measurement, reliability and validity, are considered to be utmost importance (Waltz, Strickland, & Lenz, 2005). Developed or selected tools for measuring phenomenon of interest must demonstrate adequate evidence support for reliability and validity. The measurement process also needs to be concerned in order to yield reliable and valid information. The beginning of measurement is clarifying the object, characteristic/attribute or element that want to be measured (Burns & Grove, 2003). Therefore, the conceptual principle for the measure and the measurement framework should be determined (Waltz, Strickland, & Lenz, 2005). These aim to increase precision and trustworthiness of the measurement.

According to major theories in this field, such as the Effort-Reward Imbalance Model and the Demand-Control(-Support) Model, they initially were developed and tested in Western countries, as well as replicated in other non-Western countries. It should be expected that there would be differences in sources and measurements, stressor-strain relationships, and socio-cultural characteristics between the two. Such differences, it may also affect the development of a national strategy and the reduction

and control of psychosocial stress.

The conceptual framework of this study was based on the Effort-Reward Imbalance Model (Siegrist, 1996), combined with the Demand-Control(-Support) Model, which also is known as the job strain model (Johnson & Hall, 1988; Karasek & Theorell, 1990), and the Healthy Work Organization Model (Wilson, DeJoy, Vandenberg, Richardson, & McGrath, 2004). These three models all were utilized in terms of a multidimensional approach to elements of the psychosocial work environment.

The ERI and the DC(S) models have received particular attention in identifying stressful components of the psychosocial work environment. The ERI model is designed to combine situational and personal conditions in the workplace. Its hypothesis is centered on three components; extrinsic effort, extrinsic reward, and overcommitment. These components are measured by the Effort Reward Imbalance Questionnaire (ERIQ).

The DC(S) is recognized as the most widely used model to study the impact of job stress on health. It focuses exclusively on three major concepts of job task- job demands, job control, and social support. They have been selected to represent the vital characteristics of the psychosocial work environment. These concepts are measured by the Job Content Questionnaire (JCQ). The combination of these two measures has resulted in a more efficient predictor of health outcomes, such as coronary heart disease, mental distress, poor self-reported health status, and well-being, than the use of only one model (Ota et al., 2005).

The Healthy Work Organization is a new model and is based on the concept of work organization from the National Institute for Occupational Safety and Health (NIOSH). It is broad in scope and complex, and has been elaborated upon and tested in order to expand the relationship of work-health beyond the immediate interaction between work and the worker. It provides a more systematic accounting of macro-organizational characteristics, such as climate and career development opportunities, and consists of five main components; organizational attributes, organizational climate, job design, job future, and psychological work adjustment. Some of these components were selected as variables in the present study. In addition to the ERI and DCS models, this model could provide comprehensive framework in a study of the

psychosocial aspects at work in Thailand.

1.2 Purposes

The purpose of the study was to develop an instrument that measures those aspects of the psychosocial work environment. It seeks to describe key aspects of the work environment that may impact psychological health and well-being among Thai industrial manufacturing workers.

1.3 Research Objectives

The objectives were:

1. To develop and test the reliability and validity of the developed instrument.
2. To examine the associations of the characteristics of the psychosocial work environment with health outcomes (psychological health problems, i.e., psychosomatic symptoms, anxiety, and depression).
3. To examine the associations of the characteristics of the psychosocial work environment with psychological well-being (i.e., job satisfaction).
4. To explore the key characteristics of the psychosocial work environment among Thai industrial manufacturing workers.

1.4 Research Questions

Four main research questions were asked:

Research Question 1: Do the subscales of the developed instrument demonstrate adequate validity and reliability to measure the key domains of the psychosocial work environment for Thai garment workers?

Specific Research Questions:

1. Does the Thai version of the Effort-Reward Imbalance Questionnaire (Thai-ERIQ) demonstrate adequate validity in terms of content, construct, and criterion-related validity, and demonstrate adequate reliability in terms of internal consistency and stability

2. Does the Thai version of the Job Content Questionnaire (Thai-JCQ) demonstrate adequate validity in terms of content, construct, and criterion-related validity, and demonstrate adequate reliability in terms of internal consistency and stability?

3. Does the additional section of the developed instrument demonstrate adequate validity in terms of content, construct, and criterion-related validity, and demonstrate adequate reliability in terms of internal consistency and stability?

Research Question 2: To what extent are the characteristics of the psychosocial work environment associated with psychosomatic symptoms, anxiety, and depression?

Specific Research Questions:

1. To what extent are the subscales of the ERIQ associated with psychosomatic symptoms, anxiety, and depression?

2. To what extent are the subscales of the JCQ associated psychosomatic symptoms, anxiety, and depression?

3. To what extent are the subscales of the additional section of the developed instrument associated with psychosomatic symptoms, anxiety, and depression?

Research Question 3: To what extent are the characteristics of the psychosocial work environment associated with job satisfaction?

Specific Research Questions:

1. To what extent are the subscales of the ERIQ associated with job satisfaction?

2. To what extent are the subscales of the JCQ associated with job satisfaction?

3. To what extent are the subscales of the additional section of the developed instrument associated with job satisfaction?

Research Question 4: What is the most parsimonious set of domains that can be used to comprehensively represent the key characteristics of the psychosocial work environment in Thailand?

1.5 Conceptual Framework, Variables and Definitions

Relationships between Variables

In the conceptual framework of the present study (Figure 1.1), psychosocial work environment is a major cause or stressor in the workplace, which leading to a

stressful work experience. The psychosocial work characteristics have dimensions that include effort, rewards, overcommitment, job demands, job control, social support, and organizational factors. All these components can be interrelated with each other or independently. By means of individual cognition, belief, and coping, the workers modify their perceptions of stressful work experiences as whether they are positive (job satisfaction) or negative (psychological strain).

In this study, "job strain outcome" refers to employee psychological and physical health outcomes. These outcomes are regarded as an imbalance of perception of work-related factors, such as effort, rewards, overcommitment, workload demands, job control, social support at work, and other organizational factors. Job strain outcomes include the workers' perception of psychosomatic symptoms, anxiety, and depression. They also can result in employees' subjective perception of job satisfaction.

1.6 Definition of Terms

Variables in this study were divided into three types, including independent variable (psychosocial work environment), mediator variable (overcommitment), and outcome variables (physical and psychological health and well-being). The definitions of variables were described as follows:

Psychosocial work environment refers to psychosocial work characteristics, which relating to all organizational factors that affect employee health and well-being. These psychosocial work characteristics variables are constructed base on three models: the ERI model (including effort, rewards, and overcommitment), the DC(S) model (including job or workload demands, job control, and social support), and the HWO model (including worker beliefs, organizational policies and practices, organizational climate, and environmental and physical work conditions).

"Effort" is described as the workers' perception on the jobs that they spend mental and/or physical energy to achieve the goals of their work task. It consists of demands and obligations at work that are measured by the effort components of the ERIQ.

"Rewards" are referred to the workers' perceptions on their jobs that they gain compensation in terms of money and/or fringe benefits, acknowledgement, appreciation, and respect from both supervisors and coworkers. Rewards also refer to

the perceptions of security in their jobs (job stability) and the opportunities for career development. They all are measured by the rewards components of the ERIQ.

"Overcommitment" is described as the personal characteristics in terms of individual cognition, emotion, and coping style that workers use when they confront the stressful work conditions. It might be affected by individual attitudes, beliefs, behaviors, and emotions. This element is measured by the ERIQ.

"Job or workload demands" are defined as the workers' perception of their job that they have to do their tasks over long a period of time with required constant deadlines. They include psychological demands (the workers perceived how fast and/or how hard they have to perform their tasks); physical demands (the workers perceived the amount energy they must spend to complete their tasks); and emotional demands (the workers perceived how the difficulty they have to dealing with interpersonal interactions within the organization). Psychological and physical demands are measured by the demand components of the JCQ, whereas emotional demands are measured by the Copenhagen Psychosocial Questionnaire (COPSOQ).

"Job control or control over work" is referred to the workers' perception that they do have influence over the day-to-day responsibilities of their own work. It consists of skill utilization (skill discretion: the workers perceived the use and the development of their skills and job abilities) and task authority (job autonomy: the workers perceived their ability to make decisions about the job, and influences on the work group, work decision-making, and company policy). These elements are measured by the control components of the JCQ.

"Social support at work" is defined as any types of support that the workers perceive they obtained from supervisors and/or coworkers. It includes material, informational, and emotional supports. These elements are measured by the JCQ.

"Organizational factors" are other influenced factors that affect the workers health and well-being. These factors are related to organization and management. They include worker beliefs, organizational policies and practices, organizational climate, and environmental and physical work conditions. These variables are defined as follows:

- Worker beliefs are the perceptions of workers as how the organization is committed to or responsible for their health and well-being in the workplace and are measured by questions developed by the researcher.

- Organizational policies and practices are the worker perceptions regarding organizational structure, management styles, and working conditions that guide their actions relating to health behaviors and job tasks through the policy statements and practice guidelines of the organization. They also include facilities and reinforcement of safety and health practices within the workplace and are measured by questions developed by the researcher.

- Organizational climate is described as perceived attitudes, feelings, and behaviors that relating to the organization. It is measured by questions developed by the researcher and consists of four dimensions: *organization support* (the actions undertaken at the organizational level that the workers perceive to encourage, advocate, or assist them in dealing with their tasks and responsibilities); *participation with others* (the worker perceptions on the climate in which they are encouraged to involve themselves in some meaningful ways with their colleagues in the organization); *communication* (the extent of effective information exchange within the organization by which the worker perceive they obtain important and useful information for their health and jobs); and *safety and healthy climate* (a climate within the organization that the workers perceive regarding the degree of safety and health relating to promoting healthy life in the work environment).

- Environmental and physical work conditions are defined as workers perceptions of all work environments and conditions that encompass the potential hazards in the workplace. They are measured by questions developed by the researcher.

The outcome variables in the present study are job strain and job satisfaction. They are referred as the consequences of the interaction between the workers' perception and perceived characteristics of the psychosocial work environment, which are mediated by the individual attributes. Although job satisfaction is not health-related outcome, it is a part of individual psychological well-being that is a component of holistic care in nursing.

"Job strain" is focused on the workers' perception and reactions to the stressful work experiences and resulted in psychological and physical health outcomes, psychosomatic symptoms, anxiety, and depressive symptoms.

"Job satisfaction" is described as how satisfied workers are in their work situation, tasks, job demands, and responsibilities. It is measured by the questions developed by the researcher.

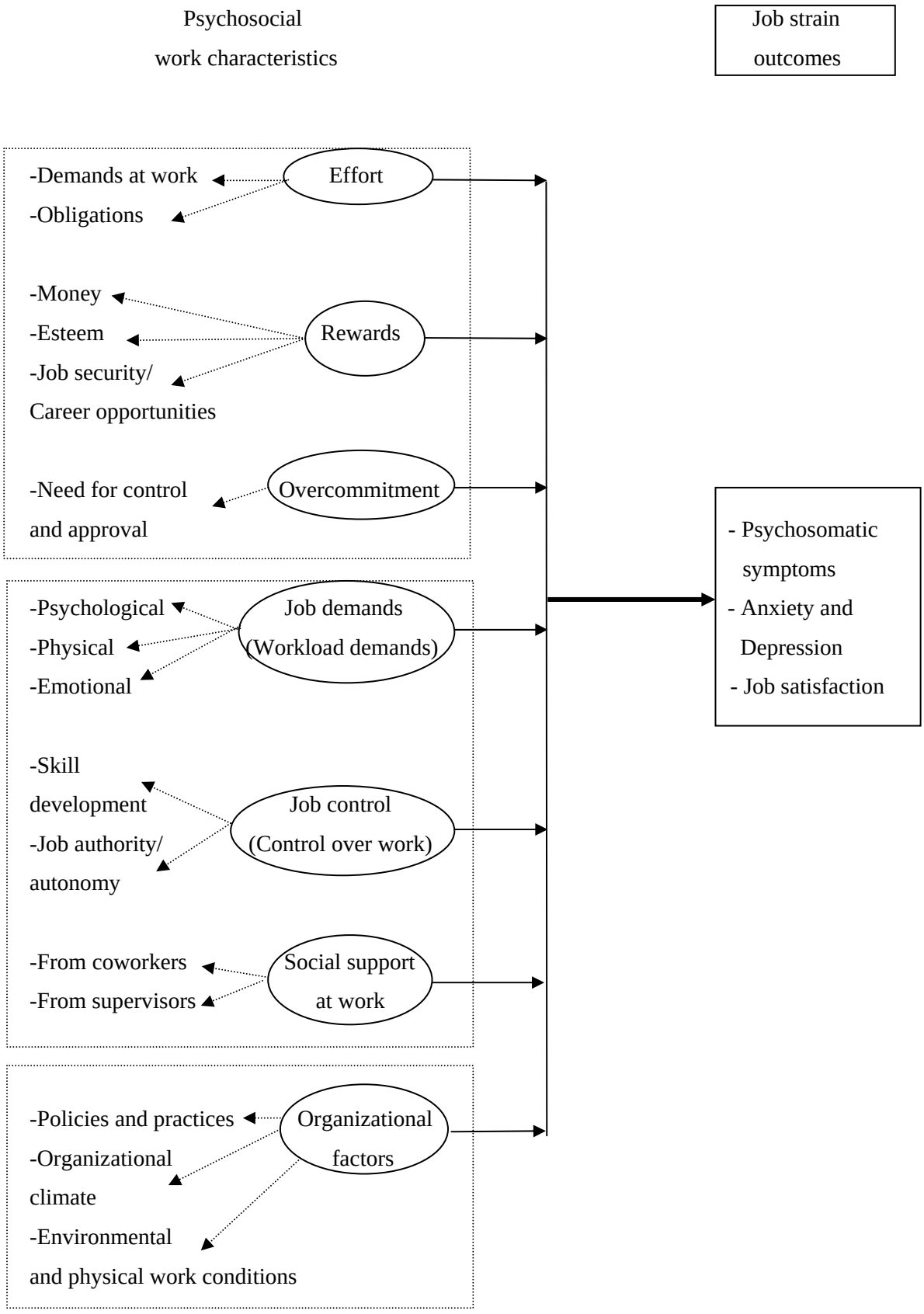

Figure 1.1 Conceptual Framework of the study

CHAPTER II
LITERATURE REVIEWS

This chapter provides information about the relevant literature in the present study. It includes definitions of psychosocial work environment, a review of relevant models, a conceptual framework used in this study, which includes definition of terms of variables and measurement of job strain outcomes, and job characteristics of textile and garment manufacturing industry in Thailand and cultural difference.

A review of the literature for this study has been conducted in both English and Thai. Published studies were identified by means of a systematic search of the following databases: PubMed, PsycINFO, PsycARTICLES, CINAHL, Science Direct, and ProQuest by using the key words “psychosocial factors at work,” “working conditions,” and “occupational stress”, as well as the texts “psychosocial and work,” “job strain,” “the demand-control-support model,” “the ERI model,” “psychosocial work environment and workers,” and “psychosocial stress and workers.” In so far as possible, data focused on manufacturing workers and then, other occupations. In addition, the reference lists of relevant publications were screened for additional information. All types of study designs were included. All were screened to meet the criteria of scientific study; i.e., sufficient sample sizes, a response rate greater than 60%, controls of potential confounders and biases, and valid and reliable instruments. Relatively brief research and abstracts also were selected to provide an overview of model utilization, especially in East Asian countries.

Due to the amount of workforce among textile sub-industries, garment workers are populations of interest in the present study. In the process of garment industry, they expose to a variety of health hazards both physical and psychosocial work environment.

2.1 Definition of Psychosocial Work Environment

The term psychosocial work environment often referred to the psychological and social conditions people experience in the workplace (Hammer, Saksvilk, Nytro, Torvatn, & Bayazit, 2004; Hemmingway & Marmot, 1999). It sometimes refers to psychosocial risk factors or psychosocial hazards, that is, the workplace stressors or organizational factors that can threaten the mental and physical health of employees (Burton, 2004). It also can be defined by the interaction between a person's cognitions, emotions, and behaviors and his or her environment (Siegrist et al., 2004, p.1484).

The psychosocial work environment can be characterized by few resources (e.g., low control over work, low skill discretion, and low decision authority), unsuitable demands (e.g., demands that are too high or too low, and monotonous work), few social resources (e.g., limited social support from colleagues and management, role conflict, and limited social community), and low predictability (e.g., job insecurity, little feedback from supervisors, and lack of information or good communication (Arvidsson, Johansson, Ek, Akselsson, & Josefsson, undated). Pikhart et al. (2001) also provided six dimensions for measuring the characteristics of the psychosocial work environment at work: decision authority, job demand, job variety, social support at work, and effort and reward at work. Among the studies in the area of occupational and environmental health, the Effort-Reward Imbalance model and the Demand-Control(-Support) model are prominently used to explain the characteristics of the psychosocial work environment.

2.2 Theory and Model

The Effort-Reward Imbalance Model

Introduction to the Model

The Effort-Reward Imbalance Model (ERI) was introduced by Siegrist et al. in 1986 and is one of the most important models to guide occupational stress and health research (Siegrist, 1996; Siegrist, & Weber, 1986; van Vegchel, de Jonge, Bosma, & Schaufeli, 2005). Its origin was in medical sociology and the ERI model emphasizes

both the effort and reward structure of work. The ERI model focuses on specific situational and personal characteristics that elicit or enhance the stressful work experience (Marmot, Siegrist, Theorell, & Feeney, 1999; Siegrist & Peter, 2000). It derives from "social reward theory" and builds on the notion of job demands to include the amount of effort invested by workers (Siegrist, 2000). The model is concerned with distributive justice, which is the balance between effort spent and rewards received in a core social role in adult life (Siegrist, 1996).

The model predicts that a chronically stressful experience might occur when workers have continued high effort, as defined by the following conditions: (a) lack of alternative choice in the labor market, (b) unfair job arrangements for strategic reasons, and (c) a specific personal pattern of coping, whereby the employee is characterized by a motivational pattern of excessive work-related overcommitment (Siegrist, 1996; Siegrist & Peter, 2000). The ERI also postulates that a lack of reciprocity between costs (effort) and gains (rewards) defines a state of emotional distress that can lead to the arousal of the autonomic nervous system and associated strain reactions (Siegrist & Peter, 2000). The ERI model can be a predictor of psychological well-being, as it can identify strong negative emotions related to impaired well-being (van Vegchel, de Jonge, Bosma, & Schaufeli, 2005). The model describes possible adverse health reactions due to stimulated neurobiological, psychological, and behavioral pathways.

Key Concepts and Relationships

The ERI comprises three components: extrinsic effort (the demands and obligations put on the working person), extrinsic rewards (offered or promised as part of social exchange in terms of money, esteem, and job security/career opportunities), and intrinsic overcommitment (personal coping with demands and reward expectancies) (van Vegchel, de Jonge, Bosma, & Schaufeli, 2005; Siegrist & Peter, 2000).

Overcommitment is seen as a personality characteristic based on the cognitive, emotional, and motivational elements of Type A behavior. It reflects excessive ambition in combination with a need for approval and esteem (van Vegchel et al., 2005) and can be described as the person-specific dimension of the ERI Model, whereas effort and rewards comprise the situation-specific dimension of the model. The current version of the ERI model is illustrated in Figure 2.1.

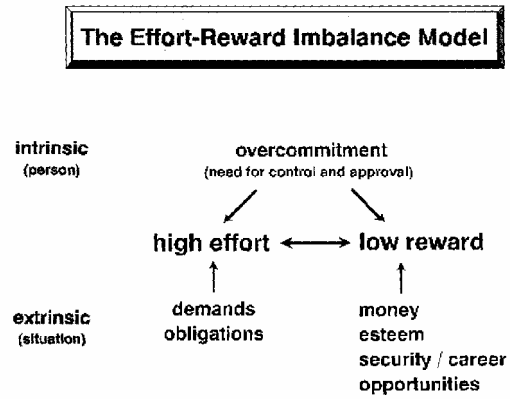

Figure 2.1 The Effort-Reward Imbalance Model (Siegrist & Peter, 1999)

In summary, the ERI model claims that stressful experience is most likely to result from an imbalance between high extrinsic effort and low extrinsic rewards, in combination with a high level of overcommitment. A distinction is drawn between extrinsic effort (situational factors that make work demanding) and intrinsic effort (personal factors such as motivation). It is argued that a combination of both provides a more sensitive indicator of stress at work (Calnan, Wainwright, & Almond, 2000, p. 299; Siegrist & Peter, 2000, p. 85).

Relevant Research Studies

Western Countries

The ERI model has guided occupational health research in the context of job characteristics and employee health for the past decade. It has become increasingly popular, mostly in European research, and numerous studies have applied the model to various health outcomes, including physical health (mainly cardiovascular-related outcomes), behavioral (e.g., sickness absence, smoking, and alcohol consumption), and psychological well-being (e.g., psychosomatic health symptoms, and job-related well-being) (van Vegchel, 2005; van Vegchel, de Jonge, Bosma, & Schaufeli, 2005).

The model originally was used to investigate the relationship between work stress and cardiovascular outcomes; therefore, most studies originally measured cardiovascular disease. In 1998, the model was applied to other psychological and behavioral outcomes. The number of published empirical studies using the ERI model

since has grown rapidly. The ERI has been shown to be associated with cardiovascular risk and disease (e.g., Peter & Siegrist, 1997), psychiatric problems (e.g., Bakker, Killmer, Siegrist, & Schaufeli, 2000; Godlin, Kittle, Coppieters, & Siegrist, 2005), musculoskeletal disorders (e.g., Joksimovic, Starke, Knesebeck, & Siegrist, 2002), gastrointestinal symptoms (e.g., Rothenbacher et al., 1998), and self-reported symptoms (e.g., van Vegchel, de Jonge, Meijer, & Hamers, 2000). Additionally, the association between ERI and adverse health has been found to be significantly increased if employees appear to be overcommitted to their jobs (de Jonge, Bosma, Peter, & Siegrist, 2000; Siegrist, 2005; Siegrist & Peter, 1994). In Belgium, France, Germany, Italy, the Netherlands, Poland, and Slovakia, it has been associated, with self-rated health problems, as well (Hasselhorn, Tackenberg, & Peter, 2004).

In one study of the ERI model, work stress was defined as an imbalance and overcommitment, which, either by themselves or in interaction, were shown to strongly predict the occurrence of heart disease in Germany, Finland, and England (Vrijkotte, van Doornen, & de Geus, 2004). A review by van Vegchel (2005) stated that ERI studies generally were either prospective (longitudinal) or cross-sectional, and that they varied in terms of outcome measures. He also showed that most studies of behavioral outcomes and psychological well-being, supported the ERI hypothesis. None (such as the study by Preckel, von Kanel, Kudielka, & Fischer, 2005) supported the OVC hypothesis. OVC was independently associated with vital exhaustion (depressed mood), instead, and with increased prevalence odds ratios of negative affectivity in public transport employees (Joksimovic, Starke, Knesebeck, & Siegrist, 2002). It also was an independent predictor of coronary restenosis (Joksimovic et al., 1999).

ERI research studies have been utilized in a wide range of occupations, including health care professions, such as nursing and nurses aides (e.g., Bakker, Killmer, Siegrist, & Schaufeli, 2000; Hasselhorn, Tackenberg, & Peter, 2004), blue and white collar workers in a variety of industrial and company settings, public administration, telecommunication, sales work, construction work, transport enterprises, manufacturing and assembly plant, civil servants, and hospitalized patients (e.g., Godlin, Kittle, Coppieters, & Siegrist, 2005; Kuper, Singh-Manoux, Siegrist, & Marmot, 2002). Most often, data for men and women were analyzed separately to determine gender-specific issues (e.g., Chandola, Siegrist, & Marmot, 2004;

Niedhammer, Tek, Starke, & Siegrist, 2004). The model also has been used outside work life, for example, in a study of depression symptoms among those 60 years or older in the United States and Germany (Vondem, Knesebeck, & Siegrist, 2003).

The present study is interested in Thai workers in the garment industry, where workers mostly are women. Data were collected for both male and female workers but analyzed separately.

ERI study designs were prospective (i.e., longitudinal or cohort) (e.g., Fahlen et al., 2005; Kudielka, van Kanel, Gander, & Fischer, 2004) and cross-sectional (e.g., Hasselhorn, Tackenberg, & Peter, 2004; Peter & Siegrist, 1997). One study that tested cardiovascular risk profiles was case-control (Appels, Siegrist, & de Vos, 1997); however, it examined only the concept of need for control and difference in social support between case and control groups, although it was conducted based on age- and gender- matched and minimized for selection and recall biases. The results confirmed that the "immersion" subconcept was critically associated with a coronary-prone coping career and supported this subconcept as necessary to be postulated in the ERIQ. An intervention study discussed a stress management program in bus drivers (Aust, Peter, & Siegrist, 1997).

Various outcomes have been identified in these studies, including cardiovascular diseases (e.g., acute myocardial infarction), coronary heart diseases, cardiovascular risk factors and biological indices (e.g., hypertension, atherogenic lipids, fibrinogen, blood pressure, blood lipids), self-reported/perceived health status or health-related quality of life, and physical and mental health functioning and well-being (e.g., job satisfaction, depressive symptoms, anxiety, burnout, fatigue, and intention to leave from work). Other outcomes have included sickness absence, musculoskeletal pain, increased body mass index, and dyspeptic symptoms. Recent studies also have found an association between overcommitment at work and sleep problems, such as sleep disturbance, insomnia, decreased sleep quality (Kudielka et al., 2004; Ota et al., 2005; Peter, Geissler, & Siegrist, 1998). Among women, sleep problems were associated with high overcommitment and low reward. Job satisfaction, job stress, and perceived health status are integrated as outcomes into the present study, which is a cross-sectional design.

Most of these studies focused on either the ERI or a combination of ERI and OVC effects on health outcomes, and support the ERI hypothesis, either singularly and in combination. The OVC hypothesis by itself rarely was studied and supported. Some studies have shown a relationship between overcommitment and health effects, for example, predicting restenosis in cardiac patients (Joksimovic et al., 1999), vital exhaustion (Preckel, von Kanel, Kudielka, & Fischer, 2005), and changing cardiac sympathetic regulation (Vrijkotte, van Doornen, & de Geus, 2004).

East-Asian Countries

Although the vast majority of ERI research studies have been conducted in Europe, some have been conducted in post-communist countries (Pickhart et al., 2001), Japan (Tsutsumi, Kayaba, Theorell, & Siegrist, 2001), and Australia (Lewig & Dollard, 2003). Outside European society, there has been no investigation of the discriminant validity of the ERI based on a large working population (Tsutsumi et al., 2004).

In addition to the DC(S) model, the ERI has been utilized more frequently in Japan, where the standardized Japanese version of the Effort Reward Imbalance Questionnaire (ERIQ) was developed by Tsutsumi et al. (2001). The ERI model has been applied to large number of Japanese employees, e.g., a cross-sectional survey by Tsutsumi et al. (2002). Studies based on the ERI have been conducted in a variety of occupations and settings, including male and female employees, such as dental technicians, production companies, and hospital staff. Results showed a low prevalence of ERI exposure, which reduced the statistical power of the model. Levels of the two stress measures of the model, effort-reward imbalance and overcommitment, were found to be similar for both genders, after controlling for potential confounders. Additionally, the prevalence of ERI status was found mostly in employees aged 25-30 and decreased with age, while the level of overcommitment increased with age. The present study focuses on workers in the industrial manufacturing in Thailand aged 15-60 years.

Watanabe, Irie, and Kobayashi (2004) found a non-significant negative relationship between ERI and a depressive state in blue and white collar workers in a cross-sectional survey. Results showed that social support played a significant role in the effect of the ERI model on worker depression. The risk of a depressive state was exacerbated most when low social support combined with ERI and OVC. These

findings seem to demonstrate an additional effect; complicating the theoretically predicted interactive effect.

The ERI has been used to study the association between job stress and depression among male and female workers at a small Japanese production plant (Tsutsumi, Kayaba, Theorell, & Siegrist, 2001). The cross-sectional study revealed that the combination of high effort and low reward was more frequent found among workers with indirect supportive tasks who had been targeted for downsizing and threatened by job loss. ERI and OVC were independently related to depression.

A similar cross-sectional study conducted by Irie, Tsutsumi, Shioji, and Kobayashi (2004) investigated the relationship between the ERI and the biological markers of disease risks in Japanese workers at a downsized manufacturing corporation. The ERI was shown to have an impact on physical health and was positively associated with elevated values of red blood cell, hemoglobin, hematocrit, triglycerides and glutamic pyruvic transaminase (GPT). It was negatively correlated with a high-density lipoprotein cholesterol level. Overcommitment was positively related to hematocrit and glucose levels, but negatively correlated to total protein level. The ERI model was not found to be significantly related to cortisol, biopyrins levels, and atherogenic lipids.

Kawakami and Tsutsumi (2000) have summarized evidence on the utilization of the ERI model, and its components have been associated with several psychosocial outcomes. The application of the ERI in Japanese working populations seems favourable, at least for psychosomatic symptoms and behaviors. Overcommitment was found to be independently correlated with musculoskeletal symptoms in male dental technicians (Tsutsumi et al., 2001). The ERI and OVC also predicted depression in a study of male and female productive plant workers (Tsutsumi et al., 2000). Among female nurses, the indicators of mood scores of depression and confusion were significantly higher in the high ERI group than the counterpart group (Ohya et al., 2000). Each component of the ERI model and its summary measures were significantly associated with psychological disorder in male and female employees of a producting company (Nagami et al., 2000). The possible association of effort and reward with tobacco dependence was reported in nurses (Kawano, 2000).

A study developed in China by Yang and Li (2004) tested the applicability of the ERI model, and the reliability and validity of the Chinese version of the ERIQ. Results indicated that the ERI related to depressive symptoms and had satisfactory criterion validity, although the overcommitment scales were questionable.

Studies of the ERI in Australia have been infrequent. One cross-sectional survey conducted by Lewig and Dollard (2003) did examine emotional labor on well-being and job satisfaction in call center workers. Significant main effects were found for the ERI, emotional effort reward imbalance (ERID), overcommitment with respect to emotional exhaustion (EE), and ERID with respect to job satisfaction. The relationship between ERI and EE showed that they were mediated by overcommitment. There seems to be no utilization of the ERI model in Thailand.

Summary of Designs/Findings

The ERI model is one epidemiological framework that is used to evaluate the dimensions of psychosocial work characteristics in health, and is becoming more and more widely used (Niedhammer, Tek, Starke, & Siegrist, 2004; Siegrist, 1996). The model defines the psychosocial dimensions at work (i.e., effort, reward, and overcommitment), and postulates that a combination of high effort and low reward (ERI hypothesis) can lead to adverse health as measured by autonomic and neuroendocrine arousal (Siegrist, 2005). All three dimensions are postulated as having separate and combined effects on health. Overcommitment is unique in that it acts as a personal risk factor. Most of the epidemiological evidence reviewed in support of this assumption has originated from investigations conducted in western countries (Siegrist, 2000).

A review of literature suggests that, in 18 years of empirical research, the ERI model has been found to be a valuable contribution to occupational health research by helping explain the work stress phenomenon in terms of a stressful psychosocial work environment (van Vegchel, 2005). Most studies have powerfully supported the assumption of ERI. Overcommitment, however, still is not consistently confirmed. Consistent with some studies in Thailand, rewards have been shown to be the major characteristics of the psychosocial environment in the workplace. Moreover, the investigation has also demonstrated that health outcomes vary, depending on the specific reward used (van Vegchel, de Jonge, Bakker, &Schaufeli, 2002). Generally,

most adverse health effects were found for employees who reported both high efforts and low rewards, thereby supporting the ERI model.

With reference to critical evidence reviews of the ERI model, studies have shown that the model has been extensively utilized over the past 10 years (Tsutsumi and Kawakami, 2004); van Vegchel, de Jonge, Bosma, & Schaufeli, 2005). The model provides significant measures for the evaluation of stressful psychosocial work characteristics on employee health and well-being. Its predictive validity is high for various health outcomes. The heart of the model, that high effort is combined with low rewards, has been intensively tested. The overcommitment assumption has been tested in about half of the studies, while the interaction assumption between the ERI and OVC has been incorporated in very little empirical research. However, the effectiveness of the ERI is expected to be greater with shift workers in service occupations and human service professions, both of which require personal interactions.

The model is applicable in diverse populations and attempts to establish generalizability and cross-cultural differences. Using different ERI indices can complicate comparisons between studies that use the model. For example, one-half of ERI studies have used the original standardized ERIQ, whereas the others used proxy measures. Although both measures supported the model, the full ERIQ seems closer to the constructs of the model than proximate measures. Additionally, the concept of “effort” in the original questionnaire is comprised of a variety of different items (e.g., physical load, time pressure, and working overtime). In case of specific occupations, it might be desirable to divide specific physical and psychological demands.

The ERI model has been recommended to study in different populations and is an appropriate tool to measure psychosomatic symptoms as short-term target outcomes, and sick leave as a medium-term target outcome as the basis of the intervention. Simultaneously, it would be preferable to assess some organizational indices (e.g., job satisfaction, morale, motivation, and performance). The cooperation of employers has also been suggested. The ERI model also can be used independently or as a complementary model with others, such as the DC(S) model.

The literature indicates that the ERI model is a selective approach that helps to better understand the stressful experiences of work environment in a comprehensive way. The ERI, combining with the DC(S) model, may be contribute to the clarification of psychosocial work characteristics in Thailand.

Measurement of the Model

Since the ERI was developed by Siegrist (1996), it has been used as a theoretical model for work-related stress in several studies and tested in occupational health research. An ERI Questionnaire (ERIQ) was developed to further test the validity and predictive power of the model in regard to health outcomes and cardiovascular disease, in particular (Siegrist & Peter, 1999). The questionnaire originally was German but has been translated into English. The recommended version is the full ERIQ, which consists of 46 items with three core dimensions: extrinsic effort (6 items), extrinsic reward (11items,1 item for monetary gratification, 5 items for esteem reward, and 5 items for job security and career opportunities), and overcommitment (29 items). Coping pattern (overcommitment) includes four uni-dimensional subscales: need for control/approval (6 items), competitiveness and latent hostility (6 items), impatience and disproportionate irritability (8 items), and inability to withdraw from work and obligations (9 items).

The original questionnaire targets employed workers, who are middle-aged men and women (preferably 30-60 years old). The classifications of items have derived from principal component factor analysis. One item regarding physically demanding work was recommended only if the study sample had a sufficient prevalence of stressor (e.g., blue-collar workers and nurses). The total scores showed two aggregate measures: ratio of effort and reward (measure of the extrinsic components of the model), and sum score overcommitment (measurement of the intrinsic components of the model). These two measures are predicting variables, both independently and in combination.

A short version of the ERIQ has been developed that contains 23 Likert-scaled items that define three core scales. The overcommitment scale in this version is reduced to 6 items. Rating is five points for the items on effort and rewards, and four points for overcommitment. The higher the score, the more perceived demands are experienced as stressful for effort. A higher point score of overcommitment and high

level of reward also are predictive of adverse health. In summary, increasing values of the ratio indicate increasing effort-reward imbalance (Fahlen, Peter, & Knutsson, 2004; Siegrist et al., 2004).

The ERI model has been utilized mostly in western countries; only a few studies have been conducted in Asian countries, such as Japan, Taiwan, and China (Li et al., 2005; Tsutsumi et al., 2001; Yang & Li, 2004), and none has been conducted in Thailand.

The ERIQ is considered a standardized self-report measure and has been translated into several languages. The psychometric properties of the scales have also been tested, and the questions have been proven to be particularly useful in a large-scale social epidemiological research. It is interesting that the ERIQ has shown satisfactory internal consistency in the epidemiologic studies of the ERI model.

The findings from studies used the ERIQ are summarized in the following table.

Table 2.1 Summary of the studies used the ERIQ

Authors	Study samples	Measurement	Findings	Strengths	Limitations
Siegrist et al. (2004)	Different working populations in five European countries (Belgium, France, Sweden, the United Kingdom, and Germany)	The 23-item version of ERIQ (by reduced overcommitment scales)	The shorter ERIQ demonstrated its suitability for cross-cultural research. Discriminant validity was given in terms of gender, age, and education. Self-rated health was measured as an outcome related to one aspect of content validity. Exploratory and confirmatory analyses have been shown a statistically more appropriate short scale from different study samples.	The study conducted in both male and female employees across different socio-cultural countries.	These studies were cross-sectional design. They were conducted in heterogenous samples. Statistical method was based on the assumption of main and interaction effects of the effort and rewards scales rather than overcommitment and other formulations.
Hanson et al. (2000)	Blue and white-collar employees from different work settings in the Netherlands	The Dutch 47-item ERIQ	Results found sufficient internal consistency (Cronbach's alpha ranged from .68 to .85) and factorial validity for the extrinsic effort and reward subscales. There was a slight weakness among ten items of the status control subscale for need for control. Results also confirmed the congruent validity of the subscales and a hypothesized relationship with health functioning as an external construct.	The study utilized in large sample sizes. The study samples were matched to control confounding factors.	The study was cross-sectional design. I was conducted in heterogenous samples and in female rather than male workers.
Tsutsumi et al. (2001)	Dental technicians	The Japanese version of the ERIQ (full version)	Result was found to be satisfactory on factorial structure, internal consistency (Cronbach's alpha ranged from .77 to .91), and criterion validity with respect to musculoskeletal symptoms.	Response rate was acceptable. The study was conducted in homogenous groups, were controlled for occupational confounder.	The study was a cross-sectional design and showed a selection bias. It was restricted to dental technicians and had a small sample size.

Table 2.1 Summary of the studies used the ERIQ (Cont.)

Authors	Study samples	Measurement	Findings	Strengths	Limitations
Yang & Li, (2004) (Chinese)	Health care workers in China	The short ERIQ (23 items) was modified from the traditional Chinese version of the ERIQ (which developed by Cheng and tested in Taiwanese workers)	The psychometric properties showed acceptable Cronbach's alpha coefficients for all three scales (.56 approximately .82). The factor analysis demonstrated the close fitness with the theoretical constructs, although the overcommitment scales still were questionable. Results indicated that criterion validity was satisfactory and that the ERI was independently related to depressive symptoms ($p < .01$).	(Data were limited to the abstract.)	(Data were limited to the abstract.)
Li et al. (2005)	Male and female health care workers	The 23-item ERIQ	The Chinese version of the ERIQ showed satisfactory internal consistency (.74 approximately .81). An exploratory factor analysis demonstrated that the factor solution in both men and women reflected the appropriate theoretically postulated structure. Criterion validity found consistent associations in all three scales, with a validated measure of job dissatisfaction for both men and women.	The study controlled for confounding factors. It utilized large sample sizes. Response rate was high. The steps of translated and back-translated were well-organized.	The study was a cross-sectional in design. It showed a selection bias and was restricted to health care workers in university hospitals.

The application of the ERIQ to Chinese health care workers (Li et al., 2005) suggests that it can be applied to other occupational groups in China (e.g., industrial and transport workers) and Taiwan (e.g., employees in the microelectronics industry), as well.

Some studies have provided measures of reliability for the ERIQ and are presented in the following table:

Table 2.2 Studies on measures of reliability for the ERIQ

Reference	Occupation Type	Scale	Cronbach's Alpha Coefficient
Siegrist et al., 2004	Working men and women in 5 different European countries	Effort	.79 (in France- French version) .74 (in UK) .71 (in Sweden- Swedish version) .72 (in Germany) .68 (in Belgium)
		Rewards	.85 (in France- French version) .83 (in UK) .80 (in Sweden- Swedish version) .86 (in Germany) .79 (in Belgium)
		Overcommitment	.79 (in France- French version) .81 (in UK) .79 (in Sweden- Swedish version) .73 (in Germany) .82 (in Belgium)
Hanson et al., 2000 (Dutch version)	Employees from 4 companies	Effort Rewards - status control - esteem Overcommitment - need for approval - competitiveness - time pressure - inability to withdraw from obligations	.71 .70 .77 .82 (.81 after revised) .43 .59 .54 .68
Hasselhorn, Tackenberg, & Peter, 2004 (23-item ERIQ)	Nursing staff in ten countries	Extrinsic effort Extrinsic rewards Overcommitment	.69 (France and Slovakia) – .77 (Italy) .74 (The Netherlands) – .81 (Slovakia) .73 (Italy) - .81 (Germany)
Kuper et al., 2002	Male and female civil servants in UK	Extrinsic effort Rewards	.72 .75

Table 1.2 Studies on measures of reliability for the ERIQ (Cont.)

Reference	Occupation Type	Scale	Cronbach's Alpha Coefficient
Tsutsumi et al., 2001 (Japanese version)	Unknown	Extrinsic effort Extrinsic rewards Overcommitment	.88 .91 .77
Tsutsumi et al., 2002 (46- item Japanese version)	Japanese working population, including dental technicians, employee of private companies, staff of several hospitals	Effort Rewards Overcommitment	.82 - .88 .80 - .91 .60 - .76
Watanabe, Irie, & Kobayashi, 2004 (Japanese version)	Unknown	Effort Rewards Overcommitment	.81 .88 .78
Yang & Li, 2004 (Chinese version)	Health care workers	All scales	.56 - .82
Li et al., 2005 (23-item Chinese version)	Workers in three university hospitals	Effort Rewards Overcommitment	.78 .81 .74

The ERIQ has been assessed for content validity, and factor analysis has been used to confirm construct validity. A study on criterion validity by Tsutsumi et al. (2001) showed that there was a significant correlation between components of the ERI and musculoskeletal symptoms. All scales of the ERI also showed a significant correlation with job dissatisfaction (Li et al., 2005), and depressive symptoms (Yang & Li, 2004). Chandola, Siegrist, and Marmot (2005) demonstrated support for convergent validity using associations with age, self-rated health, and job strain.

To further improve the internal consistency and predictive validity of ERI, the original full version has been recommended (Fahlen, Peter, & Knutsson, 2004). The ERI is considered a theoretical framework that emphasizes broader aspects of job control than the JCQ (Landsbergis & Theorell, 2000), which contains items and scales

that measure income and aspects of low job security/career opportunities. Approximately 9 of the 14 concepts employed by Siegrist and Peter (1999) to measure extrinsic effort and low reward are contained in the JCQ, and some researchers have concluded that the JCQ provides a broader set of psychosocial work characteristic measures.

Strengths and Limitations of the Model

The current ERI is a more recent theoretical model used to identify chronic stressful experiences at work and their adverse long-term health effects (Siegrist, 1996). The model as described by Siegrist (1996) and Siegrist and Peter (2000), provides other concepts relating to psychosocial work characteristics. It is less general than the DC(S) model regarding paid employment and negative health effects. The DC(S) model also includes learning activity outcomes and a variety of different occupations, whereas ERI focuses on the work role and the structure of social reciprocity. Although the ERI can be applied to wide range of occupational settings, it is limited to paid jobs. The predominant features of the model include situational job conditions and personality characteristics, as well as additional aspects of the social labor market (e.g., job security, cost, and gain conditions).

The ERI is complex and has a number of components, although the original hypotheses of the model were less complicated than those of the new one. The current model has been extended from one hypothesis to three, which results in more potential interrelationships. All theses interconnected elements have clear and consistent definitions and structural relationships, as can be seen in Figure 5. For the intrinsic factor of overcommitment, the approval of personal coping patterns explains the way of physiological reactions. Empirical indicators can be applied from the broad definition of the three components labeled concepts of effort, rewards, and overcommitment. Subconcepts, such as demands, obligations, and esteem, are not clarified.

The ERI model is valuable in that it emphasizes social reciprocity at work and pays more attention to personal factors. The model can be considered a guide in establishing workplace interventions related to the individual in both practical and research utilizations.

The Demand-Control(-Support) Model

Introduction to the Model

The Demand-Control Model (DCM) or Job Strain Model was first introduced in 1976 by Karasek in his doctoral thesis since he observed that both health and the behavioral effects of work were the combined result of the psychological demands of work and structural job characteristics as they related to decision-making and skill-utilization. The DCM initially was developed for work environments, which can be chronic stressors and are the product of complicated human organizational decision-making (Karasek & Theorell, 2000; Theorell & Karasek, 1996).

The original model consisted of two basic components of psychosocial work characteristics: psychological job demands and decision latitude or job control. The model has since been further developed and tested by Karasek and Theorell (1990). The dimension of social support was elaborated by Johnson and Hall (1988) on the model and called it the "Demand-Control(-Support) Model or DC(S) Model." It sometimes called the "Iso-strain Model" because of the notion that a lack of social support leads to isolation (Morrison, Payne, & Wall, 2003). This model predicts that stress can cause both psychological strain and physical illness and that the behavioral correlates of work can be motivating factors in the development of new behavior patterns.

Key Concepts and Relationships

The three most studied characteristics of the psychosocial work environment in relation to health are job demands, decision latitude (job control), and social support at work (Bourbonnais, Comeau, Vezina, & Dion, 1998). The original DCM regarded two basic job characteristics as primary sources of job stress: psychological job demands and decision latitude (Karasek & Theorell, 1990). In the present study, however, all three psychosocial work characteristics are emphasized.

In the DC(S) model, psychosocial work experiences can be characterized by different combinations of demands and control dimensions, in which social support is considered to be a buffering effect. The original DCM showed that psychological demands, combined with decision latitude resulted in four job quadrants or categories. The dynamic DCM showed job situations associated with the development of mastery over a significant period of time (Theorell & Karasek, 1996). The original DCM has

two hypotheses, the job strain hypothesis and the active learning hypothesis (Karasek & Theorell, 1990, 2000). The first is the primary predicting hypothesis, which postulates that a high level of psychological job demands combined with a low level of worker decision latitude in the task (defined together as “job strain”) can result in the most adverse reactions of psychological strain (fatigue, anxiety, depression, and physical illness) (Karasek & Theorell, 1990, 2000). High job strain can occur when workers are exposed to unfavorable working conditions and increasingly spend their forces and their control over work. “Iso-strain,” which is described as the joint effect of job strain and lack of social support or social isolation in the workplace, is the worst hypothesized situation (Karasek & Theorell, 2000).

Theorell & Karasek (1996) hypothesized that job strain would increase the risk of psychological strain and illness and that a high level of psychological demands combined with a high level of decision latitude (which they labeled an “active job situation), would lead to the “desirable stress” outcome of increased motivation and learning opportunities. Situations with low levels of psychological demands and with high and low decision latitude were identified as “relaxed” (low job strain) and “passive job situations,” respectively.

Their second hypothesis concerned psychological growth, which is the result of behavioral and skill development. This situation occurs when workers have psychosocial experiences in their job. From this growth, new learning patterns emerge that require both individual psychological energy expenditure and the exercise of decision-making capability (Karasek & Theorell, 2000). These two major hypotheses are presented in the DCM (see Figure 2.2).

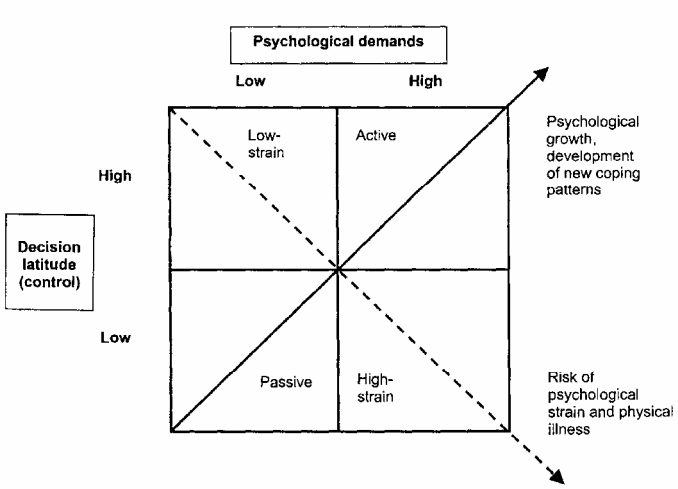

FIGURE 2. Psychological demand/decision latitude model [Karasek, 1979]. Reprinted from "Job demands, job decision latitude, and mental strain: implications for job redesign" by RA Karasek published in the Administrative Science Quarterly, Vol. 24, by permission of Administrative Science Quarterly © 1979 by Cornell University.

Figure 2.2 The Demand-Control Model (Huang, Feuerstein, & Sauter, 2002)

The dynamic version of the DCM (see Figure 2.3) shows the combined effects of demands and decision latitude continuing over time and interacting with the individual personality and its impact on psychophysiological and behavioral outcomes (Theorell & Karasek, 1996).

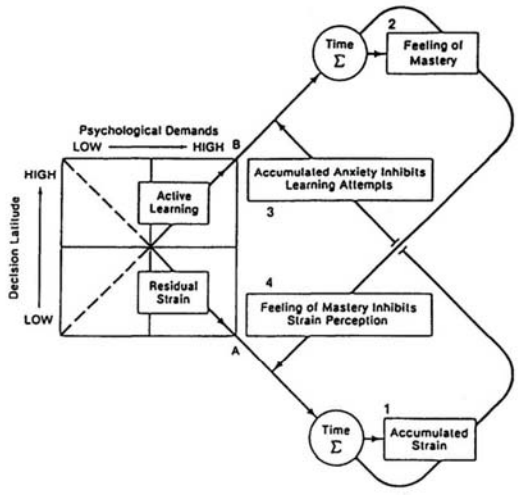

Figure 2. The environment, the worker, and illness: Dynamic associations linking environmental strain and learning to evolution of personality.

Figure 2.3 The dynamic version of the DCM (Theorell & Karasek, 1996)

Logically, the DCM cannot be collapsed into a uni-dimensional form (Karasek & Theorell, 2000).

Relevant Research Studies

Western Countries

Over the past 20 years, the DC(S) has been used predominantly to identify the core dimensions of the psychosocial characteristics of work in the area of occupational health to better understand the association between work and health (van der Doef & Maes, 1999; van Vegchel, 2005). After the model was generated in the late 1970s, it becomes a leading theoretical frame of reference for occupational research. Numerous studies have utilized either the DCM or DC(S), and hypothesized the association with a broad range of health outcomes (e.g., psychiatric morbidity, poor health functioning, sickness absence, coronary heart disease, musculoskeletal disorders, and behavioral risk factors) (de Jonge, Mulder, & Nijhuis, 1999; Head et al., 2005; Muntaner & Schoenbach, 1994; Schhall, Landsbergis, & Baker, 1994; Theorell & Karasek, 1996). Both the job strain model (DCM) and/or the iso-strain model (DC(S)) were hypothesized to be linked with hypertension, cardiovascular disease, cigarette smoking, psychosomatic symptoms, depression, musculoskeletal pain, and adverse birth outcomes (e.g., Cheng et al., 2000; Seago & Faucett, 1997).

The DCM and DC(S) also have gained attention in research on work organizations and public health (Karasek & Theorell, 1990; Soderfeldt et al., 1996). The predictions of the DC(S) have been extensively examined in both United States and Sweden. The well-established theoretical framework of the model has been widely tested in Canada, the United Kingdom, Finland, France, Denmark, Germany, Belgium, the Netherlands, and Australia, as well as Japan (Kawakami & Tsutsumi, 2000; Landsbergis & Theorell, 2000).

The DC(S) is widely utilized in understanding the psychosocial and physical risk dimensions of work environments associated with employee health. Job strain has been tested primarily among non-specific work groups, which is a generalization permitted by the model (Bourbonnais, Comeau, & Vezina, 1999). The association between the psychosocial work environment and psychological health status has been shown in earlier studies. A number, both in the West and Japan, have examined the relationship of job control and job strain with depression and other psychological

health problems, and all found a strong association (Bourbonnais, Comeau, & Vezina, 1999; Bultmann, Van Den Brandt, & Kasl, 2002; De Croon et al., 2004; Pikhart et al., 2004; Williams et al., 1997). The model also provides an empirical measurement tool, the Job Content Questionnaire (JCQ), which was designed to assess the psychological and social dimensions of work environment characteristics (Karasek & Theorell, 1990).

Although both cross-sectional and longitudinal studies have yielded some support to the job strain and iso-strain hypotheses, empirical tests of the models are inconsistent, as are conclusions regarding the interaction and buffer hypotheses (de Lange, Taris, Kompier, Houtmant, & Bongers et al., 2003; van der Doef & Maes, 1999). Most study designs are cross-sectional. Some authors have documented two prospective (longitudinal) examples that have confirmed the strain hypothesis regarding depression (Bildt & Michelsen, 2002; De Lange et al., 2003).

The job strain hypothesis has been confirmed in the majority of cross-sectional studies examining male and gender-mixed samples related to psychological health and well-being, and distress, whereas the iso-strain hypothesis has been supported in only about half of such studies (van der Doef & Maes, 1999). van Vegchel (2005) indicated that more DC(S) studies have tested the strain hypothesis (i.e., only the main or additive effect), as opposed to the buffer hypothesis (i.e., the interaction effect). It seems that more researchers believe that an additive effect is sufficient to prove the validity of the model. Subsequently, results reflected in the confirmation rates, which received considerable support, were found more for additive effects than for interactive effects. The relatively limited number of studies testing the buffer hypothesis have shown inconsistent results (van der Doef & Maes, 1999).

Diverse populations have been studied, including health care workers (e.g., hospital employees, nurses, physicians), and workers in other organizations (e.g., companies, factories) among both male and female employees (de Jonge, Mulder, & Nijhuis, 1999; Muhonen & Torkelson, 2003; Sanne et al., 2005). Study designs mainly have been cross-sectional, although prospective (longitudinal or cohort) studies have increased due to questions on the relationship of cause and effect. Case-control studies and multi-method designs have been studied less frequently, e.g., Hall and Johnson (1989) and Evans et al. (2006), respectively.

Core components have included psychological job demands and job control, and aspects of additional social support. They have been tested chiefly in combination, or at least in one dimension of job demands and/or control. The majority of studies have resulted in either strong support or partial support of the job strain and iso-strain hypotheses. The DC(S) was generated to investigate the relationship between work characteristics and health, specifically cardiovascular health, and numerous studies have supported this association. Various psychological health outcomes have been examined, as well, including psychological well-being (e.g., quality of life, job satisfaction, job involvement), mental health problems (e.g., depression, anxiety, burnout), and psychological distress (e.g., psychosomatic complaints, fatigue and physical health problems, emotional exhaustion). Recently, the DC(S) has been utilized to study other health outcomes, including musculoskeletal disorders, sickness absence, and returning to work after an injury or illness.

East-Asian Countries

In 1992, the International Labour Office (ILO) postulated that job stress was one of the major causes of work-related health problems. After the first conference on job stress in 1998, which was attended by the European Union (EU), Japan, and United States, increasing concern emerged among several East Asia countries, e.g., China, Korea, Taiwan, Australia, and particularly Japan (Kawakami, 2000). These countries were concerned about work-related stress and the conceptual reference (e.g., the DC(S) model), as well as its adverse effects on worker health. This has led to renewed research activity, particularly in Japan, which has promoted research on job stress.

The DC(S) model has been utilized in East-Asian countries, as well. The “job strain hypothesis” (high demands and low control over work) and “iso-strain hypothesis” (job strain combined with low support from work) of the model are predominantly utilized. Among countries in East Asia, available evidence has mostly been presented in Japanese studies. Most of these investigations have been conducted in cross-sectional studies, although a few have been prospective or longitudinal (Cheng, Chen, Chen, & Chiang, 2005; Kondo et al., 2006; Tarumi, Hagihara, & Morimoto, 2004). All involve both male and/or female workers in various factories, as well as civil servants.

Most Asian studies have focused on the association between psychosocial job stress and adverse health outcomes, such as mental health (e.g., depressive symptoms, psychological distress, job dissatisfaction), coronary heart disease and risk factors (including biologic markers), general health status (e.g., psychosomatic symptoms, poor self-reported health), musculoskeletal disorder (e.g., upper extremity musculoskeletal pain), and behavioral patterns (e.g., sickness absence, insomnia, drinking problem) (Cheng, Chen, Chen, & Chiang, 2005; Cheng, Luh, & Guo, 2003; Kawakami & Haratani, 1999; Kawakami, Haratani, & Araki, 1992; Kawakami & Tsutsumi, 2000; Kondo et al., 2006).

These findings strongly support the DC(S) model. Perceptions of higher job demands, lower job control, and poor workplace social support were all significant psychosocial job characteristics. In a research review of job stress in Japan, Kawakami and Haratani (1999) noted that lack of job control or skill use, lack of worksite support, and some types of job demands (qualitative demands), such as trouble at work, work responsibility, not being allowed to make mistakes, and difficulty in keeping up with new technology, had a great effect on mental health among Japanese working populations.

A few studies that utilized the DCM or DC(S) model have been conducted in Thailand. A cross-sectional study in 536 electronics workers by Buranatrevedh (2002) found that 24% experienced general stress and 15%, occupational stress. It used a modified Job Content Questionnaire. A study by Yingratanasuk, Serekajornkitcharoen, and Pusapakdeepob (2000) also used the model with different questionnaire. Employees who had scored high on the role conflict and overload scales received the highest mean score on job demands. Tuntiseranee, Olsen, Chongsuvivatwong, and Limbutara (1999) found that psychological job demands weakly correlated with infant in southern Thailand who were small for their gestational age. A study by Bhanthumnavin (2003) found that perceived social support from supervisors and organization are associated with subordinate performance. This study, however, was not based on the DC(S).

Although these findings have revealed the impact the psychosocial work environment on worker health in Thailand, psychological health and well-being in studies that use the DC(S) model are relatively rare outcome variables. They, therefore, are reviewed and investigated in the present study.

Summary of Designs/Findings

In summary, the DC(S) is considered to be a well-defined model regarding psychosocial job characteristics. It has also provided a validated instrument (the JCQ) and been supported by a number of empirical studies. Many workers outcomes have been examined, especially adverse health (e.g., coronary heart disease, myocardial infarction, psychological health problems, musculoskeletal disorders, and behavioral risk patterns). These studies have frequently been a cross-sectional design, although an increasing number of longitudinal or prospective studies have been used in studies of cardiovascular disease. Other designs, such as case-control (Hall & Johnson, 1989), multi-method (Evans et al., 2006), quasi-experimental (Michie, Wren, & Williams, 2004), are rarely utilized. Participants in DC(S) studies almost always have been male and/or female workers employed in various work settings, including blue- and white-collar workers, and hospital personnel. Studies also have been conducted with national samples.

These studies almost always highlight the main effect of the strain and iso-strain hypotheses, which are the central to the model. The main findings of previous studies suggest that the job strain and the iso-strain hypotheses are strongly or partially supported. It is rare that no association was found. However, results do show inconsistency and very few investigated the active or behavioral learning hypothesis of the DC(S) model (e.g., Taris et al., 2003).

Consistent with these findings, studies in Thailand have shown that demands from work, control over work, and social support at work are all key characteristics of the psychosocial work environment, although they do differ in occupations, the underlying model, and measurement tools. A lack of knowledge about the psychosocial work environment in Thailand is due to insufficient studies of that its dimension, especially those that are based on a well-defined model like the DCM or DC(S). Moreover, measures of psychosocial work characteristics in Thailand also have borrowed from Western countries, so that a modification of the questionnaire is often required.

Some authors have documented criticism regarding conflicting evidence. Bourbonnais, Comeau, and Vezina (1999) indicated that discrepancies in results may be due to differences in the populations studied (whether they were homogeneous or

heterogeneous), methodologies (whether cross-sectional or longitudinal studies, self-reported or external measures of job strain, diverse measures of exposure or outcome, the lack of control for confounders or effect modifiers), varying statistical procedures, and lack of power to detect a significant risk.

de Lange et al. (2003) stated several deficiencies in the conclusions of these studies. For example, they usually did not take account methodological quality, which led to the hypothesis not being supported, as well as inconsistent results. Theses studies were based primarily on a cross-sectional design, which does not allow a test of reversed and reciprocal causal relationships, and restricts causal interpretation. Nor did they clearly define which patterns of results were required to justify the conclusion that there was "a joint effect" of demands and control on outcomes as measured over time. de Jonge et al. (1999) indicated that, in most DC studies, there was a poor match between theoretical reflections about job control (autonomy) and the measures used.

Some limitations have been shown in studies based on the DC(S) model, and confounding factors and potential biases should be controlled in any further study- and in the present study, as well. Validity and reliability, as well as objective measurements, have been suggested to strengthen the results. The present study, therefore, is based on the DC(S), and strain and iso-strain are hypothesized as having the worst psychological impact on health and well-being.

Measurement of the Model

The Job Content Questionnaire (JCQ) is the means of investigating psychosocial factors at work of the DC(S) model. It is considered to be the most widely used self-administered instrument of its type and was designed to measure the social and psychological characteristics of jobs in the workplace (Karasek et al., 1998). It is based on the DC(S) model, which has been utilized to study stress and health in the workplace. The JCQ includes three best-known scales of the model: decision latitude, psychological demands, and social support. Physical demands and job insecurity have been added to access aspects of job demands.

All scales on the JCQ were generated for the purposes of analyzing micro-level and job characteristics, such as risk assessment by individuals exposed to environments in different work settings in order to predict work-related illness or

adverse health effects. The JCQ also has been used to test the active-passive behavioral correlates of jobs, such as activation, worker motivation, job satisfaction, absenteeism, and labor turnover, as well as the underlying conceptual framework for measuring work quality in social policy and work quantity issues (Karasek et al., 1998).

The JCQ has been translated into more than a dozen languages and is accepted as an (inter)national standardized instrument for various occupations in several different countries (Karasek et al., 1998), including Dutch, German, French, Spanish, and Swedish, as well as Chinese, Japanese, Korean, Taiwanese, and Thai (where a partial translation has studied physical and psychological job demands in nurses) (JCQ Center, 2006; Kaewthummanukul, 2003; National Institute for Occupational Safety and Health, 2006). Using the JCQ, a number of research studies in the west have been done with cross-sectional or prospective designs. Relevant studies in Asia still are beginning, except in Japan (Li et al., 2004), where the Japanese JCQ scales version is increasingly utilized.

The physical aspects of work environment are measured in a very general manner. Several scales of the JCQ include measurements of psycho-social strain outcomes (mental and physical health), but personality scales or non-job stressor assessment (Department of Work Environment, U Mass Lowell, 2006). The JCQ was originally constructed for the Framingham Offspring Study, a large-scale study in the United States that measured the risk of job-related coronary heart disease (Hurrell, Nelson, & Simmons, 1998). The original form of the questionnaire was derived from the Framingham survey and developed for the National Heart, Lung, and Blood Institute.

According to the JCQ, its core questions were drawn from the U.S. Quality of Employment Survey (QES), which was administered in 1969, 1972, and 1977 to a national representative sample of employed individuals (Landsbergis & Theorell, 2000). The original short version consisted of 27 psychosocial questions, which were developed and tested by researchers at the Institute for Social Research, University of Michigan. They were used in personal interviews to assess six different job stressors. The full version of the JCQ, i.e., the recommended version 1.1, was introduced in 1985 and had 8 additional QES items and 14 new questions, for a total of 49 items (Hurrell, Nelson, & Simmons, 1998; Landsbergis & Theorell, 2000). The full JCQ

includes scales for psychological job demands (a composite of items measuring workload and role conflict), skill utilization, job decision latitude, coworker support, supervisor support, job dissatisfaction, depression, and sleeping problems. A long version of the JCQ consists of 112 items and includes scales in the areas of customer contact, social identity, and the human computer interface.

Karasek and Theorell (1990) have indicated that the items in the JCQ are largely in an agree-disagree format. The subscales have internal-consistency coefficients ranging from .40 to .83 and test-retest reliabilities generally greater than .90. Obtained scores from the JCQ can be compared to national average scores on the QES. Landsbergis & Theorell (2000) indicated that the scores from the updated JCQ (version 1.5) scale used to address the global economy for any sample can be compared to national U.S. averages by job title, sex, and industry code in 1995. The JCQ has been widely accepted by those who utilize the DC(S) model. It has been mostly used in North America, Europe, and Japan. The reliability was based primarily on six major studies from the U.S., Canada, the Netherlands, and Japan.

The means and standard deviations of scales were similar across all six studies, and internal consistency tended to be similar across populations (average Cronbach's Alpha was .73 for women and .74 for men. The alpha coefficients of subscales were generally acceptable ($\alpha > .70$), however, the five-item psychological demands scale was only borderline (average $\alpha = .63$), and the three-item job security scale had low reliability ($\alpha < .60$) for two of the three available data. Typically, studies using the JCQ employ a response format based on intensity, which ranged from "strongly agree" to "strongly disagree."

The validity of various versions of the JCQ has been studied, including English, Dutch, and Japanese (Karasek et al., 1998; Kawakami et al., 1995; Kawakami & Fujigaki, 1996), French (Niedhammer, 2002), Spanish (Gimeno et al., 2004), and Chinese (Cheng, Luh, & Guo, 2003; Li et al., 2004). The examination of its psychometric properties is still crucial to allow international comparisons. However, the psychometric properties of the JCQ rarely have been reported in Thailand. The findings of these studies have resulted in different and inconsistent reports on key variables (e.g., psychological demands were statistically significant correlated with bus incidents and regulating action in Spanish bus drivers (Gimeno et

al., 2004). Psychometric properties have varied within the particular context of culture and gender (e.g., Cronbach's alpha coefficients for the Japanese JCQ scales were ranged from .61 to .87 for men and .65 to .87 for women in the study by Kawakami et al., 1995).

Reliability values using the JCQ in studies of job stress and cardiovascular disease, as well as some additional studies examined the values of reliability testing of the JCQ, are reported in the following table:

Table 2.3 Studies on measures of reliability for the JCQ

Reference	Occupation Type	Scale	Cronbach's Alpha Coefficient
Karasek, 1998 (as cited in Landsbergis & Theorell, 2000)	Unknown	Psychological demands Job decision latitude - skill discretion - decision authority Social support - from supervisor - from coworkers Job insecurity	.63 - .72 (men), .63 - .71 (women) .81 (men), .82 (women) .73 (men), .75 (women) .68 (men), .68 (women) .84 (men), .84 (women) .75 (men), .77 (women) .61 (men), .58 (women)
Original analyses Cornell WSBPS (as cited in Landsbergis & Theorell, 2000)	Unknown	Psychological demands Job decision latitude - skill discretion - decision authority Social support - from supervisor - from coworkers Job insecurity	.70 - .74 .81 - .83 .72 - .80 .77 - .81 .87 - .89 .67 - .72 .46 - .72
Kawakami et al., 1995 (Japanese version)	Blue-collar workers (male and female employees of the telephone and electric companies)	All scales	.61 - .89 (men) .65 - .87 (women)
Kondo et al., 2006 (Japanese version)	Employees of an electrics firm in Japan	Job demands Job control Social support - from supervisor - from coworkers	.66 .84 .85 .73

Table 2.3 Studies on measures of reliability for the JCQ (Cont.)

Reference	Occupation Type	Scale	Cronbach's AlphaCoefficient
Cheng et al., 2005 (Chinese version)	Paid employees	Job demands - Physical demands - Psychological job demands Job control - skill discretion - decision authority Social support - from supervisor - from coworkers	>.80 .45 >.80 >.80 >.80 >.80
Li et al., 2004 (Mainland Chinese version)	Health care workers	Psychological job demands Decision latitude Social support	.56 .72 .82
Yang & Li, 2004 (Chinese version)	Health care workers	All scales	.56 - .82
Niedhamner, 1998	Men and women employed in a wide variety of occupations by the French national company	Psychological demands Decision latitude Social support at work	.69 .65 .52
de Lange et al., 2002 (Dutch version)	Employees working in 34 companies, located throughout the Netherlands	Job demands Job control	.65 - .72 (varied across occasions), median alpha = .71 81 - .83, median alpha = .82
Bourbonnais et al., 1998 (18-item JCQ)	Nurses in six acute care hospitals in Quebec city, Canada	Psychological demands Job decision latitude Social support	.79 .72 .83
Escriba-Aguir & Tenias-Burillo, 2004 (Spanish version)	Workers of all professional categories in two general hospitals of Valencia, Spain	Psychological demands Job decision latitude Social support	.66 .83 .86
Lerner et al., 1994 (A modified version of JCQ)	Full or part-time workers	Job demands Job control	.71 .76
Andrea et al., 2003 (Dutch version)	Employees from 45 different companies and organizations in The Netherlands	Job demands Decision latitude Social support	.70 .81 .81

Table 2.3 Studies on measures of reliability for the JCQ (Cont.)

Reference	Occupation Type	Scale	Cronbach's Alpha Coefficient
Becerril, 1999 (Spanish version)	Female workers in two electronic maquiladora plants in Mexico	Psychological demands Decision latitude - skill discretion - decision authority	.58/.66 .45/.63 .43/.48
Phakthongsuk & Apakupakul, unpublished research (Thai version, *r = .8028*)	White and blue collar employees in Songkhla province	Job demands - Physical demands - Psychological job demands Job control - skill discretion - decision authority Social support - from supervisor - from coworkers Additional items - Physical and psychological hazard - Job security	 .7598 .6800 .6841 .6841 .8389 .6756 .8626 .5959

These studies have shown that content validity, as well as internal consistency-reliability testing, are satisfactory and support the use of the scales and subscales of the JCQ. Nevertheless, most studies have found control to be the most reliably determined and psychological demands to be the least; for example, inter-rater reliability was poor (Intra Class Coefficient <.9) for psychological job demands. In particular, the items "not excess," "repetitive work," and "enough time" were much less reliably estimated (Li et al., 2004; Ostry et al., 2001). In second studies, the validity of the JCQ has shown satisfactory concurrent validity, discriminant validity, and predictive validity (Becerril, 1999), external validation (Gimeno et al., 2004), and criterion validity that is related to depression symptoms (Yang & Li, 2000).

Although most study results have been very similar to the original JCQ, some have differed, especially in the aspect of psychological job demands. For example, psychological demands showed a lower value of internal consistency in studies by Brisson et al. (1998) and Kawakami et al. (1995). A study by Yang and Li (2004) found that the job demands scales were still questioned for the Chinese version of JCQ, although the Cronbach's alpha coefficient was acceptable. Similarly, Li et al. (2004) reported that the scale on psychological job demands had shown lower internal

consistency for the (mainland) Chinese version of JCQ. These findings are needed for make a clear distinction between terms “qualitative” and “quantitative” demands (Pelfrene et al., 2003).

Strengths and Limitations of the Model

The DC(S) model is relatively complex regarding the number of concepts and subconcepts within it. The elements increase the potential for theoretical interrelationships among them, which correspond to multiple factors in the workplace that influence worker health and well-being, thus its comprehensiveness. Although the model is fairly broad in scope as it relates to diverse occupations, it is less general in that it predicts mainly negative or adverse health outcomes. It mostly explains the impact of stressful psychosocial work characteristics on illness and chronic diseases.

The model, as described by Karasek and Theorell (1990), Muntaner and O’Campo (1993), and van der Doef and Maes (1999), provides semantic and structural clarity and consistency. All components are clearly and consistently defined and organized, and hypothesized specifically to job situations and job characteristics. The original definition of concepts and subconcepts were abstract but they can be understood and allow the model to be empirically accessible and testable. Due to the efforts of Karasek and his colleagues, the Job Content Questionnaire (JCQ) provides a precise operationalization of psychosocial characteristics at work.

The relationships among concepts and subconcepts are interconnected and can be put into a coherent whole, which is consistent with the proposed assumptions of the model. Although Karasek and Theorell (2000) clarified the definitions, purposes, and assumptions of the DC(S), the phrase “psychological (job) strain” and “psychosocial (job) stress” still are used interchangeably, which may be confusing to readers. Three diagrams: are now available that describe the relationships among the original concepts of psychological demands and decision latitude, together with a third dimension “social support” and a dynamic version of the DC model. The second diagram, which combining social support, is not widely utilized.

The DC(S) model has been empirically supported and accepted as the leading model for studying psychosocial dimensions at work and work-related stress. The model is valued in practice and research, especially in the area of occupational health and safety. It still is important in terms of characterizing the psychosocial dimensions

of work at the task-level and contributes to workplace interventions. However, it does not capture aspects of personal worker attributes, such as personality and coping style. Focusing solely on the DC(S) model, therefore, offers an insufficient perspective on the psychosocial work environment.

The Healthy Work Organization Model

Organizational factors, which are absent in both the JCQ and ERIQ, are major components of the Healthy Work Organization model. Additional items relating to organizational factors are to be added to the developed instrument in that the translated version of the ERIQ and JCQ do not include some important psychosocial work characteristics that are reported in Thailand.

Introduction to the Model

Work organization is an important topic in the study of the work-health relationship (Wilson, DeJoy, Vanderberg, Richardson, & McGrath, 2004). The National Institute of Occupational Safety and Health (1996) has indicated that "work organization" generally refers to the way work processes are structured and managed, such as job design, scheduling, management, organizational characteristics, and policies and procedures. Recently, several related areas of workplace health research have emphasized healthy work organizations, their traits and characteristics.

A healthy work organization (HWO) has been defined as one in which culture, climate, and practice create a positive environment that promotes employee health and safety, as well as organizational effectiveness (Lim & Murphy, 1999). Attention has been directed toward research in job stress, which delineated job and organizational attributes that characterize healthy or low-strain work environments. Organizational climate and cultural factors now are increasingly studied as the contributions to stress in the workplace (Wilson et al., 2004).

There have been very few attempts to develop or test models of healthy work organizations; therefore, empirical data are limited. Recently, the aspects of a healthy work organization and broad-based assessment of organizational influences have been included as important issues in occupational health and safety. Three preliminary studies that relate to organizational health factors (Lowe, Schellenberg, & Shannon, 2003; Sauter, Lim, & Murphy, 1996; Smith, Kaminstein, & Makadok, 1995) have influenced the construction of this model. A healthy organization in the model is

characterized by intentional, systematic, and collaborative efforts to maximized employee well-being and productivity by providing well-designed and meaningful jobs, a supportive social-organizational environment, and accessible and equitable opportunities for career and work-life enhancement (Wilson et al., 2004).

A HWO model was first proposed in 2002 by Vandenberg, Ok Park, DeJoy, Wilson, & Griffin-Blake in an attempt to present and test the antecedents and consequences of a healthy workforce. Later, the model was tested for validation by Wilson et al. (2004). The structural equation modeling (SEM) analyses supported the proposed HWO model. Results have shown that employee perceptions of their organization affect their perception of organizational climate, which impacts the way people relate to their job and regard their future within the organization. This, in turn, impacts their work adjustment, health, and well-being. The HWO model is relatively new developed and, consequently, has generated very few empirical research studies. Due to its multiple components and the relationships among concepts and subconcepts, it is a highly complex model, and a result still needs further refinement.

Key Concepts and Relationships

The concept of healthy work organization refers to the organization and structure of work processes and the inherent interrelationships that exist between the variables of employee well-being and organizational effectiveness outcomes (Park et al., 2004). The HWO model attempts to incorporate this core aspect of a healthy work organization (Wilson et al., 2004). The conceptualization of the HWO model consists of six interrelated domains or components: organizational attributes, organizational climate, job design, job future, psychological work adjustment, and employee health and well-being, which can lead to healthy work organization. These six basic components are represented by three distinctive domains of work life, which play an integral role in the model: job design (employees' individual perceptions of immediate work tasks), organizational climate (the social and interpersonal aspects of the work situation), and job future (job security, equity, and career developments).

These all dimensions of the HWO model are presented in Figure 2.4. They also provide clear definitions, empirical indicators, and measurements.

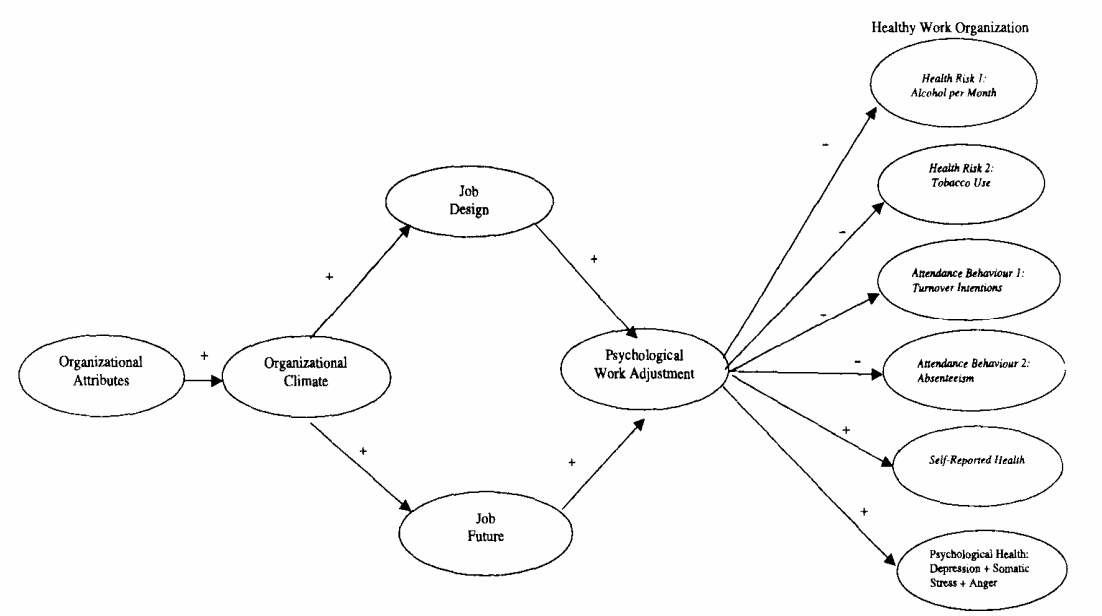

Figure 2.4 The Healthy Work Organizational Model

There has been relatively little direct empirical research and no systematic analysis of HWO conducted to date (Wilson et al., 2004). Although no explicit assumption is stated in the HWO model, it can be implied from the statement that employees and their perceptions and expectations of work organization play a critical role in organizational outcomes, especially health and well-being. Furthermore, policies, procedures, and actions that an organization takes to improve efficiency and effectiveness are filtered through the employees and reflected in their satisfaction with, and commitment to, the job and organization.

Some of the following concepts of the HWO model have been selected to be integrated into the present study: worker beliefs, organizational policies and practices, organizational climate, environmental and physical work conditions, and job satisfaction.

Relevant Research Studies

Western Countries

The fact that a healthy workplace can help prevent occupational disease and injury, as well as promote positive and healthy lifestyle behaviors, has been increasingly researched (Addley, 1999). Benefits can be viewed from the standpoint of both the organization (e.g., positive effects on morale, motivation, sickness

absence, productivity, quality of work, safety profile, flexibility of the workforce, and industrial relations and litigation) and the individual (e.g., improved quality of life, of work and well-being). DeJoy and Southern (1993) outlined an integrative model of workplace health that encompassed worker characteristics, organizational work environment, and extra-organizational influences. A variety of instruments for assessing individual risk were developed, but there was lack of organizational risk appraisal (DeJoy & Wilson, 2003). According to the HWO model, the experience of work is reflected through job design, organizational climate, and job future, all of which affect the thoughts and feelings of employees about their job, work group, as well as the entire organization. The HWO is an effort to include the organization and worker as a whole.

There is limited evidence-based data about the HWO model. The model was applied in an intervention study conducted by Park et al. (2004). The study was developed to examine the effectiveness of healthy work organization intervention on organizational climate and worker health and well-being in different ethnic groups (white, Black, and Hispanic employees). The intervention was designed to enhance the capacity for employee participation and decision-making, and to create a healthier work organization. Findings from pre- and post-comparisons between the treatment and control groups showed the positive effects of the intervention on both climate, health, and well-being outcomes, although these effects varied significantly by ethnic group.

Other studies have utilized some dimensions of HWOs to determine whether the factors associated with employee health outcomes, such as role clarity and organizational climate, were predictors of sickness absence (Vaananen et al., 2004). Supervisor support, group cohesion, and job stress also have been studied as predictors of job satisfaction (Steinhardt, Dolbier, Gottlieb, & McCalister, 2003). Findings from these two studies support the association between HWO and employee health and well-being in the workplace.

A study by Browne, Warnock, and Boykin (2000) utilized the concepts of HWO as an innovative strategy. This cross-sectional study was conducted to examine the relationships between selected Asynchronous Learning Networks (ALNs) work characteristics (faculty workload, institutional support, and compensation practices) and work-related outcomes (global job satisfaction and pay satisfaction). A significant

association was found between adequate technical support, policies and practices that promote equity in workload, pay for faculty teaching ALN-based courses, and improvements in pay and global satisfaction. These preliminary studies on the conceptual HWO confirm the usefulness of the model.

Nevertheless, additional testing and model refinement are needed as an important next step in providing the confidence necessary for extended organizational application. It also has been recommended that the model be tested in various settings with other organizational outcomes (Wilson et al., 2004). Consequently, some factors of the HWO (e.g., policies and practices, organizational climate, and environmental and physical work conditions) have been selected and integrated in the present study.

East-Asian Countries

Little is known about the HWO model in Asia or in Thailand, specifically. One is a Japanese study by Tei and Yamazaki (2003), which used the conceptual model of healthy work organization. This study surveyed 612 Japanese workers in an information service industry company to study the effect of work stressors and organization characteristics on worker health status, job dissatisfaction, and turnover intentions. Using factor analysis, five major factors were identified: scales of organization characteristics, insufficient evaluation system, undeveloped management system, career and future ambiguity, and work and workplace characteristics (e.g., poor coworker support, poor supervisor, insufficient office amenities, and high job demands and control). Results showed a significant relationship between organization characteristics and health status, job dissatisfaction, and turnover intentions of workers. The HWO was found to be a useful framework for the study of organizational health.

Measurement of the Model

Since the HWO model has been developed only recently, its utilization still is being determined. The empirical data presented by the model have been reliable and valid, however. According to the HWO model, several instruments were utilized; other its measurements have been constructed. Some researchers have used only certain components of the original questionnaire, especially organizational climate and organizational commitment.

Summary of Designs/Findings

There have been very few studies of the HWO model, although its concepts have been utilized in both western and non-western countries. There is no study of the model in Thailand. The validity of the model does need further refinement. One intervention study revealed that there was a positive effect on both climate and that well-being outcomes varied by ethnic group (Park et al., 2004). Other studies have used different concepts of the model; for example, one study conducted in Japan by Tei and Yangzaki (2003) used the conceptual HWO model. These findings all support to the HWO model for the study of organizational health as a whole.

Organizational factors in Thailand, such as organizational climate and organizational commitment are significantly associated with job performance of workers and productivity (Meesakul, 1997; Nilsang, 1999; Poonaueng, 2000; Thipakam, 2000). Very few studies have emphasized health and well-being. Organizational factors, including physical and safety environment, therefore, have been corporated into the present study.

Strengths and Limitations of the Model

The healthy work organization is an alternative positive worksite approach. The model has a high degree of complexity regarding the numerous work-related elements that influence worker and organization health and well-being. As it is initially was developed, the model has a broad of scope and expanded the views of work-health relationships and their application in various occupations. It not only utilizes positive but also negative directions. The model provides a comprehensive approach to the workplace and ultimately to healthy work organizations. A clear theoretical definition of concepts is provided by Wilson et al. (2004) and offers more ideas for operationalized empirically measures. These definitions are the guidance to assume accurate measurement based on evidenced supporting. The purposes, definitions, and interconnections among concepts are consistent with the implied assumption of the model.

The major weakness of the model is that it has been replicated by only a few studies. Although the HWO was developed based on existing supportive data and is a validated study, it still needs to be further tested for refinement. Some concepts of the DC(S) and ERI models, indicate psychosocial job characteristics, such as workload,

social support at work, job security, and control/autonomy have been included in the HWO model. Some subconcepts of the HWO have been chosen to be additional variables of the present study.

2.3 Comparison of the Three Models

Explanation of Workplace Phenomena

A survey of research in occupational health epidemiology has indicated that there were 49 studies (10% of the total) on psychosocial hazards in developing countries such as Thailand, Korea, and China (Barry et al., 1992). Occupations included manufacturing, agriculture, mining, and health care. Although previous studies on psychosocial factors at work in Thailand apparently rarely have been documented, their emphasis has focused primarily on the prevalence of mental health problems. Some studies related to stress at work, anxiety, depression, job dissatisfaction, alcohol and drug addicts, somatic symptoms, and social relationship problems (Kittiraksanon et al., 1996; Kongskon, 2000; Samuthsin, 1998; Siriwanarangsun, 2004; Yingratanasuk, Serekajornkitcharoen, & Pusapakdeepob, 2000).

Psychosocial factors at work have been considered to play an important role in contributing to the social determinant of ill health (Marmot, Siegrist, Theorell, & Feeney, 1999). Several different approaches have been utilized to measure psychosocial characteristics at work. Among them, the ERI and DC(S) models have received special attention. These two models have been tested in a number of studies, and a substantial body of knowledge generated. This has led to strong assumptions that stressful work experiences are associated with elevated risk of heart diseases and other diseases (e.g., sickness absence, musculoskeletal disorders (MSDs), and psychiatric disorders). Coronary heart disease (CHD), MSDs, and mental illness are provided as examples of diseases in which are notably associated with psychosocial conditions in the workplaces.

More recently, research studies have shown that combined personal and environmental factors in the ERI and DC(S) models have helped explain the adverse effects of psychosocial work conditions, including cardiovascular diseases (e.g., CHD, myocardial infarction) (Bosma, Peter, Siegrist, & Marmot, 1998; Peter et al.,

2002), health functioning status (Li, Yang, & Cho, 2002; Ostry et al., 2003), insomnia (Ota et al., 2005), psychiatric disorders (e.g., mental distress, stress at work, and depressive symptoms) (Calnan et al., 2004; Calnan, Wainwright, Almond, 2000; Stansfeld, Fuhrev, Slipley, & Marmot, 1999; Tsutsumi, Kayaba, Theorell, & Siegrist, 2001), and employee health and well-being (e.g., emotional exhaustion, psychosomatic health complaints, physical health symptoms, and job satisfaction) (de Jonge, Bosma, Peter & Siegrist, 2002).

The Models as a Foundation for Intervention Design

The ERI and DC(S) models both fulfill methodological criteria for a theoretical model that is reliable, sensitive to change, and valid, as well as able to identify stressful working conditions (Marmot, Siegrist, Theorell, & Feeney, 1999; Theorell, 2000). The difference in the conceptual development of these two models has implications for the design of an intervention to improve health in the workplace. The focus of the DC(S) model is a change of task structure, such as job enlargement, job enrichment, and increased support within the jobs. A reduction of negative outcomes from a stressful work condition (i.e., high cost-low gain) based on the ERI model emphases actions at three levels: individual (e.g., reduction of excessive need for control), interpersonal (e.g., improvement of esteem reward), and organizational structure (e.g., adequate compensation by improved pay and incentives, opportunities for job training, learning new skills, and increased job security) (Marmot, Siegrist, Theorell, & Feeney, 1999).

Intervention studies recently have been conducted on these two models in order to determined the effects of a stressful work experience on health, sickness-absence behavior, and productivity (Peter & Siegrist, 2000). In a study by Orth-Gomer (1994), the DC(S) model, for example, demonstrated the effects of reduced task load, increased decision latitude, job enrichment, and improvement of social support at work on cardiovascular risk. A small-scale intervention by Aust, Peter, and Siegrist (1997), based on the ERI model, reported reduced overcommitment in an intervention group of highly stressed inner-city bus drivers as compared to the control group.

A study by Fontaine et al. (2004) confirmed that work instability had an impact on work stressors and health outcomes. It suggested that all negative health

outcomes (e.g., psychosomatic conditions and psychological strains) are subject to the individual in the organization and society at large. This result suggests that there should be measurements of organization and reorganization, and of individual workers. A participatory organizational intervention was developed by Lavoie-Tremblay et al. (2005) and carried out principally in the ERI and DC(S) models to improve the psychosocial work environment in a long-term care unit. It was found that reward element was significantly increased and the ERI assumption (high effort combined low reward) was a significant association.

2.4 Measurement Needs on the Psychosocial Work Environment

Most occupational health research is oriented primarily to the identification and modification of dangerous work conditions of physical stressors to assure that workers safe and healthy workplace conditions (Baker, 1985; MacDonald, Karasek, Punnett, & Scharf, 2001). Focusing on the psychosocial work environment, job stressors comprise a large number of environmental work conditions thought to impact on health and well-being (Hurrells, Nelson, & Simmons, 1998). One approach to identifying these stressors is to use questionnaires that consist of specific questions regarding a particular occupation or work setting so as to elicit specific features or characteristics of the work environment. An alternative approach is to measure generic or global job characteristics (Landsbergis & Theorell, 2000).

A review of the literatures has revealed that there are several well-known measuring tools, including the Job Content Questionnaire (JCQ), the Swedish Demand-Control Questionnire (DCQ-a short and modified version of JCQ), the Swedish Work Organization Matrix (WOM), the Whitehall Job Characteristics Questionnaire (the adapted JCQ), the Effort-Reward Imbalance Questionnaire (ERI), the Occupational Stress Index (OSI), and the National Institute for Occupational Safety and Health (NIOSH) generic job stress questionnaire (Landsbergis & Theorell, 2000; MacDonald, Karasek, Punnett, & Scharf, 2001). All of these instruments are widely used and have well-defined properties. However, these global job stressor questionnaires tend to focus only on individual jobs characteristics rather than on systems of work organization (Landsbergis & Theorell, 2000).

Petterson and Arnetz (1997) concluded that the work environment has to be included in any discussion of work quality. The psychosocial work environment, work quality, and health should be strongly emphasized. These should be a consideration of the person-environment fit and work-health interaction, and a modification of individual and social resources to better understand the association between potential stressors and the impact on the individual worker and on the organization by more refined and specific tools that measure a comprehensive view of work and health also are necessary.

Due to implications on human morbidity and mortality, there have been extensive research studies on stress (Quick, 1998). It is important to understand individual and organizational stress experiences. Quick has suggested four construct categories of experience: demands and stressors; healthy and normal stress response; modifiers of the stress responses and psychological, behavioral; and medical forms of individual distress. When job or work stress is discussed, it mostly often is examined in relating to work environment, specifically to the psychosocial work environment. In psychosocial research, scales commonly are developed that one specific to a study and results then on generalized to other populations without re-evaluating the stability of the original scale structure (Petterson & Arnetz, 1997). The fact is that the stressors of psychosocial work-related stress cannot be identified by direct measurements as can be physical and chemical environment do. Researchers have indicated that stressful work experience can be analyzed in terms of an interaction of work characteristics and of coping characteristics of the individual worker (Marmot, Siegrist, Theorell, & Feeney, 1999).

In psychological-oriented theory, the subjective and objective work environments, and reactions and health are not clearly separated (Petterson & Arnetz, 1997). As already indicated, the questionnaire or self-report is the most utilized method. It is regarded as a “subjective” psychosocial measure in that individual employees answer given questions. Although questionnaires are inexpensive and easy to statistically quantify and analyze. It has been argued and criticized that their answers may be colored or distorted by personal responsive styles influenced by cognitive consistency within the person, and personal characteristics (Kompier, 2005).

A good questionnaire should include a proper introduction of the study, a primary analysis of selective (non) responses, analysis at the group level, and appropriate statistical analysis. Data should be a useful and valid. Endocrinological strain measures and self-reported stress measures, for example, do not replace each other but instead reflect a different understanding of the process or aspect of the stress response.

Recently, there have been efforts to develop more objective measures (Landsbergis & Theorell, 2000) related to questions on whether one should use occupation-specific measures or measures that can be generalized across occupations; what aspects of work should be measured, such as job characteristics (e.g., demands, control), role characteristics, organizational climate, hours, or broader systems of work organization (e.g., lean production); what characteristics are a property of the individual, job, job title, occupation, or organization; and which questionnaires based on theory which the best measure psychosocial exposures associated with an increased risk of health.

In the literature on job strain, two basic ways have been used to classify individuals: subjective or individual and job method (Kristensen, 1996). The subjective method is based on the responses of person to questions regarding psychosocial job characteristics (e.g., job demands, decision latitude, and perhaps social support). The individual gives a scale value for each dimension, according to a job strain matrix. The job method classifies respondents based on their job. Average values for job strain dimensions are calculated for each job on the basis of responses of people who have that particular job (usually a minimum of five people are required to avoid unreliable estimates). Both of these methods are based on questionnaire data.

Siegrist et al. (2004) have indicated that crude measures may focus on the particular characteristics of the workplace. The stressful character of a psychosocial factor is more appropriately assessed by using self-reported data obtained from questionnaires and interviews. Both approaches are utilized in the present study to determine the characteristics of the psychosocial work environment.

In Thailand, there are standardized instruments that are accepted in terms of their generalizability, including the Thai Mental Health Indicator (TMHI), the World Health Organization Quality of Life in a Thai version (WHOQOL-BREF-THAI), the

General Health Questionnaire also in a Thai version (Thai GHQ 12-28-30-60), and the Suanprung Stress Test-20 (SPST-20). These questionnaires all are self-reported of their physical and psychological symptoms and used to detecting the early stage of psychological disorders. All emphasize adverse mental health effects and do not assess psychosocial job strain. Most occupational health and safety studies in Thailand still use questionnaires as an instrument, either developed or modified by the researcher.

The present study seeks to develop valid and reliable measures for assessing the psychosocial work environment at the Thai textile and garment industries and to use that information to improve their health and well-being. It is hoped that the developed questionnaire, which is based on valid and standardized measures, can provide a new approach to the study of the psychosocial work environment and raise awareness of this issue in the workplace in Thailand.

2.5 Conceptual Framework for this Study

Elements of the Psychosocial Work Environment

Lowe (2004) regards workers as the best judges of whether or not their workplace is healthy. Specific job characteristics are closely associated with workers, and perceptions of whether their work environment is healthy. For example, trust, respect, a safe work environment, good co-workers, communication, work-family balance, job security, good supervision, job autonomy, and friendly and helpful co-workers have all been directly correlated with perceptions of a healthy work environment.

In the workplace, research conducted in the U.S., Europe, Canada, and Australia has revealed that the psychosocial work environment is the best predictor of employee well-being (Peterson, 2006). The term “psychosocial work environment” is understood by Peterson to be the way jobs are designed and the context in which people work. These have the greatest impact on both the health of the organization and the employee. Hammer et al. (2004) have indicated the psychosocial work environment to be the psychological and social conditions people experience in their workplace. It sometimes is focused on job characteristics and other social and economic factors. The psychosocial work environment also has been defined as the

interaction between a person's cognition, emotions, and behaviors and the social environment (Siegrist et al., 2004). "Psychosocial work strain," which is related closely to the psychosocial work environment, is defined by the European Union (2006) as a job situation characterized by negative psychosocial work environment factors.

"Stressful psychosocial experiences at work" sometimes is used interchangeably with "psychosocial hazards" (Burton, 2004) and are defined as workplace stressors or organizational factors at work that can threaten the mental and physical health of employees. They include the following: work overload and time pressure, lack of influence or control over how day-to-day work is done, lack of social support from supervisors or co-workers, lack of training or preparation to do the job, too little or too much responsibility, ambiguity in job responsibility, lack of status rewards (appreciation), discrimination or harassment, poor communication, lack of support for work/family balance, and lack of respect for employees and the work they do.

The partnership for European Research has identified 12 risk factors in the psychosocial work environment (Oeiji & Morvan, 2004). They are the following: low influence (low control), low social support, low rewards, low level of meaning of work, low predictability, high quantitative demands (work pace), small possibilities for development (low skill discretion), low quality of management, role conflicts, conflicts at work, violence, and threats of violence.

A study by Arvidsson, Johansson, Akselsson, and Josefsson (2004) provides additional aspects of the psychosocial work environment. Psychosocial factors at work were defined as causal conditions in the work environment that affect the interaction between the individual and the environment; whereas, psychosocial consequences tend to refer to the experiences and behaviors in reaction to environmental conditions in the workplace. The European Agency for Safety and Health at Work (2002) has stated that a stressful psychosocial work environment is characterized by: few resources (low control over work, low skill discretion, low decision authority), unsuitable demands (too high or too low demands, monotonous work), few social resources (limited social support from colleagues and management, role conflicts, limited social community), and low predictability (job insecurity, little feedback from supervisors, lack of information).

In the present study, the psychosocial work environment is defined by its characteristics of work, which are all organizational factors and job characteristics of the work environment in relating to psychological and social structure (social interaction at work) that impact on employee health and well-being. These characteristics include job demands, job control, social support at work, effort, rewards gained, overcommitment, and other selected organizational factors. Job strain outcomes are the worker perceived health results of the psychosocial work environment and are defined as the consequences of the interaction effect of all psychosocial characteristics of work. They may result in positive (challenge) and/or negative (psychological distress) outcomes. In the present study, job strain outcomes include psychosomatic symptoms, anxiety, depression, and job satisfaction. These variables and their relationships are presented in Figure 1.1 in the Chapter I.

2.6 Job Strain

Definition of Job Strain (Concepts and Subconcepts)

Peter and Siegrist (2000) have indicated that the nature of work has undergone remarkable changes over the past few decades. These changes have shifted adverse working conditions from traditional factors (e.g., physical and chemical hazards) to psychomentally and socio-emotionally demanding jobs. The concept of "job strain" mostly is used in relation to the study of psychosocial work characteristics or the psychomental and socio-emotional conditions at work. Strain is defined as the person's response to an unmet stressor in psychological and physiological terms. Psychological responses relate to negative emotions (e.g., anger, frustration, anxiety, helplessness), whereas physiological responses concern the activation of the autonomic nervous system and related neuro-hormonal and immune reactions. The quality and intensity of a stressor and the duration of exposure, as well as individual differences in coping and vulnerability, clearly have to be taken into account when discussing strain reactions. Recent research has indicated that only part of human strain reactions are subject to conscious information processing, while a large number bypass awareness.

The term "stressful experience at work" delineates that part of affective processing that does reach consciousness and often is attributed to adverse working conditions. "Job strain" refers to the incidence of negative stress-related outcomes,

which include anxiety, burnout, emotional exhaustion, reduced performance, absenteeism, turnover, physical complaints, and illness (Elsass & Veiga, 1997). It is evident that the concept of job strain is primarily the focus of studies on negative physical health outcomes. Increasingly, job strain, is understood to be psychological strain, such as frustration, anxiety, job dissatisfaction, and turnover intentions (Liu, Spector, & Jex, 2005). Therefore, job strain can also be referred to as physical strain (e.g., total symptoms and number of doctor visits), psychological strain, and behavioral strain (e.g., absence). Furthermore, job strain has been suggested in research and theory to be initially manifested as short-term apprehension or emotional distress. As a reverse measure of psychological well-being, anxiety reflects the accumulated residual strain that occurs in response to job stressors (Karasek & Theorell, 1990). As such, anxiety is frequently used as a measure of job strain outcomes.

The psychological aspect of job strain was introduced by Karasek (1979), who understood it to be a combination of a high level of psychological workload demands and a low level of decision latitude (the terms “job decision latitude” and “job control” often are used interchangeably). The highest degree of job strain (iso-strain) refers to high job strain combined with a lack of social support or social isolation at work. These conditions are conceptualized as the job strain model or DC(S) model. The effects of job strain frequently have been reported on psychological and physical health, particularly cerebrovascular diseases (e.g., cardiovascular disease, hypertension, and increased blood pressure). Negative emotions, such as anxiety, anger, depression, and hostility, also have been found as the outcomes of job strain (Williams et al., 1997).

In a comprehensive review on job strain and health conducted by Schnall et al. (1994), almost all research found a notable positive association between increased job strain and increased risk of cardiovascular disease and mortality. The effect of job strain is similar in both cross-sectional and prospective designs, blue- and white-collar workers, and in men and women. Although a number of studies have suggested high job strain can lead to an increase in the risk of CVD, much of this research has suffered from a lack of consistency, including the way job strain is defined (Eaker et al., 2004). For example, one study conducted by De Croon et al. (2004) defined

stressful work as job demands and control. Psychological job strain was defined as the aversive and potentially harmful psychological reactions of the individual to stressful work (i.e., “need for recovery after work” and “fatigue”).

The job strain model still is the predominant conceptualization of occupational stress that is most widely used in occupational health research. Psychological job strain is defined as the interaction effect of greater psychological job demands and lower job control (i.e., a combination of decision authority or job autonomy and skill variety). Strain reactions, which usually refer to adverse health effects, also were determined to be the result of high effort and low gained rewards in the ERI model.

In this study, “job strain outcome” refers to employee psychological and physical health outcomes. These outcomes are regarded as an imbalance of perception of work-related factors, such as workload demands, job control, social support at work, effort, rewards, other organizational factors and overcommitment. They can result in anxiety and depression symptoms. They also can result in employees’ subjective perception of job satisfaction, which is defined as the workers perceived how satisfied they are with their work situation, job tasks, job demands, and responsibilities.

Aspects of Job Strain in Thailand

In Thailand, studies of job strain and its outcomes have been shown in the databases of the Ministry of Labour (MOL) and Ministry of Public Health (MOPH). Data from the MOL database (2006) indicated a number of studies that have been conducted in the area of occupational health and safety. Most of them related to safety, injuries and accidences, health and occupational diseases, rewards (salary and welfare), organizational commitment, leadership/management style, and organizational culture and climate. Others included job performance and productivity improvement, work-related stress, job satisfaction, and quality of work life. In these studies, most utilized the theories/models of administrative and human resource development. They also seemed to emphasize white-collar, rather than blue-collar, workers.

These results are similar to those in studies, presented by the Department of Mental Health in the MOPH. A national survey of mental health problems in Thai workers was recently conducted by Siriwanarangsun (2004), who found a prevalence of high and severe stress (23.9%), depression (32.8%), deliberate self injury (1.9%),

and alcohol abuse (26.9%). Important factors relating to mental health problems included the financial status of workers and their families, fringe benefits, and drug addiction. The mental health problems of workers at a battery factory, for example, revealed that workers who were assessed by the Thai Mental Health Questionnaire showed signs of anxiety (29.5%), depression (6.65%), somatic symptoms (18.6%), psychosis (3.8%), and social interaction problems (50.35%) (Kongsakon, 2000). In addition, research on factors correlating and affecting the mental health of married working women found that adequacy of family income significantly correlated with mental health (Checkchuntouk, 1999).

Regarding life satisfaction among workers in Thailand, the study conducted by Ariyabuddhiphongs, Vanchai, Ariyabuddhiphongs , and Kris (2004) found that life satisfaction of office and factory workers associated with two components: personal matters-health and family, and material matters- job position, salary, important possessions in life, and absence of worry in life. A study conducted by Chailarb (2000), however, has shown that, in the decade from 1989 to 1999, occupational stress in Thailand had not received sufficient analytical research and knowledge, and remained unclear. Attempts to promote health in the workplace have resulted in the development of healthy workplace indicators, but the dimensions of psychosocial work characteristics have not been demonstrated, and the psychosocial work environment often is still disregarded.

Some studies in Thailand have used both the DC(S) model and/or the JCQ. One study conducted by Buranatrevedh (2002) examined occupational stress in workers at an electronics plant, using an occupational stress questionnaire that was adapted from the DC model. Another study by Yingratanasuk, Serekajornkitcharoen, and Pusapakdeepob (2000) described psychosocial factors among industrial office workers using the Psychosocial Work Condition Questionnaire (PWC), which is also based on the DC(S) model. Bhanthumnavin (2003) examined perceived social support from supervisor and group members' psychological and situational characteristics were examined in health centers workers. Perceived organizational support, self-efficacy, and location of workplace were all associated with subordinate performance. Female subordinates who had emotional, informational, and material supports received higher performance rate from their supervisors than did their male

counterparts. Work-related strain outcomes in Thailand, however, have not been examined by the ERI and HWO models.

2.7 Health Outcome Measures of Psychosocial Work Environment

In the present study, health outcomes will be centered on self-reported job-related strain as measured by psychosomatic symptoms, anxiety, and depression. Anxiety and depression are measured by the Thai standardized questionnaire, the Thai Hospital Anxiety and Depression Scale (HADS). Many of these measures frequently have been referred to in the occupational stress literature, although they are not specifically designed to assess job-related strain. The stressful life events have been evidenced to be underlying of mental health disorders in adulthood (e.g., psychosomatic disorders, anxiety, and depression) (Kessler, 1997; Schwarzer & Schulz, 2001), they are considered to be selected criteria in this study.

Measurement of Psychosomatic Symptoms

Work-related factors, which often refer to physical and psychosocial work conditions, have been acknowledged as stressors that potentially impact on the individual's health and well-being at work. Through the pathway of psychophysiological functions, the stressful stimuli activate the biological stress responses via the autonomic nervous system (ANS) arousal that can be resulted in physiological reactions in a number of ways as described in the biopsychosocial model (Koh, Park, & Cho, 2005; Krantz & Ostergren, 2000; Wiholm, 2006). These are known as common ill-health symptoms correlated with stress. Koh, Park, and Cho (2005) have stated that somatization is the most common psychiatric problem, followed by depression and anxiety observed in primary care. They also reported that somatic symptoms are the most frequently complaints by Korean psychiatric outpatients.

Psychosocial stressors at work can be resulted in the individual experienced psychological strain in terms of nonspecific pain and an illness without any clear organ manifestations, such as muscular pain, overall fatigue, stomach ache, anxiety, and sleeping problems (Daniels, 2004; Krantz & Ostergren, 2000; Wiholm, 2006). Additionally, a study by Wiholm (2006) has confirmed the association between

perceived psychosocial work environment and psychosomatic symptoms, such as mental fatigue, headache, restlessness, irritation, moodiness, difficulty concentrating, and musculoskeletal symptoms (e.g., neck, back, shoulder, and arm), and skin symptoms.

In addition to sickness absence and morbidity, work-related chronic strain found to be related to unspecified subjective health complaints or unspecified psychosomatic symptoms (UPS), including headache, restlessness, depression, dizziness, anxiety, abnormal sweating, chronic fatigue, chest pain, sleep disturbances, angina pectoris, tachycardia, arrhythmia, nausea, epigastric pain, constipation, diarrhea, urticaria, loss of appetite, and undue finger in a cohort study with a large group of textile workers (Danev, Svetoslavov, & Datzov, 2006). Increased workload and decreased collegial support have been supported to be risk factors for psychosomatic symptoms report (Arnetz & Wiholm, 1997). The differences in individual physiological reactivity and gender have been well established (Koh, Park, & Cho, 2005; Krantz & Ostergren, 2000). A higher rate of symptoms has been found among women more than men regarding the traditional female roles in society. Women almost reported depressive symptoms, symptoms of bodily tension and chronic pain from muscles and joints.

Most of these studies used the ad hoc questionnaires, which were developed by the researchers. Among them, two studies had an attempt to develop a specific tool to measure the psychosomatic stress responses: the Somatic Stress Response Scale (SSRS), which yields 32 items on five sub-scales, including the cardiorespiratory response, somatic sensitivity, gastrointestinal response, general somatic response, and genitourinary response (Koh, Park, & Cho, 2005) and Common Symptoms in General Population of women instrument (CSGP-scale), which composes of 15 physical and mental symptoms (Krantz & Ostergren, 2000). When comparing these items with the Thai questionnaire, they are similar to the questions of the Suanprung Stress Test-20 (SPST-20) for Thai samples. The SPST-20, however, is inadequately to provide information about psychosomatic symptoms in workers; therefore, the items for psychosomatic symptoms measure in the present study will be developed by the researcher.

The Thai Hospital Anxiety and Depression Scale (Thai HADS)

Anxiety and depression in the present study will be measured by the Thai version of the Hospital Anxiety and Depression Scale (HADS), which originally

developed by Zigmond and Snaith (1983) and has been designed for screening purposes use within the clinical context (Barth & Martin, 2005). The HADS is considered to be a widely used screening tool since it has demonstrated adequate reliability and validation, as well as good sensitivity and specificity for mental disorders in primary care patients and the general population (Barth & Martin, 2005; Herrmann, 1997; Snaith, 2003).

The HADS is a practical self-report scale in which consists of 14 items, comprising 7 anxiety items and 7 depression items to indicate the respondent has felt in "the past week" with emphasis on the physiological aspects of the disease or changes in health status. Responses are on a four-point scale (0 - 3). A score of 0 to 7 for either subscale is being in the normal range, whereas a score of 11 or greater signifies possible presence of the mood disorders. The HADS is increasingly used in both a diverse and broad range of clinical groups, in community settings, and primary care medical practice, as well. It has been translated and available to all major European languages, as well as Arabic, Hebrew, Chinese, Japanese, Urdu, and Thai.

The Thai version of HADS has been tested for reliability, validity, sensitivity, and specificity in a study by Nilchaikovit, Lortrakul, and Phisansuthideth (1996). It is 14-item questionnaire (7 items on each sub-scale measure) with scores ranging from 0 – 21 for each sub-scale, with scores of 0 – 7 indicating normal range (non-cases); 8 – 10, the increased anxiety or depression symptoms (doubtful cases); and 11 – 21, the increased severity of anxiety or depression (cases). It is used to investigate feelings within the past week. The tool has been evaluated in Thai patients and healthy samples and confirmed validity by comparing with semistructured clinical psychiatric interview, which has been used as gold standard. The results found that a cut-off score was 11 or higher produces the best overall screening characteristics for both anxiety and depressive subscales, with Cronbach's alpha coefficients of .8551 for anxiety and .8259 for depression; sensitivity, 100% for anxiety sub-scale, 85.7%, depression sub-scale; and specificity, 86.0% for anxiety sub-scale, 91.3%, depression sub-scale. The Thai HADS is considered to be a screening tool and clinical evaluation of anxiety and depression in clinical practice.

Job Satisfaction

Job satisfaction is one of the most frequently used indices of job-perception and has been studied in the domain of industrial-organizational psychology as an

outcome that is closely linked to occupational strain (Decker & Borgen, 1993; Hirschfeld, 2000). Empirical evidence supports that it is an important attitude for both employee and the organization in terms of subjective employee well-being and behavior, which ultimately results in organizational effectiveness.

Job satisfaction is defined as the individual's attitude toward the task and work environment (Schleicher, Watt, & Greguras, 2004; Mason & Griffin, 2005). The Minnesota Satisfaction Questionnaire (MSQ), which is one of the most popular measures of job satisfaction, will be modified to measure job satisfaction in the present study. The MSQ was developed by Weiss, Davis, England, and Lofquist in 1967, and has two forms, a long and short version to measure two distinct components: intrinsic job satisfaction (how people feel about the nature of the job tasks themselves) and extrinsic satisfaction (how people feel about aspects of the work situation that are external to the job tasks or work itself) (Spector, 1997 as cited in Hirschfeld, 2000, p. 256).

The short form of the MSQ is a popular and appropriate measure and frequently used in job satisfaction research (Hirschfeld, 2000; Mason & Griffin, 2005; Schleicher, Watt, & Greguras, 2004). It also is widely used in studying theory of work adjustment (Decker & Borgen, 1993). The short form of the MSQ has twenty statements that designed to assess a person's satisfaction with the possible reinforcers of one's job, including three subscales, intrinsic, extrinsic, and general satisfaction (Decker & Borgen, 1993). Responses to items are measured by a five-point scale, ranging from very dissatisfied (1) to very satisfied (5). General satisfaction is the arithmetic sum of scores of the intrinsic and extrinsic satisfaction. The reliability of the MSQ short form has a Cronbach's alpha coefficient between .82-.88. The long form has been satisfactory (.80s). Numerous studies also support its validity for both versions (Decker & Borgen, 1993; Hirschfeld, 2000).

2.8 Limitations and Gaps of Previous Studies in Thailand

Most studies related to the work environment in Thailand have focused on the physical hazards, occupational diseases surveillance, and improvements in the work setting. These studies have tended to emphasize hazards in the workplace and

improving job performance and productivity. Additionally, indicators of a healthy workplace are emphasized over the promoting health behaviors of workers rather than their psychological health and well-being, which also can lead to a wide range of health outcomes. As a result, less attention has been paid to the psychosocial work environment and more needs to be known about psychosocial characteristics of work in the context of Thailand.

This is due to several reasons, such as a lack of theory-based research and no standardized instruments to measure or identify these characteristics. Instead, most studies have used the modified questionnaires or ones developed for specific purposes and particular conditions. Moreover, what studies and measurements relating to the psychosocial work environment that have been conducted are primarily generated from western and European samples that might be inappropriately in terms of socio-cultural and political differences if utilized with Thai workers.

The instrument in the present study has been developed to be a comprehensive tool for health care providers to determine the psychosocial work characteristics of textile and garment workers in Thailand. It has a multidimensional approach that is based on evidence-supported theory and standardized questionnaires, as well as a review of the relevant literature in Western and East-Asian countries, including Thailand. Knowledge of this issue is still minimal, and however, further investigation and instrument development still is needed. Not only quantitative studies but also the key informant group discussions are needed to investigate the psychosocial work characteristics of Thai industrial manufacturing workers.

2.9 Job Characteristics of Textile and Garment Manufacturing Industry

Introduction to the Textile and Garment Industry in Thailand

The textile industry is a key income and employment resource in Thailand and is regarded as large and well-established (Lotharukpong, 2005). In 2003, it employed about 1.08 million Thai workers, or 21.3% of the workforce in the manufacturing sector. The industry has experience high growth rates over most of the last decade. The Thai textile industry consists of five major sub-industries: approximately 2,500 garment firms; 400 dyeing, printing and finishing firms; 1,300 weaving and knitting

firms; 150 spinning companies; and 18 man-made fiber mills. Among these five smaller industries, the garment industry has encountered the biggest challenges due to the competitive international market.

The textile industry leads manufacturing industry in Thailand both in terms of contributed Gross Domestic Product (15%) and of export earnings (14%) (Wattanapanom, De Lombaerde, Withisuphakorn & Wanarat, 1997). The major export markets for Thai textiles are the United States, the European Union, and Japan. Since Thailand introduced the Investment Promotion Act in 1960, foreign capital has contributed to investment in the economy. Chinese companies from Shanghai and Hong Kong have assumed ownership of textile mills in Thailand. Japan also has invested in the country and rapidly expanding investment flowing into the industry since the 1970s (Suphachalasai, 1994).

The Thai textile industry comprises of man-made fiber, dyeing and finishing, spinning, weaving, and garment manufacturing. Apart from these five sub-industries, there are smaller concerns, such as the silk industry, non-woven fabrics (pampers, carpets in automobile industries), and home textiles. Among all of these industries, the garment industry is important for several reasons. It is a successful exporter; has increased flow of Foreign Direct Investment (FDI); has a relatively low environmental impact; and employs the largest number of workers (Suphachalasai, 1994).

The garment industry is a sub-sector and, itself, can be divided into woven (e.g., heavy textiles, jackets, suits), flat knit (e.g., sweaters, scarves), fashion (e.g., shirts, pants), and circular knit (e.g., socks, underwear) (Wattanapanom, De Lombaerde, Withisuphakorn, & Wanarat, 1997).

Specific Job/Task Structure of the Textile and Garment Industry in Thailand

Few studies have looked at the nature of factory work in Thailand or the textile and garment industry specifically. Lotharukpong (2005) has indicated that the Thai textile industry has a three-stream cycle: upstream, middlestream, and downstream. The upstream or fibre industry produces two kinds of fibres: natural and man-made. The middlestream industry consists of spinning, weaving and knitting, and dyeing, printing and finishing. The downstream is the garment industry, which is the largest and utilizes the greatest number of machines and workers. The structure of Thailand's textile industry represents as following (see Figure 2.5).

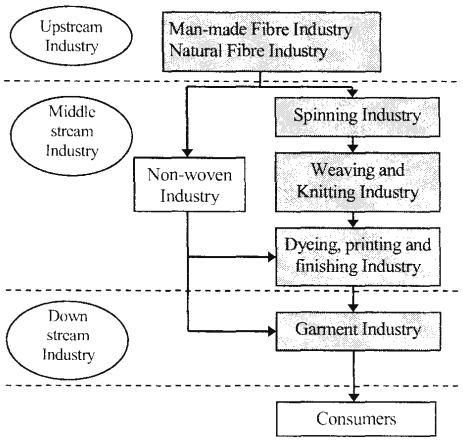

Figure 2.5 The structure of Thai textile industry (Lotharukpong, 2005)

Downstream or the garment industry utilizes the largest number of employees. It also has the greatest number of very old machines and is the largest exporter. The study by Kaufman, Tiantubtim, Pussanapibul, and Davids (2004) revealed that the Thai garment is the third-largest export industry in the country and a key source of national revenue and employment (employed over 800,000 workers in 2001).

Working Conditions and Work Environment

General Working Conditions and Work Environment

The overview of textile industry is limited to accessibly and accessibility information. Data are mainly derived from the U.S. Environmental Protection Agency (EPA, 1997; Ganiaris & Okun, 2001). In the past, the textile industry was primarily in family or domestic. Since the twentieth century, segments of the textile industry have become highly automated and computerized and can be characterized by product specialization (EPA, 1997). The major production stages in the textile industry are the production of yarn, fabric, and finished goods. The stages in textile manufacturing are shown in Figure 2.6.

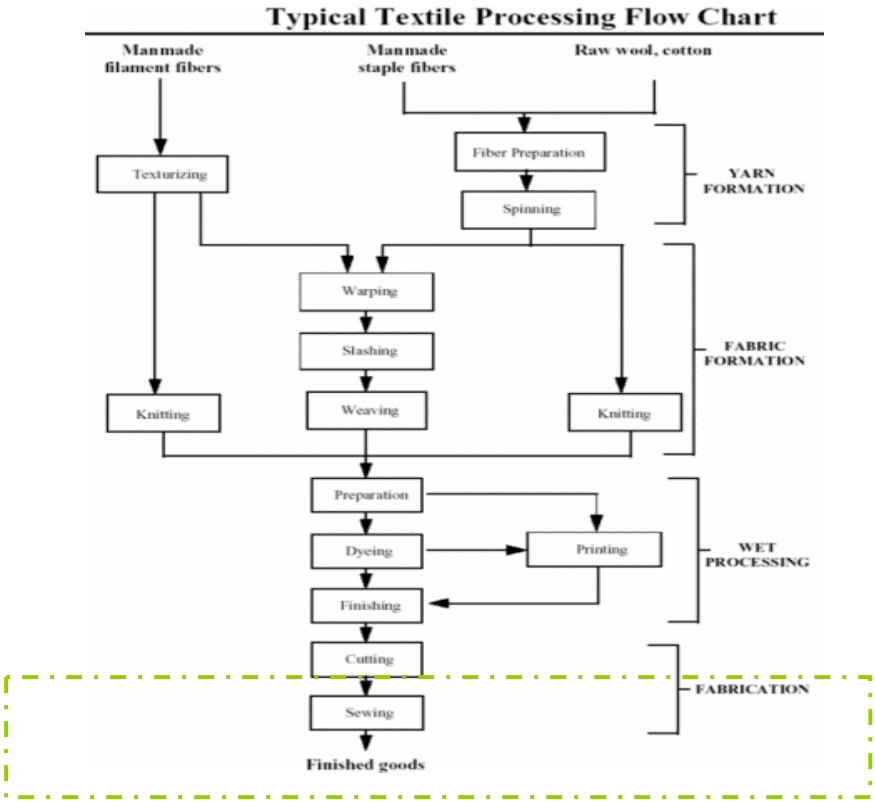

Figure 2.6 The typical flow chart of textile and garment processing (U.S.Environmental Protection Agency, 1997)

In summary, yarns are produced in the first step as either filament, multi-filament, or spun varying to amounts of thickness, twist, and/or ply. The second step produces fabric as either weaving or knitting. Finishing, the third step, represents that fabrics are going into further processes, which include scouring, bleaching, printing, dyeing, and mechanical or wet finishing process. The final step is that the finished cloth in which fabricated is into a variety of apparel, household, and industrial products ((EPA, 1997; Ganiaris & Okun, 2001, p. 11).

2.10 Impact on Employee Health and Well-being

Industrial safety in Thailand still emphasizes physical environmental hazards, such as chemicals, noise, and dust. The Thai textile and garment industry has a

prevalence of occupational disease, principally byssinosis or cotton dust disease (Office of Policy and Planning, Ministry of Public Health, 2005). Chavalitsakulchai and Shahnaraz (1990) studied health, working conditions, and work life in female shift workers in a large-scale textile company in Thailand using questionnaires, interviews, measures of the work environment, job safety analyses, and health examinations. Among 1,600 workers, 1,322 workers worked a semi-continuous three-shift system. Exposures included: more than 90 dB of noise, more than 15 mg/m^3 of dust, and less than 300 lux of illumination in the workplace. They worked mostly in a standing position with repetitive movement of the upper extremities. There were subjective complaints of anorexia and loss of body weight. Accidental injuries frequently were caused by flying/falling objects, usually due to unsafe acts or conditions at work.

Although little is known about psychosocial work characteristics in the Thai textile and garment industry, one study has provided evidence for the impact of work on the individual. Kaufman, Tiantubtim, Pussanapibul, and Davids (2004) investigated key factors affecting the implementation of standards and codes in the Thai garment industry and documented issues related to occupational health and safety. They found that some Thai manufacturers have been compelled by pressure from the international market to increase operational efficiency and reduce costs. Furthermore, some factory owners implemented cost-cutting measures that led to adverse working conditions and income, and impacted worker health and well-being.

Nonetheless, Kaufman et al. (2004) indicated that Thai workers did not support a reduction in working hours, as they gained additional income through overtime pay. Many workers strongly objected of changes in the workplace that might impair their abilities to continue to earn overtime pay. Factory owners, too, fear that their costs may increase if they have to invest in upgrading facilities and training related to industrial standards. Over 80% of workers in the textile and garment industries in Thailand are unmarried women, who are willing and prefer to work long hours and have greater manual skills. Because of the social status, there is the potential for their mistreatment. Married women applicants, for example, are usually asked to have a pregnancy test because employers do not want to pay maternity leave and the costs of training new workers. As a result, women who become pregnant during the 4-month probation period are at risk for being fired.

A study by Kaufman et al. (2004) also demonstrates that most workers have little knowledge of occupational health and safety and do not have a chance to share their ideas on OHS improvements with management. This lack of knowledge relates to the components or what equipment that influence their health and safety risks. Workers are rarely educated about these risks. Problems are related to the ineffective enforcement. The lack of circulated regulations across agencies also allows the law to be creatively interpreted. In addition, present regulations often are inflexible or unclear and some laws have not been appropriately updated. The result is that workers often work under poor working conditions and unnecessary risks to their health and safety due to lower safety standards.

It should be recognized that most Thais have relatively little awareness regarding their work situation, adhering to the old adage, “Mai Pen Rai,” meaning “Don’t worry, everything will work fine.” Workers often believe that they can work without personal protective equipment (PPE), for example, and not be harmed, because they may have friends who have not been injured despite being inadequately equipped. In many cases misfortunes are attributed to one’s destiny, to the power of spirits, or acts in a past life. These factors are often considered to be the causes of illness or accidents at work rather than unsafe acts or unsafe working conditions. As a result, Thai workers continue to endure unfavorable work conditions and engage in risk behaviors without regard to personal safety concerns.

2.11 Cultural Differences

Sociocultural factors influence the appraisal of demands and threats in the roles of adult life, and these influences are embedded in gender-based coping practices (Siegrist, 2002). The magnitude of cultural conflict is often considered to be the result of cultural differences in the country. Hofstede has argued that national cultures are important determinations of work-related values and attitudes (as cited in Swierczek & Onishi, 2003).

One aspect of the Job Stress Theory Project conducted by the Japan Ministry of Education, Science and Culture was an emphasis on culture and job stress (Kawakami, 2000). Major theories in this field, such as the Demand-Control-Support

and Effort-Rewards Imbalance models, had been developed and tested in western countries, such as the U.S. and Europe. It was expected that there would be a difference in the sources and measurement of job stress and the stressor-strain relationship in non-western, particularly East-Asian countries, which shared common cultural characteristics, although several research studies have replicated the findings in Japan and other non-western countries in general. Such a difference of culture may affect the development of a national strategy and the implementation of job stress reduction and/or control.

Evidence in the literature has shown that there is not only a hazardous physical work environment in the Thai textile and garment industries, but that the psychosocial environment may also be a source of concern and that improvements are needed for both employee health and well-being and standards of work safety. Due to the differences in the context of culture that affect employee beliefs, value, and attitude to their jobs, it is important to develop the specific measurement for psychosocial work environment in Thailand.

CHAPTER III
METHODOLOGY

This chapter provides information about the methodology of the present study, which is centered on the development of an instrument to measure the psychosocial work characteristics of Thai workers in the garment industry. This instrument has evolved from two existing standardized questionnaires related to the psychosocial work environment, the ERIQ and JCQ. This study is divided into two phases: a pilot study for questionnaire development, including translation and back-translation process, and a cross-sectional study to test the psychometric properties of the instrument. The present study has four main study objectives, each of which is related to four corresponding research questions

3.1 Study Design and Sample

Study Design

The present study is a descriptive cross-sectional design. Because the psychosocial work environment is multidimensional phenomenon, it is important to employ a group of experts and key informant groups. Knowledge regarding this issue in Thailand still is limited, and this approach allows greater understanding of the characteristics of the psychosocial work environment experienced in the workplace. The qualitative data that were yielded by the experts and key informant reviewers should strengthen the results of the study.

The present study has been divided into two phases to achieve its objectives (figure 3.1). Phase 1 was an instrument development conducted for the purpose of developing a reliable, valid, and usable measure of the psychosocial work environment for use in Thailand. The first version was tested for clarity, appropriateness, completeness, understanding, feasibility, and readability. Phase 2 was a cross-sectional survey to further test the psychometrics of the developed instrument among Thai industrial manufacturing workers in the textile and garment industries and to describe the associations among

characteristics of the psychosocial work environment and health outcomes.

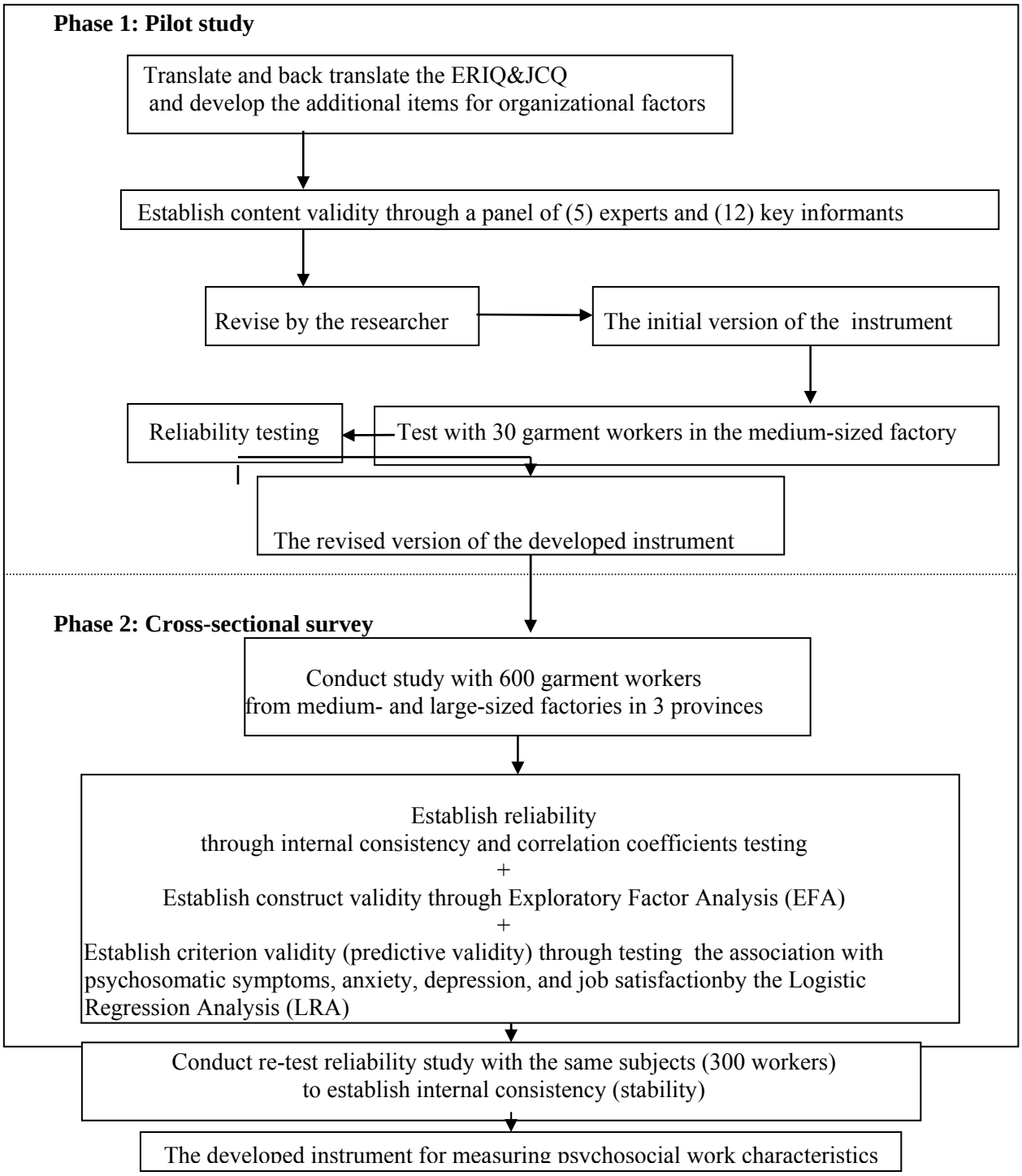

Figure 3.1 Research procedures of the study

Sample and Sampling Plan

Samples

Participants in the present study were drawn from the garment or clothing industry, which employs the largest workers among sub-industries of the textile industry (greater than 70% of total workers) (Thailand Textile Institute, 1999).

Selection Criteria

Some potential confounding factors were considered and controlled in the selection process of study. These confounders included employment status, mental health history, and stressful life events during the past year.

Inclusion criteria were workers aged 15 to 60 years of age who have worked at least 3 months in their setting, were full time employees who regularly worked with and received salary from factory through employed daily, weekly, and/or monthly jobs, and had no prior psychiatric disorder as diagnosed by a physician within 1 year previously, who were able to read and write, and were willing to participate.

For the exclusion criterion, workers who rated scores on stressful life events at high level (≥ 230 scores) and agreed that these events affect their emotional distress at work were excluded from the investigation. Results revealed that all participants had acceptable score of the stressful life events test (Min-Max = 0-150.94, Mean ± S.D. = 32.11±26.62).

Sites for Accruing Subjects

According to Ministry of Industry, there are around 2,532 clothing industries in Thailand. They consist of 2,184 (86.3%) small-sized factories (≤ 199 workers), 219 (8.6%) medium-sized factories (200-499 workers), and 129 (5.1%) large-sized factories (≥ 500 workers). Medium- and large-sized factories were considered to be suitable settings in this study in terms of the amount of workers in sites and hazardous work-related exposures. Subjects, therefore, were male and female garment factory workers in Bangkok, Thailand and its suburbs. Existing industrial factory database have shown that the majority of Thai garment industries are located in the central region of Thailand in the areas of Bangkok, Samut Prakan, Samut Sakhon, Nakhon Pathom, and Pathum thani, respectively. Nevertheless, the present study was conducted in Bangkok, Samut Prakan, and Samut Sakhon due to the amount of factories and convenience in conducting the study.

The subjects were recruited through personal and formal contact with the managing directors of the clothing factories to introduce the study and initiate communication. They also were contacted ask for permission for data collection and to advertise participation of the target samples in the study.

After the managing director's permission was received, the manager of the department of human resource development at each factory was contacted formally and personally to conduct the research.

3.2 Human Subject Protection

To protect the participants as research subjects, the study was approved by the Institutional Review Board of Mahidol University (MU 2007-075) before the data collection began.

Factory permission also was required before the study was conducted. A verbal brief about the professional qualification of the researcher, the objectives of the study, expected outcomes, and study procedures were presented at initial contact with the authorized personnel of the participating factories and organizations. The subjects were informed through verbal and written briefs, as well as the study objectives, research activities and procedures, potential risks or discomforts, and possible benefits from participation. They were reminded that they have the right to ask any questions concerning the study both before agreeing to be involved and during the study itself. The right bill and a copy of the signed and dated consent form were provided.

Subjects also were informed that their participation is voluntary and free of pressure as to whether they agree to participate. They have the right not to answer any questions and the right to withdraw from the study at any stage and to understand that this will not affect them in any way. Subjects were informed that they might experience discomfort reporting personal and job-related information on the questionnaire or taking time from work. Potential risks/discomforts might be occurred because the questionnaires may make upset feeling and uncomfortable answering. This should be minimized by ensuring the subjects that data were confidential, by having for completed the questionnaire at a convenient time and place, and invited them to contact the researcher in person if they have any questions or problems. There

were no direct benefits from participation in the study. The anticipated future benefits were that the study does lead to better understanding by health care providers and relevant personnel about the characteristics of the psychosocial work environment and use the developed instrument as a screening tool for health surveillance and promoting employees health in the workplace.

Participant's privacy were protected through providing private space and time to ask questions that might be arise during data collection. Participants were acknowledged that they can ask in-person with the researcher and/or research assistants. Confidentiality was employed in terms of data management. The obtained data were treated with confidentially and analyzed and presented only as grouped data. The assurance of confidentially was given both verbally and in writing regarding anonymity, and the security of the information. The identity of the subjects remained anonymous in all reports and publications and only the investigator had access to the raw data, which were coded and secured in a locked file. Participants also were encouraged to ask questions. There were an opportunity for them to express any concerns or apprehensions they had.

3.3 Study Procedures

Phase 1: An instrument development

The first phase was conducted to develop the instrument and provided an initial test of the psychometrics. Two standardized questionnaires, which originally were constructed in English, were fundamental to the development of the new instrument and required that a translation and back-translation method be utilized. To meet the validity criterion, an experts working group and key informants group were organized to determine the content and face validity of the developed instrument. A small group of garment workers were represented in a preliminary study to evaluate the usability of the developed instrument.

Components of the Questionnaire Instrument

The Effort-Reward Imbalance Questionnaire (ERIQ)

The original ERIQ was in German but has been translated into English and shown to be a reliable version. The recommended version of the ERIQ consists of 23 items, which is presented in the following table:

Table 3.1 The components of the ERIQ

Measures	Size (Items)
Extrinsic effort (Obligation and demands)	6
Extrinsic rewards	11
- monetary gratification	1
- esteem	5
- job security and career opportunities	5
Overcommitment	6
- inability to withdraw from work and obligations	6
Total	23

Rating is on a five-point Likert scale (1 agree/disagree and 4 levels of agreement) for the effort and rewards items, and a four-point scale for overcommitment (strongly disagree, disagree, agree, and strongly agree). The ERIQ has been translated into several languages, including Chinese and Japanese. Its reliability ranged from .68 to .88 for effort, .70 to .91 for rewards, and .60 to .82 for overcommitment (Hanson et al., 2000; Hasselhorn, Tackenberg, & Peter, 2004; Kuper et al., 2002; Li et al., 2005; Siegrist et al., 2004; Tsutsumi et al., 2002; Watanabe, Irie, & Kobayashi, 2004; Yang & Li, 2004).

The Job Content Questionnaire (JCQ)

The JCQ is considered to be the most widely used self-administered questionnaire of its kind. It was developed based on the DC(S) model, which measures the psychosocial characteristics of the work environment (Karasek et al., 1998). The JCQ is used to study job stress and worker health outcomes, especially cardiovascular risk and disease. The scales of the JCQ analyze job characteristics at the micro-level. It is accepted as standardized questionnaire for various occupational settings in several countries and has been translated into more than a dozen languages.

The recommended version of the JCQ has 49 items (Hurrell, Nelson, & Simmons, 1998; JCQ Center, 2006; Landsbergis & Theorell, 2000). Emotional demand was added with three items, which were modified from the Copenhagen Psychosocial Questionnaire (COPSOQ). Details of the recommended version are presented in the following table:

Table 3.2 The components of the JCQ

Measures	Size(Items)
Co-worker social support	6
Decision authority	3
Job insecurity	6
Macro-level decision authority	8
Physical job demands	5
Psychological job demands	5
Skill discretion	6
Skill utilization	1
Supervisor social support	5
Mental health measures	2
Physical health measures	2
Total	49

Rating is on a four-point Likert scale: strongly disagree, disagree, agree, and strongly agree. Prior studies have revealed that the psychometric properties of the English JCQ are satisfactory (Cronbach's alpha coefficient ≥.7) (Landsbergis & Theorell, 2000), which varied from .56 to .83 for job demands, .65 to .89, job control, and .52 to .92, social support at work (Andrea et al., 2003; Becerril, 1999; Bourbonnais et al., 1998; Cheng et al., 2005; de Lange et al., 2002; Escriba-Aguir & Tenias-Burillo, 2004; Gimeno et al., 2004; Kaewthummanukul, 2000; Karasek, 1998 and Original analyses Cornell WSBPS as cited in Landsbergis & Theorell, 2000; Kawakami et al., 1995; Kondo et al., 2006; Li et al., 2004; Lerner et al., 1994; Niedhamner, 1998; Yang & Li, 2004).

Other Factors

Organizational factors that could not be found in both the ERIQ and JCQ have been incorporated in the present study. These factors include organizational policies and practices, organizational climate, and environmental and physical work conditions. Questions to measure these factors have been developed by the researcher based on a review of the literature, and information and advice from experts in the area of occupational health and safety. Worker beliefs also will be measured to determine their perception of the organization's commitment to, and responsibility for, their health and well-being by incorporated into the scale of policies and practices. This additional section consists of 30 items, which is presented in the Table 3.3. Rating is on a five-point Likert scale (to a very large extent = 5, to a large extent = 4, somewhat = 3, to a small extent = 2, and to a very small extent = 1).

Table 3.3 The components of the additional section on organizational aspects

Measures	Size (Items)
Policies and practices	7
Organizational climate	12
• Climate support	3
• Climate participation	3
• Climate communication	3
• Climate safety and health	3
Environmental and physical work conditions	11
Total	30

Measurement Development and Translation

Translation of the ERIQ and JCQ into Thai

Although specific theoretical domains of the psychosocial work environment have been identified in the West, little is known about the psychosocial work environment in Thailand and no specific instrument to measure these characteristics has been developed. Since the ERIQ and JCQ are well-known measures of the psychosocial work environment that have been extensively used to assess these factors at work in many countries of the world, they are appropriate tools to translate into Thai and trial for use with Thai workers.

Beck, Bernal, and Froman (2003, p. 65) have suggested that English-language instruments should not blithely be translated into other languages with the assumption that the same measurement properties would exist across cultures. Thailand is one East-Asian country that is a unique in many of its socio-cultural aspects. A translation and back-translation process is necessary, therefore to test the criterion of validation for cross-cultural equivalence, in addition to careful validity testing. The use of at least two translators working independently is suggested for the back-translation (Gonzalez, Stewart, Ritter, & Lorig, 1995, p. 1429).

For the present study, four professional translators were required to ensure the accuracy and appropriateness of a Thai version of the ERIQ and JCQ. Two would translate the instruments into Thai. This Thai version then was given to two other persons to translate back into English. The two English versions then were checked for consistencies and convergences. These four translators were a bilingual and fluent in both languages. Whenever there were difficulties, the researcher and translators

worked together to discuss these problems and reached a consensus regarding the translated questionnaires.

Four bilingual experts were employed in the present study. They had assumed to be qualified in Thai and English language. Two were employed in the translation process. One expert completed Bachelor's degree in nursing in Thailand, Master's degree and Doctor of Philosophy in nursing in the United States and currently works as mental health nurse in the United States. Another expert originally received Bachelor's degree in computer engineering in Thailand, received Master's degree in administration in United States, and currently works as online business webmaster for American company in Thailand. Both of them had assumed to be familiar with Thai and western cultures. Others were employed in the back-translation process. One obtained Bachelor of Arts in Thailand, Master of Arts and Doctor of Philosophy in linguistics, as well as postdoctoral in literacy writing in the United States. At present, she works as an instructor in a university in Thailand. Another one completed Bachelor's and Master's degrees in administration in the United States, and currently works as managing director and an interpreter for a company in Thailand.

Expanded Items

Additional items relating to organizational factors were added to the developed instrument in that the translated version of the ERIQ and JCQ did not include some important psychosocial work characteristics that were reported in Thailand. These items were developed by the researcher based on a review of relevant literature and then considered by the experts.

Establishing Content Validity and Usability

Expert reviewing and Procedures

Initial face validity of the developed instrument was established through a review of the literature. It was then given to an expert panel, following the recommendation of Lynn (as cited in Barnason, 2002), to further evaluate content validity. Polit and Hungler (1995, p. 419) have indicated that a panel of experts is becoming increasingly common to evaluate and document the content validity of new instruments. Agreement by a minimum of five experts is recommended to control for chance agreement.

Each expert independently reviewed all items of both the ERIQ and JCQ, as

well as the extended scales of the instrument. They also asked to evaluate the format, grammar, and word choice for each item. The panel consisted of three occupational physicians, and two occupational health nurses. The experts were asked to rate each item as to how representative or relevant it is in measuring psychosocial work characteristics. A rating scale of 1 (not at all relevant), 2 (somewhat relevant), 3 (quite relevant), and 4 (highly/very relevant) was used (Barnason, 2002, p. 127; Waltz, Strickland, & Lenz, 2005, p. 155). The experts also were asked to suggest additional items.

The content validity index (CVI) was computed to quantify the extent of agreement between the experts. Based on this value and feedback from reviewers, all retained items were refined until they are satisfactory. A formal CVI was computed across the experts' ratings of each item's relevance to the scale. The CVI is the proportion of items given a rating of quite/highly relevant by all raters involved (Waltz, Strickland, & Lenz, 2005, p. 155). For the entire instrument, the CVI is the percentage of total items rated by the experts as either 3 or 4. Generally, a CVI score of .80 or higher is considered to reflect good content validity.

Key Informants

Items of the developed instrument were improved by comments and suggestions from representatives of the garment industry regarding the exclusion or inclusion of items, wording, and clarity of existing items. Workers were recommended from manger or supervisor and then were asked to be volunteers. Twelve workers (six men and six women) were invited to participate as key informants to review the instrument. They were drawn from two garment factories: one factory in Samut Prakan province and another in Samut Sakorn provinces, three women and three men from each factory site from one medium-sized and one large-sized factories. They were asked either to volunteer and/or be recommended by the manager or leader. These workers were one-on-one interview and asked to respond to the issues above, as well as to additional question relating to readability, word choice, and comprehension.

These key informants almost were recommended by the head of department of human resource development at each factory. They were also asked for their willingness to participate in individual interviewing on the psychosocial work

environment issues. At the end of interviewing, seven key informants also reflected their unclear understanding about the psychosocial work environment (Appendix B).

Revision Procedures

Qualitative data, such as feedback, problems, and comments on individual items obtained from the panel of experts and key informant groups were used to revise each item of the questionnaire. These data allowed the developed instrument to be improved, refined, and achieve greater usability in terms of clarity, simplicity, accuracy, appropriateness, comprehension, and convergence. Additionally, each item was reviewed for appropriateness, grammar, and offensiveness or appearance of bias. Such collaboration between the researcher and reviewers resolved whatever the conflicts, doubts, and ambiguities that were identified.

Data Collection

Sample and Setting

In phase of instrument development and pilot study, samples consisted of twelve key informants and thirty five garment workers. Subject recruitment was conducted through personal and formal contact with authorized personnel, such as the managing director and/or the manager of department of the human resource development. Key informants were six female and six male workers from one medium- and one large-sized factories in the areas of Samut Sakhon and Samut Prakan provinces, respectively.

Once the initial version of the developed instrument has been established, it was tested with 30 workers in the garment industry. This is consistent with the recommended number of subjects (15 to 30) representative of the target population for preliminary item try out (Burns & Grove, 2005). A pilot study was conducted with samples who were female and male garment workers (female:male = 9:1) from one medium (n=19)- and one large–sized (n=16) factories in Samut Prakan province to test the initial internal consistency.

Data Collection Procedures

The initial version of the developed questionnaire was administered to the target subjects in a preliminary tryout. A self-report paper-and-pencil questionnaire was used to elicit information from the study participants. The researcher and trained research assistants distributed the questionnaire to the subjects at each factory. All

were asked to sign a consent form after they have been informed of their rights, potential risks, and benefits of the study. They also were allowed to ask questions at an interview session convenient for them.

Data collection was conducted in a conference or meeting room at a convenient time. It was assumed that the 1-hour lunch break was suitable time to complete the questionnaire. Lunch was provided. If the questionnaire requires additional time to be completed, a tea break was offered as well. Although the questionnaire was checked when it was returned for completeness, missing data might occur and the data set then were re-checked for completeness. It was understood that any questions could be asked of the researcher or research assistants in person and that subject responses to the questionnaire were checked for completeness before the subjects left.

Burns and Grove (2005) also recommended that the reactions of respondents during the test be observed to note behaviors, such as long pauses or other indications of confusion about specific items. Moreover, they indicated, too, that a debriefing session needs to be held during which respondents are invited to comment on items and offer suggestions for improvement. After permission has been obtained, employees were contacted in person by the investigator to assure that the developed questionnaire was understandable and appropriate for administration.

Data Management

Guidelines for coding and managing any missing data were to established lower error in the analysis of data. In this process, obtained data were converted into an accurate, complete data set in a format that can be analyzed statistically. These data were coded for each variable by assigning a name and format. A database and codebook was set up to determine how the data were entered and edited. Data records were documented for any changes that relate to the original data. Regular backup was made and the datasets were stored in multiple locations.

Data Analysis

The obtained data were undergone statistical analysis for item-scale correlation and coefficient alpha to test the intercorrelation among items and to determine scale quality (scale consistency). A reliability coefficient was computed since it is a comparison procedure that is performed objectively and returns a numeric index of the magnitude of the

test's reliability. It can be considered as a correlation coefficient value (Pearson's correlation: *r*), which normally range between -1.00 and +1.00. The higher the coefficient, the more stable the measure (Polit & Hungler, 1995). Burns and Grove (2005) also suggest that an *r* value of .1 to .29 traditionally is considered to indicate a weak relationship, .3 to .5 a moderate relationship, and above .5 a strong relationship. Weak correlations tend to be disregarded in nursing research.

DeVellis (2003, p. 93) has indicated that an item with a high correlation value is more desirable than one with a low value. Theoretically, the internal consistency of the instrument describes estimates of reliability based on the average correlation among items within the test (Nunnally & Burnstein, 1994, p. 251). It usually is reported in terms of a Cronbach's alpha coefficient. This value represents the internal consistence or homogeneity of the instrument to the extent that all its subscales measure the same characteristics (Polit & Hungler, 1995, p. 414). Internal consistency also is considered to be the best means of assessing one of the most important sources of measurement error in psychosocial instruments, the samplings of items. A value of .7 to .9 is considered satisfactory.

Nunnally and Burnstein (1994) have determined that Cronbach's alpha coefficient should be at least .7 as a lower acceptable limit if a new tool is to have sufficient internal consistency. Cronbach's alpha coefficients greater than .7 are considered to be sufficient. If there is strong evidence, items may be added or deleted to increase the alpha value of the questionnaire. Cross-correlations of the ERIQ and JCQ scales were examined to identify their associations and should help the researcher make a decision on which items are retained in the revised version of the developed questionnaire. Descriptive analysis, such as mean value and standard deviation also was performed and reported.

Revision Procedure

Feedback, comments, and problems that arise during the data collection were taken into consideration for possible modification or revision of the questionnaire. Such improvement helped assure its usability. Additionally, other mistakes on responses that might be caused by unclear questions, confused instructions, or difficult words were addressed. The revised instrument then was further subjected to study.

Study procedures in the pilot study are summarized in the Figure 3.2.

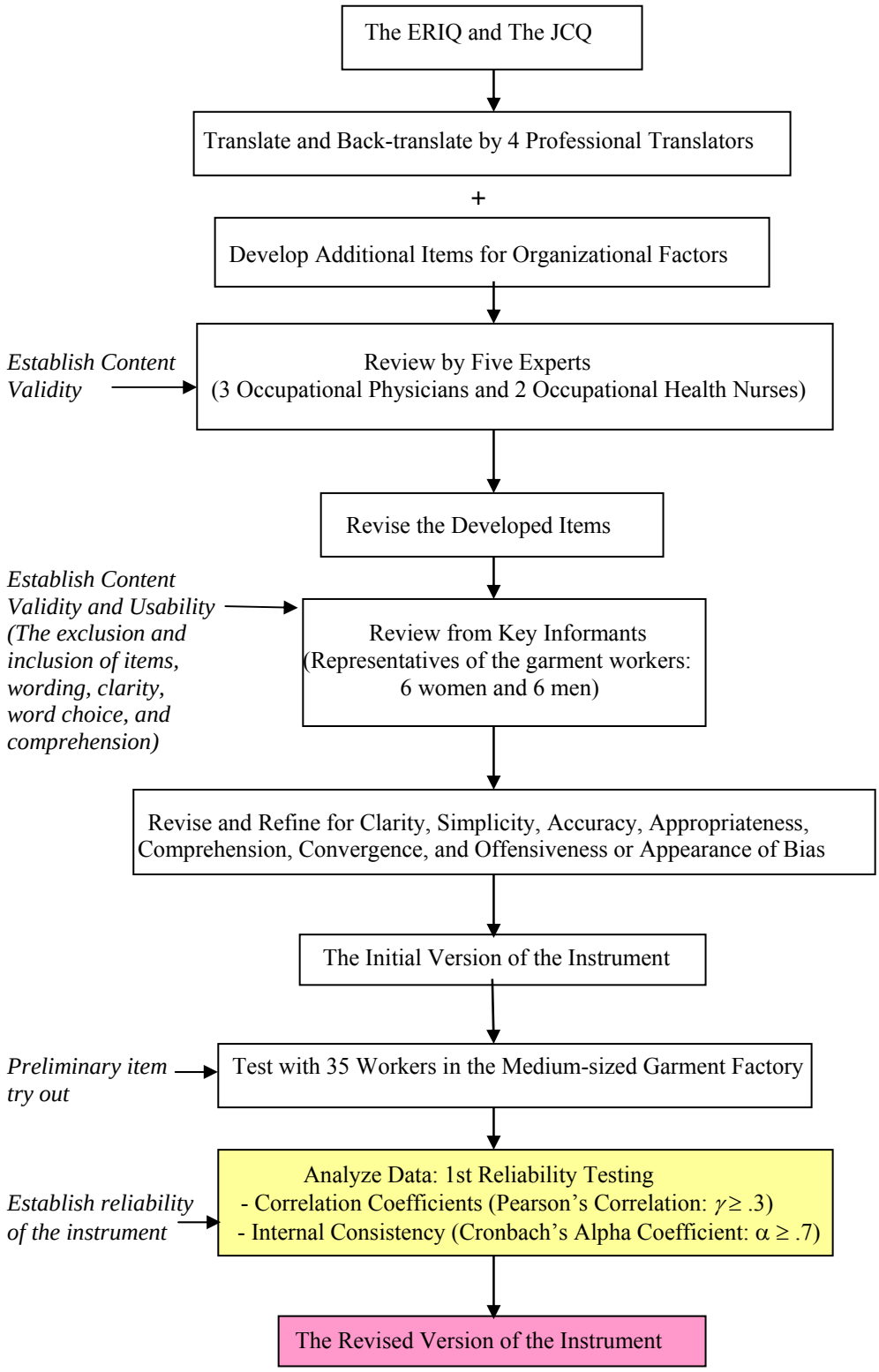

Figure 3.2 Study procedures for pilot study (Phase 1)

Phase 2: Cross-sectional Study

In this phase, a second cross-sectional survey was conducted to test its psychometric properties in the target population and provide an initial report about job strain in Thailand.

Measures

Revised Version of the Instrument

The revised version of the developed questionnaire was obtained from the pilot study. It should meet the criteria for internal consistency, e.g., items internal correlations ≥ .3 and coefficient alpha ≥ .7. The ERIQ and JCQ items were analyzed separately and their own values considered.

Items with $r \geq .3$ were selected to be retained. This latter coefficient is helpful in evaluating items for scale retention. Items with $\alpha \geq .70$ also were retained. This provides a satisfactory Cronbach's alpha coefficient obtained in the final version.

Outcome Measures

In the present study, health outcomes were centered on self-reported job-related strain as measured by psychosomatic symptoms, anxiety, and depression through the Common Symptoms in the General Population of Women (CSGP Scale) and the Thai Hospital Anxiety and Depression Scale (Thai HAD Scale), respectively. Job satisfaction, psychological well-being outcome, was measured by the modified Minnesota Satisfaction Questionnaire.

Demographic Data

The demographic profile included gender, age, personal and family monthly income, marital status, educational level, job title and sector, duration of employment, prior job experiences, employment status, shiftwork, and mental health history.

Procedures

Sample and Settings

According to Ministry of Labour, types of factory have divided into three sizes: small (≤ 199 employees), medium (200 – 499 employees), and large (≥ 500 employees). Samples in this study were drawn from medium and large factories. Sampling techniques included stratified random sampling, due to the variety of enterprises that can be vary by administrative policy, management, and welfare, and simple random sampling, which is appropriate for a cross-sectional survey.

Proportionate stratified sampling was employed in psychometric testing to determine the number of factories and samples from each factory size. A cross-sectional survey was conducted, using a simple random sampling method with both male and female workers.

Regarding scale development, Nunnally (1978, 1994) has suggested 300 people to be a sufficient number. Tinsley and Tinsley, and Comrey have suggested that a ratio of about 5 to 10 subjects per item up to about 300 subjects, that is, a sample of 100 subjects would be poor, 200 fair, 300 good, 500 very good, and 1,000 excellent (as cited in DeVellis, 2003). Bennett et al. and Levy and Lemeshow have indicated an adequate sample size to detect statistical significant can be computed by the following formula (as cited in Mongkol et al., 2003, p. 47):

$$n = \frac{Z_{/2}\ P(1- P)}{d^2}$$

$Z_{/2}$ = 95% confidence interval (1.96)

P = Prevalence of mental health problem

(Prevalence of occupational stress at high level = 23.9% or 0.239 cited in Siriwanarangsun, Baulek, Suriya, & Rujirachakorn, 2004)

d = Measurement error at acceptable level (0.028)

n = 455

A minimum of 455 subjects, therefore, should provide an adequate sample size. The additional 91 workers (approximates 20% of the sample) were assured that there was an adequate sample. Approximately 546 workers should be recruited to obtain complete data sets for analysis. This follows the suggestion by Hulley et al. (2001) that observed prevalence increases the precision of the estimate. The cross-sectional survey in this study was conducted with 300 workers at each medium and large factory size, which yielded approximately 600 subjects, adjusting for response rate and missing data.

It also has been suggested that all items in the final form be administered to a large sample of subjects representative of the target population (Burns & Grove, 2005). The sample size needed for statistical analysis is dependent on the number of items, and is recommended to be at least 10 subjects for each item/variable being tested (DeVellis, 2003). This ratio is desirable to generalize from a wider population

in terms of applying for factor analysis (Dixon, 1997). In the present study, however, it is difficult to follow this ratio because of a number of questions of the questionnaires.

This study focused on medium- and large-sized industries. Stratified and simple random sampling procedures were used to select participants. Six hundreds workers were recruited through the managers of department of the human resource development at each worksite, 300 workers (50%) from three medium-sized factories and other 300 workers (50%) from large-sized factories with the proportion of 10 workers, 9 female workers were recruited. These factories were randomly selected within the areas of Bangkok, Samut Prakan, and Samut Sakhon (1 medium-sized factory and 1 large-sized factory from one province). Subjects were then collected randomly by the assigned numbers for the purpose of retest study.

In a cross-sectional survey, samples were female and male garment workers (9:1) in the areas of three target provinces (i.e., Bangkok, Samut Prakan, and Samut Sakhon provinces). Subjects were randomized from workers who work in the production line of three medium- and three large-sized garment factories. Although four hundred fifty five subjects was adequate sample size, the questionnaires were distributed to nine hundred workers (n=900, 150 per factory). A retest study was managed to seek for stability of the developed instrument with a subsample (n=450).

Distributing the Questionnaire and Collecting Data

Subject recruitment was conducted through personal and formal contact with authorized personnel, such as the manager of the department of the human resource development. If it is possible, labor unions and members of the textile and the garment industry clubs also were contacted through the Thai Garment Manufacturers Association to introduce the research project and initiate communication with the target samples. Permission from these authorities at each factory size was obtained before beginning the recruitment process.

Once a final version of the developed instrument has been prepared, personal distribution is preferable before the data collection begins. Research assistants and data collectors were trained to administer the questionnaire and in the data collection process to limit systematic errors. The questionnaire was handed to the participants due to establish rapport. It was administered as a paper-and-pencil questionnaire and

rated on a Likert-scale with numerical values.

When personal contact was established with the participants, a script for an introductory verbal was prepared to introduce the respondents to the purpose of the study objectives, the intended use of the developed questionnaire, human subject protection, an estimate of the time required for completion, and instructions about how to respond to the questionnaire. Subjects completed the questionnaire at worksite or in some other private place, such as at home or apartments, that was suitable and convenient for them. They also dropped the completed questionnaire in a locked box at worksite. An assigned numbered name was requested for the retest study. In the case of incomplete data, subjects were contacted by either a phone call or a face-to-face interview at their workplace or home.

Data Analysis

Data obtained were identically treated for coding and scoring procedure, with the guideline for dealing with missing data in analysis and data inputting. The process of data management in this phase was followed the process of data management in the pilot phase.

Descriptive Data

Descriptive statistics were employed to present the participants' demographic data and initial scale results. The researcher organized the data by giving meaning and facilitating insight, and examining the phenomenon through descriptive statistics (Burns & Grove, 2005). Strategies to organize data for examination included frequency distribution (e.g., ungrouped and grouped frequency, and percent distribution), and measures of central tendency (e.g., mode, median, and mean). Dispersion of data also was assessed to explore deviations or variability of individual differences in terms of modal percentage, range, difference scores, the sum of squares (SS), variance, and standard deviation (SD).

Reliability Testing

Reliability is a major criterion of an instrument to ensure its quality and adequacy (Nunnally & Burnstein, 1994; Polit & Hungler, 1995). The basic estimates of reliability are coefficient alpha and correlations between alternative forms (under the various conditions) (Nunnally & Burnstein, 1994, p. 254). Test-retest reliability is an alternative-form method to determine instrument reliability. This method was

conducted with the same people who were tested by the same test after a period of time. For a paper-and-pencil measure, Burns and Grove (2005, p. 374) have recommended a period of 2 weeks to 1 month before comparing the scores obtained between the two testing times.

Test-retest reliability and internal consistency were applied to determine the reliability of the developed instrument. After 3 to 4 weeks, a retest study was given to a smaller set of the sample (50 garment workers). This original sample was accessed through formal and personal contact with managers and workers, who provided a numbered/listed name or a pen-name in the first test. Their names were kept confidential.

Validity Testing

The validity of an instrument denotes how well it measures, what its purpose to measure, or how well the measurement represents the phenomenon of interest (Hulley, Martin, & Cummings, 2001; Nunnally & Burnstein, 1994). The three major aspects of validity are content, construct, and criterion-related validity. Choosing questions would seem to be a subjective process, but judgment is important to assure that items assess the characteristics that the investigator wants to assess. This first step is to yield that the instrument has its face validity. Two approaches, based on the judgment of experts working group and key informants group were to determine the content validity in the pilot study.

Construct validity is the second aspect, which represents how well a measurement conforms to theoretical concepts (constructs) concerning the subject of study (Hulley, Martin, & Cummings, 2001, p. 45). Nunnally and Burstein (1994, p. 86) have indicated that a better measure of construct validity is obtained by combining results from a number of measures rather than taking any one of them individually. Exploratory factor analysis allows the investigator to achieve construct validity and used to examine relationships among various items on the instrument and then to closely cluster these that are related as a factor.

The third aspect of validity is criterion-related validity, which refers to the degree to which the measurement correlates with an external criterion of the phenomenon under investigation (Hulley, Martin, & Cummings, 2001, p. 45). This aspect includes concurrent and predictive validity, which relate to differences in the

timing of obtaining measurements on a criterion (Polit & Hungler, 1995, p. 420). Concurrent validity determines the ability of an instrument to distinguish individuals who differ in their present status on the same criterion. Predictive validity refers to the ability of the measurement to predict the future occurrence of that criterion or the adequacy of an instrument in differentiating between the performance or behaviors of individuals on some future criterion (Burns & Grove, 2005; Polit & Hungler, 1995).

Construct Validity

Factor analysis is a useful analytic method that helps the investigator determine whether one broad or several more specific constructs were needed to characterize the item set (DeVellis, 2003, p. 103). As mentioned above, exploratory factor analysis is considered to be an appropriate means to achieve the construct validity of the developed instrument and to serve the purpose of data reduction.

Factor analysis is often used to test the validity of ideas about items in instrument development to decide how they should be grouped together into subscales and which items should be dropped from the instrument entirely (Dixon, 1997, p. 314). It also is considered an important statistical method for providing evidence of validity in an instrument that is already has utilized Cronbach's alpha coefficient, which is a measure of internal consistency reliability. Items that are strong in factor analysis generally yield acceptable alpha coefficients when grouped together in a scale and provide evidence of internal consistency reliability and support beginning evidence of construct validity in developing a scale.

Principal components analysis (PCA) was employed in making decisions about weighting the variables (Nunnally & Burnstein, 1994). Following the eigenvalue rule of Kaiser, factors with eigenvalues less than 1.0 will be disregarded (DeVellis, 2003; Hair, Anderson, Tatham, & Black, 1998). The scree plot test also was considered to identify retained factors. Factor loading was used to indicate the extent to which a single variable is related to a cluster of variables (Burns & Grove, 2005). This follows the recommendation by Hair et al. (1998) that the lowest factor loading have a practical significance in most instances ± .3. Only for sample size of 350 or greater is a loading value of .3 significant.

Orthogonal rotation was employed on the assumption that all factors have independent or non-correlated with one another (DeVellis, 2003). A factor loading

value of .4, however, was considered significant in the present study due to the assumption that highly loaded questions can help to identify what the construct might be, as recommended by Field (2000). Communality values (h^2) also was reported, in which the squared multiple regression coefficient for each variable describes the amount of variance in a single variable across all factors in the analysis (Burns & Grove, 2005, p. 491).

Criterion-related Validity

The criterion validity is the extent to which the measures are demonstrably related to concrete criteria (Burns & Grove, 2005). It is often divided into concurrent validity and predictive validity. Both of them share similarities in that both are generally measured as correlations between a test and some criterion measure. However, the gold standard tool is required for concurrent validity testing (Burns & Grove, 2005; Waltz, Strickland, & Lenz, 2005). In the present study, criterion-related validity, therefore, was assessed through an examination of predictive validity, which refers to the ability of an instrument to predict performance or attitudes it should theoretically be able to predict on the basis of instrument scores. Because of lack of a well established instrument on the psychosocial work environment in Thailand, the predictive validity measure was suitably. Psychosomatic symptoms, anxiety, depression, and job satisfaction, in the present study, were used as the predicted psychological outcomes associated with psychosocial work environment among Thai garment workers. Data were obtained during the cross-sectional study.

Measures of psychological health outcomes consist of:

1) Psychosomatic symptoms outcome- The Common Symptoms in the General Population of Women (CSGP Scale) was modified to evaluate only psychosomatic health complaints. Although the CSGP Scale includes physical and psychological symptoms most frequently reported by women, it has shown strongest correlations with the standardized instrument that utilize among general population. The modified scale consisted of fifteen items with four-point Likert response scale (almost never/never, every month=0, every week=1, and almost everyday=2). Scores of five or more points defined a high level of symptoms. Cronbach's alpha coefficient was satisfactory (α = .9249).

2) State of anxiety and depression- The Thai Hospital Anxiety and Depression Scale (Thai HADS) was utilized to assess anxiety and depressive symptoms among the

subjects. The Thai HADS has shown good reliability and validity for both anxiety and depression subscales. It includes fourteen items related to moods occurring during the last week- seven items for anxiety subscale and seven for depression rated on a four point response scale. Cronbach's alpha coefficients were .8883- .8505 for the subscales of anxiety and .7892 for depression. As recommendation for Thai HADS, the best cut-off point is 11, indicating who has score 11 to 21 could be considered case of anxiety or depression. Nevertheless, the subjects who had score greater than 8 points were identified as a risk case in this study due to the purpose of the preventive perspective.

3) Job satisfaction- Job satisfaction is considered to be one of indicators of psychological well-being in organizations. The short form version of the Minnesota Satisfaction Questionnaire (MSQ) was modified to assess the subjects' satisfaction with their present job. It is frequently used in job satisfaction research. It has twenty statements designed to assess a person's satisfaction with the possible reinforcers of one's job, including three subscales: intrinsic, extrinsic, and general satisfaction. Responses to items are measured by a five-point scale, ranging from very dissatisfied (1) to very satisfied (5). General satisfaction is the arithmetical sum of the scores for intrinsic and extrinsic satisfaction. Cronbach's alpha coefficient was satisfactory (α = .8562). The tertile scores of job satisfaction were grouped for analysis. Based on tertile score distribution, job satisfaction at low and moderate levels was gathered together as a risk group, with the preventive purpose.

The predictive validity is determined through the logistic regression analysis (LRA). Only the separate individual measures of ERIQ and JCQ were used in the analyses because this study was intended to seek the relationships between individual psychosocial work characteristics and psychological outcomes. To examine predictive validity, the original constructs of ERIQ, JCQ, and organizational factors were used in data analyses instead of the new constructs based on the EFA as these new scales were firstly tested and still needed further replication and refinement in other Thai working population. However, all new constructs of the developed questionnaire were tested for the associations with psychological outcomes in the additional analyses (Appendix C). Procedures for psychometric properties testing are summarized in the Figures 3.3.

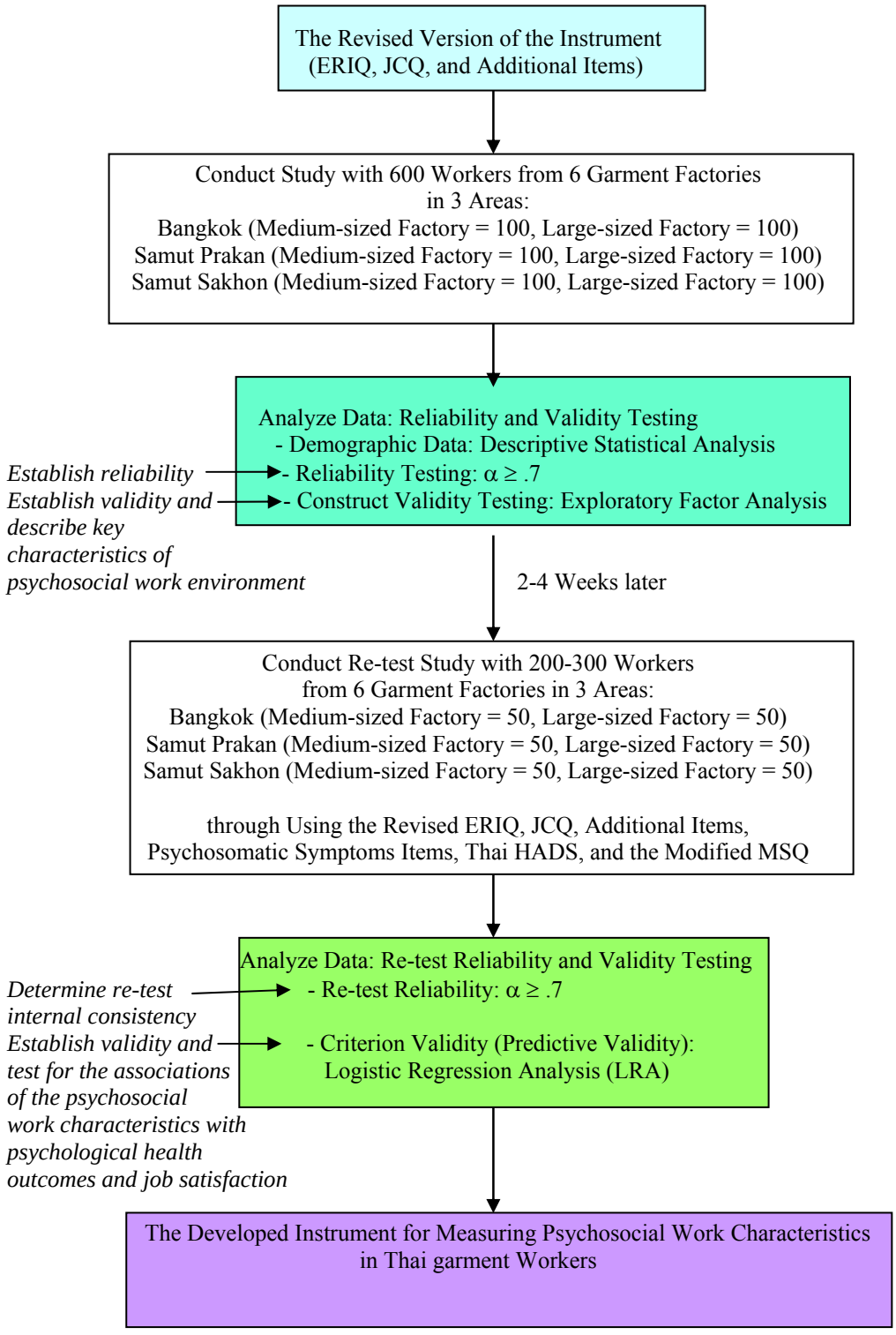

Figure 3.3 Study procedures for psychometric properties testing (Phase 2)

CHAPTER IV
RESULTS

The aims of this study were to develop an instrument that measures aspects of the psychosocial work environment (PSWE) and to describe key characteristics of the PSWE that may impact psychological health and well-being in Thai industrial manufacturing employees, specifically garment workers. Data were collected from April to July 2007. The study is divided into two phases: instrument development and a cross-sectional survey. An instrument development process and a test of the initial psychometric properties of preliminary items was conducted from December 2006 to May 2007. A cross-sectional study was conducted to test the validity and reliability of the developed instrument. It was conducted from May to July 2007. In this chapter, the results from data analysis are presented in two parts: the first part describes the data about sample characteristics and psychological outcomes and the second part provides the findings corresponding to research questions.

1. Sample Characteristics and Psychological Outcomes

Sample Characteristics

1.1 Phase I: Instrument Development

The first phase was conducted for the purpose of developing a valid, reliable, and usable instrument. A total of 12 key informants and 35 workers were asked to participate in the phase of instrument development and pilot study, respectively. All of key informants were blue-collar workers. Demographic characteristics of these samples are presented in Table 4.1.

Table 4.1 Characteristics of key informants (KI, n = 12) and sample in a pilot study (PL, n = 35)

Variables	n(%)		Mean(SD)		Min-Max	
	KI	PL	KI	PL	KI	PL
Factory size						
• Medium	6(50.0)	19(54.3)				
• Large	6(50.0)	16(45.7)				
Gender						
• Female	6(50.0)	32(91.4)				
• Male	6(50.0)	3(8.6)				
Age (years)			28.25(5.46)	31.66(8.28)	21-38yrs.	21-56yrs.
• 15-24	3(25.0)	5(14.3)				
• 25-34	7(58.3)	20(57.1)				
• 35-44	2(16.7)	6(17.1)				
• 45-54	0	3(8.6)				
• 55-60	0	1(2.9)				
Marital status						
• Married/Partnered	8(66.7)	21(60.0)				
• Single	4(33.3)	10(28.6)				
• Divorced/separated	0	3(8.6)				
• Widowed	0	1(2.9)				
Educational level						
• Elementary school	3(25.0)	17(48.6)				
• Junior high school	4(33.3)	10(28.6)				
• Senior high school/ Certificate in Vocational	5(41.7)	6(17.1)				
• Diploma	0	1(2.9)				
• Bachelor's degree	0	1(2.9)				
Current employment status			4(3.62)yrs.	8(9.76)yrs.	6 months -10yrs.	9 months -39yrs.
• Full-time	11(91.7)	29(82.9)				
• Others (i.e., daily and weekly)	1(8.3)	6(17.1)				
Current job position			3(2.35)yrs.	6(5.93)yrs.	6 months -8yrs.	3 months -24yrs.
• Blue-collar workers	12(100.0)	27(77.1)				
• Supervisors	0	8(22.9)				
Work sector						
• Sewing	3(25.0)	11(31.4)				
• Cutting	1(8.3)	0				
• Packing	2(16.7)	6(17.1)				
• Quality Control (QC)	1(8.3)	5(14.3)				
• Embroidering	0	5(14.3)				
• Others	5(41.6)	7(20.0)				
• Not specified	0	1(2.9)				
Paid working hours/wk	12	35	47(15.91) hrs.	57(10.51) hrs.	48-72 hrs.	40-77 hrs.
Having shift-work						
• No, but working sometimes for over time in the evening	12(100.0)	11(31.4)				
• No, and do not working for over time in the evening	0	3(8.6)				
• Yes, working with a night shift	0	21(60.0)				
Personal monthly income (baht)			5,850 (979.33)	6,786 (2,051.51)	4,500-8,000	3,500-15,000
• Sufficient with saving	1(8.3)	7(20.0)				
• Sufficient without saving	10(83.3)	18(51.4)				
• Insufficient, no debt	1(8.3)	6(17.1)				
• Insufficient, with debt	0	4(11.4)				

Table 4.1 Characteristics of key informants (KI, n = 12) and sample in a pilot study (PL, n = 35) (Cont.)

Variables	n(%)		Mean(SD)		Min-Max	
	KI	PL	KI	PL	KI	PL
Family monthly income (baht)			10,445	13,276	5,000-	5,000-
• Sufficient with saving	3(25.0)	8(22.9)	(2,555)	(6,234.79)	13,000	30,000
• Sufficient without saving	9(75.0)	18(51.4)				
• Insufficient, no debt	0	5(14.3)				
• Insufficient, with debt	0	4(11.4)				

Key informants consisted of six female and six male. The mean age of participants in a key informants group was 28.3±5.46 years and age ranged from 21 to 38 years. Most of them were married (66.7%), completed senior high school or certificate in vocational (41.7%), worked full-time (91.7%) in sewing sector (25.0%), and reported having sufficient personal and family monthly income without saving (83.3% and 75.0%, respectively). The number of paid working hours per week ranged from 48 to 72 with the mean of 47±15.91 hours. Their mean number of year in current employment was 4±3.62 years with an average of 3±2.35 years in the current position.

Participants in the pilot study consisted of blue-collar workers (77.1%) and supervisors (22.9%). The majority was female (91.4%). Age ranged from 21 to 56 years with the mean age of 31.7±8.28 years. Most of them were married (60.0%), completed elementary school (48.6%), worked full-time (82.9%) in sewing sector (31.4%), and reported having sufficient personal and family monthly income without saving (51.4% and 51.4%, respectively). The number of paid working hours per week ranged from 40 to 77 with the mean of 57±10.51 hours. Their mean number of years of current employment was 8±9.76 years with an average of 6±5.93 years in the current position.

1.2 Phase II: Cross-sectional Study

A cross-sectional survey was conducted for the purpose of further testing the psychometric properties of the developed instruments (i. e., Thai ERIQ, Thai JCQ, and the additional section), seeking the key characteristics of the PSWE, and describing the associations among these aspects of the PSWE and psychological health and well-being outcomes. Eight hundred thirty respondents (n=830) returned the questionnaire for a response rate of 92.2%. After excluding those with incomplete data, a final sample of 828 respondents (92%) provided data for the ERIQ and

additional section of organizational factor analyses and 790 respondents (87.8%) for the JCQ. Sample characteristics are summarized in Table 4.2.

Table 4.2 Characteristics of sample in a cross-sectional study

Variables	n	%	Mean	SD	Min-Max
Factory size (n = 828)					
• Medium	413	49.9			
• Large	415	50.1			
Gender (n = 828)					
• Female	691	83.5			
• Male	137	16.5			
Age (years) (n = 810)			31.02	7.15	17-60 yrs.
• 15-24	135	16.7			
• 25-34	469	57.9			
• 35-44	169	20.9			
• 45-54	33	4.1			
• 55-60	4	0.5			
Marital status (n =805)					
• Married/Partnered	486	60.4			
• Single	259	32.2			
• Divorced/separated	46	5.7			
• Widowed	14	1.7			
Educational level (n = 819)					
• Elementary school	329	40.2			
• Junior high school	263	32.1			
• Senior high school/ Certificate in Vocational	174	21.2			
• Diploma	37	4.5			
• Bachelor's degree	16	2.0			
Current employment status(n = 807)			6 yrs.	4.01	3 months-35 yrs.
• Full-time	647	80.2			
• Others (i.e., daily and weekly)	160	19.8			
Current job position (n = 827)			3yrs.	1.02	3 months-30 yrs.
• Blue-collar workers	764	92.4			
• Supervisors	63	7.6			
Work sector (n = 828)					
• Sewing	345	41.6			
• Cutting	86	10.4			
• Packing	62	7.5			
• Quality Control (QC)	52	6.3			
• Embroidering	22	2.7			
• Others	169	20.4			
• Not specified	92	11.3			
Paid working hours/wk(n = 828)			48 hrs.	21.76	42-98 hrs.
Having shift-work (n = 806)					
• No, but working sometimes for over time in the evening	723	89.7			
• No, and do not working for over time in the evening	66	8.2			
• Yes, working with a night shift	14	1.7			
• Yes, but working without any night shifts	3	0.4			

Table 4.2 Characteristics of sample in a cross-sectional study (Cont.)

Variables	n	%	Mean	SD	Min-Max
Personal monthly income (baht) (n = 805)			6,445	1,966.17	2,400-20,000
• Sufficient with saving	136	16.9			
• Sufficient without saving	467	58.0			
• Insufficient, no debt	76	9.4			
• Insufficient, with debt	126	15.7			
Family monthly income (baht) (n = 733)			11,953	5,211.64	2,600-35,000
• Sufficient with saving	227	31.0			
• Sufficient without saving	343	46.8			
• Insufficient, no debt	53	7.2			
• Insufficient, with debt	110	15.0			

Participants in a cross-sectional survey consisted of blue-collar workers (92.4%) and supervisors (7.6%). The majority was female (83.5%). Age ranged from 17 to 60 years with the mean age of 31±7.15 years. Most of them were married (60.4%), completed elementary school (40.2%), worked full-time (80.2%), and reported having sufficient personal and family monthly income without saving (58.0% and 46.8%, respectively). Most of subjects worked in sewing sector (41.6%), followed by cutting sector (10.4%), packing, 7.5%; quality control, 6.3%; embroidering, 2.7%, and other sectors (e.g., mechanic, electrician, pattern makers, designing, button sticking, stock checking, etc.), 20.4%. Number of paid working hours per week ranged from 42 to 98 with the mean of 48±21.76. Their mean number of years of current employment was 6±4.01 years with an average of 3±1.02 years in the current position.

A test-retest study was used with a subsample to evaluate the stability of the developed instrument. Four hundred thirty nine (n=439) returned both questionnaires for a response rate of 97.6%. After excluding those with incomplete data, a final subsample of 408 respondents (90.7%) provided data for the ERIQ and additional section of organizational factor analyses and 379 respondents (84.2%) for the JCQ. Chi-square test and t-test analyses were employed to test the homogeneity between sample and subsample. The tests of homogeneity between sample and subsample revealed no differences in age, marital status, education, current job position and years in job position, paid working hours/wk, having shift-work, and personal and family monthly income ($p>.05$).

Psychological Outcomes

Psychological health and well-being outcomes were used for predictive criterion-validity testing and analysis of the association between psychosocial work environment and health effects. They included psychosomatic symptoms, anxiety, depression, and job satisfaction. Descriptive data on these psychological outcomes are presented in Table 4.3.

Table 4.3 Descriptive data on psychological outcomes

Psychological outcomes	n	%	Mean	SD	Min-Max
Psychosomatic symptoms (n = 820)			3.67	5.37	0-30
• Non-case (≤ 4 scores)	584	71.2			
• Case (≥ 5 scores)	236	28.8			
Anxiety (n = 822)			6.11	2.85	0-17
• Non-case (0-7 scores)	597	72.6			
• Potential case (8-10 score)	166	20.2			
• Case (11-21 scores)	59	7.2			
Depression (n = 823)			4.52	3.05	0-14
• Non-case (0-7 scores)	669	81.3			
• Potential case (8-10 score)	125	15.2			
• Case (11-21 scores)	29	3.5			
Job satisfaction (n = 816)			70.88	9.20	29-100
• Low level (≤ 68 scores)	281	34.4			
• Moderate level (69-75 scores)	257	31.5			
• High level (≥ 76 scores)	278	34.1			

Results revealed that 236 subjects (28.8%) reported they had psychosomatic symptoms (score ≥ 5), which included general psychosomatic and physical (musculoskeletal) complaints. Musculoskeletal problems frequently reported during last 6 months were troubles (such as ache, pain, and discomfort) in lower back and shoulders for both right and left parts of body (Appendix C). A number of 166 participants (20.2%) had scores indicating risk for anxiety or potential case whereas the scores of 59 participants (7.2%) indicated that they had anxiety. A number of 125 participants (15.2%) had scores indicating risk for depression or potential case whereas the scores of 29 participants (3.5%) indicated that they have depression. Subjects with low, moderate, and high job satisfaction were equally distributed (34.4%, 31.5%, and 34.1%, respectively).

2. Findings corresponding to research questions

The present study has four main research questions and nine specific research questions. These questions were answered as follows:

Research Question 1: Do the subscales of the developed instrument demonstrate adequate validity and reliability to measure the key domains of the psychosocial work environment for Thai garment workers?

Specific research question 1.1: Does the Thai version of the Effort-Reward Imbalance Questionnaire (Thai-ERIQ) demonstrate adequate validity in terms of content, construct, and criterion-related validity, and demonstrate adequate reliability in terms of internal consistency and stability?

1. The Effort-Reward Imbalance Questionnaire (ERIQ)

1.1 Content Validity

1.1.1 Translation and back-translation process

This process was performed for two months from December 2006 to January 2007. Two bilingual experts worked independently and separately to translate the instrument, resulting in congruent translated questions. Nevertheless, some differences were found in semantic equivalence in responses of two items, and inconsistent interpretation of two items.

For examples, response 'distress' was translated into Thai as *'unhappy'* and *'worry*; and word 'adequate' from item 16 and 17 was translated into Thai *'appropriate'* and *'enough'*. Inconsistent translation existed in two items: item 5 'physically demanding' was translated into Thai *'put much effort'* and *'commanding'* and item 6 'more and more demanding' was translated to *'increasing job quantities'* and *'continuously more and more commanding'*.

To solve these problems, the researcher reviewed and rechecked their concepts with the original version and consulted with the bilingual experts and then selected the statements with clear meaning. Finally, discrepant items were clarified and rectified to be close meanings with the original and fit to Thai context. For instances, *'unhappy'* was selected to use for 'distress'; *'put much physical effort'* was selected to use for 'physically demanding'; *'increasing job quantities'* was selected to use for 'more and more demanding'; and *'satisfy and appropriate'* was selected to use for

'adequate work prospects and adequate salary/income'. Then, the translated version was submitted to a back-translation process.

The back-translated questionnaires were generally congruent. Some differences were found in semantic equivalence and tense usages. The response format 'not at all distress', for example, was translated into Thai *'not at all unhappy'* and then it was back-translated into English *'absolutely fine'* and *'not dissatisfied'*. 'Distressed' was translated into Thai *'unhappy'* and was back-translated to *'uncomfortable/uneasy/unhappy'* and *'dissatisfied'* in English. Problems on tense usage were mostly to be present perfect tense while the original items are present simple tense.

These problems were resolved by the researcher through rechecking concepts with the original version and consulting with the bilingual experts. Eventually, *'absolutely fine'* was selected to use for 'not at all distressed'; *'unhappy/uncomfortable'* was selected to use for 'distressed'; *'interruptions'* was selected to use for 'interruptions and disturbances'. However, tense usages did not modify because of there were not different meanings for tenses in Thai. The back-translated items were also reviewed and suggested by the authorized author. Suggestions included that the translated and back-translated questions should evoke comparable connotations, feelings, and cognitions among Thai interviewees as they do among English-speaking interviewees. The Thai ERIQ was reviewed and refined by the researcher before being further reviewed by the expert working group.

1.1.2 Expert review

Ratings by five experts were principally on 4 (highly/very relevant) on a scale of 1-4, although a very few items were rated 2 (somewhat relevant) and 3 (quite relevant). A Content Validity Index (CVI) was also examined for the purpose of identifying the extent of agreement on all items of Thai ERIQ (23 items). It showed a score of .95 for the entire questionnaire (ranged from .70 to 1.00 on the items). Suggestions and comments were returned to revise and refine the developed questionnaire. Major concerns were found that there are problems relating to connotations and feelings, response style, and rhetorical wordings. For examples, *'I have pressure …'* was recommended to be replaced with *'I feel pressured …'*; and *'I receive the respect from my colleagues*' was recommended to be replaced with *'I have been accepted from my coworkers'*. Alternative response was

recommended by an expert who is psychiatrist to adding rating-point for frequency of feeling. Moreover, item *'I have enough support in the difficult situations'* was recommended to change to *'I have assistance when I confront the trouble situations'*.

These major concerns were reviewed by the researcher through rechecking concepts with the original version and consulting with experts. Some were revised for clarification. However, the response format was not modified because of the need to maintain its construct as in the original. The Thai ERIQ was also refined by a professional editor to improve its readability level before a trial with a group of key informants.

1.1.3 Key informants interviewing

Interviewing with key informants was performed for one month from March to April 2007. After signing the informed consent form, they were asked to complete the first version of the instrument, which took 20-40 minutes. Then, one-on-one interview was conducted to ask about wording, clarity, and comprehension of the Thai ERIQ items. Survey administration took 1.30-2 hours for each individual interview. At the end of interviewing, seven key informants also discussed their understanding about the psychosocial work environment.

Major findings included the need for word clarification, lack of familiarity with long statements, disagreement on wordings, infrequent occurrence of work situations, and lack of acquaintance with response style. Item 'I receive the respect I deserve from my supervisor' was translated to *'I have considerably acceptance/respect by my supervisor'*; *'considerably accepted'* was questioned because it was too broad extent to explain in Thai. 'Difficult situations', for example, was unclear in terms of the extent of those situations. Three items of the reward scale, which start with 'Considering all my efforts and achievements, …' seemed to be long statements and cognitive questions. It was also questioned by key informants that some items might be inappropriate for use with workers who only completed primary education. This response style was unfamiliar among Thai workers.

The developed instrument was reviewed and revised based on key informants' comments and suggestions before being distributed to the study subjects. Some were rewritten, for example, 'considerably accepted' was modified to *'properly accepted'*;

and 'difficult situations' was replaced with *'problematic or difficult situations'*. Others were retained as previously stated in the original.

1.2 Internal Consistency

Cronbach's alpha coefficients were used to estimate the internal consistency reliability of the Thai ERIQ. The internal consistency reliabilities and item-total correlation coefficients were calculated for the unique scales of the constructs. They were evaluated for the pilot study and the main cross-sectional study and are given in Table 4.4.

Table 4.4 Item-total correlations and Cronbach's alpha coefficients of the effort, reward, and overcommitment scales (N of a pilot study = 35, N of a cross-sectional study = 828)

Scales	Items	Item-total correlation		Cronbach's alpha coefficient	
		Pilot study	Cross-sectional study	Pilot study	Cross-sectional study
Effort	▪Time pressure	.7425	.5728	.8809	.7736
	▪Interruptions	.7852	.5100		
	▪Responsibility	.8043	.4827		
	▪Pressure to work overtime	.3767	.5046		
	▪Physically demanding work	.7691	.4895		
	▪Increasing demands	.6686	.5584		
Reward	▪Esteem- Respect from supervisors	.7422	.4401	.8927	.8060
	▪Esteem- Respect from colleagues	.4857	.4050		
	▪Esteem- Adequate support	.6871	.4341		
	▪Esteem- Unfair treatment	.4616	.4996		
	▪Career opportunities- Job promotion prospects	.6915	.5639		
	▪Job security- Undesirable change	.5260	.4738		
	▪Job security- Job insecurity	.6504	.5061		
	▪Job security- Adequate position	.4634	.3066		
	▪Esteem- Adequate respect and prestige	.7994	.5471		
	▪Career opportunities- Adequate promotion prospects	.7677	.5224		
	▪Monetary gratification- Adequate salary income	.6237	.5110		
Overcommitment	▪Overwhelmed by time pressure	.4954	.3475	.6720	.6581
	▪Thinking about work problems	.5373	.4236		
	▪Relax and switch off work	.1933	.2062		
	▪Sacrifice too much for job	.2880	.2995		
	▪Work still on mind	.5566	.5746		
	▪Trouble sleeping at night	.3623	.4816		

In a pilot study which was conducted to determine the initial psychometric properties of Thai ERIQ, it was found that the internal consistency were sufficient. All item-total correlations were rather greater than .30, with the exception of two items of the overcommitment scale, item 20 'relax and switch off work (r = .1933)' and item 21 'sacrifice too much for job (r = .2880),' suggesting weak relationships. Cronbach's alpha coefficients showed satisfactory reliability for two scales: .8809 for the 6 items of effort, and .8927 for the 11 items of reward, whereas the 6 items of the overcommitment showed a marginal value at .6720.

Similar findings were found in a cross-sectional study, all item-total correlations were higher than .30, with the exception of two items of the overcommitment scale, item 20 'relax and switch off work (r = .2062)' and item 21 'sacrifice too much for job (r = .2995),' suggesting still be weak relationships. Although the internal consistencies of all three scales were lower than as in a previous pilot study, Cronbach's alpha coefficients were satisfactory for the scales of effort (α = .7736) and reward (α = .8060), whereas the overcommitment scale displayed a marginal value (α = .6581).

1.3 Construct validity

The initial version of Thai ERIQ was administered to female and male workers in a cross-sectional survey during April 2007 to June 2007. Mean, standard deviation, median, and minimum and maximum score of the ERI scales are shown in Table 4.5.

Table 4.5 Effort-Reward imbalance ratio, mean scores, standard deviation, median, and minimum and maximum of the effort, reward, and overcommitment scales

Variables	n(%)	Mean	SD	Median	Min-Max
Effort (N = 823)		11.53	3.81	10.83	6-28
Reward (N = 822)		48.41	5.46	49.86	24-55
Overcommitment (N = 825)		14.15	2.48	14.27	7-24
ERI Ratio (N = 816)		0.46	0.21	0.40	0.20-1.83

The mean of ERI ratio was found to be low (0.46±0.21). In this study, only 2% (n=16) of workers reported an ERI ratio ≥ 1 (median = 0.40), indicating little effort-reward imbalance in this sample of industrial manufacturing workers. The mean scores of effort, reward, and overcommitment were found at the middle tertile of score distribution: 11.53±3.808, 48.41±5.458, and 14.15±2.479, respectively.

Exploratory factor analysis (EFA) was employed to determine construct validity. The principal components method with orthogonal rotation and eigenvalues greater than 1 was used to examine the factor structure. To determine the appropriateness of factor analysis, the first step was to search the correlations matrix for all variables, indicating low to moderate correlations ($r = -.007$ to $.514$, $p<.05$). It was likely they share some common factors. To identify the degree of interrelated among variables in the Anti-Image Correlation Matrix (AIC), the Measure of Sampling Adequacy (MSA) was used to quantify the intercorrelations and the appropriateness of factor analysis with the meaning of reaching 1 when each variable is perfectly predicted without error by the other variables (Hair, Anderson, Tatham, & Black, 1998). Results indicated that the variables are multivariate normal distribution (ranged from .675 to .925).

The Barlette test of sphericity was also examined, which provides the statistical probability of significant correlations at least some of the variables, indicating there were some relationships between the variables as needed in the analysis ($p<.001$). The Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) was employed to confirm the relevancy and representative of the variables or items (Field, 2000). It indicates that the patterns of correlations are relatively compact and yields distinct and reliable factors when greater than 0.5. In this study, KMO showed great value at .852, and therefore factor analysis is appropriate. Based on EFA and item factor loadings above $\pm$ 0.3, a six factor solution was remained and found to account for 56.59% of total variance. Item loadings on six factors, with Varimax rotated factor matrix, are presented in Table 4.6.

Table 4.6 Factor analysis and factor loadings of 23-item ERIQ using principal component analysis with varimax rotation (n = 828)

Item	Factor					
	1 (Effort)	2 (Reward2)	3 (Reward1)	4 (OVCn)	5	6
▪ 6.Increasing demands	**.747**					
▪ 4.Pressure to work overtime	**.669**					.317
▪ 5. Physically demanding work	**.634**					
▪ 1. Time pressure	**.612**					
▪ 3. Responsibility	**.550**					
▪ 2. Interruptions	**.542**		-.421			
▪ 11. Job promotion prospects		**.706**				
▪ 16. Adequate promotion prospects		**.703**				
▪ 13. Job insecurity		**.663**				
▪ 17. Adequate salary income		**.650**				
▪ 15. Adequate respect and prestige		**.581**	.424			
▪ 12. Undesirable change		**.443**				
▪ 8. Respect from colleagues			**.766**			
▪ 7. Respect from supervisors			**.731**			
▪ 9. Adequate support			**.680**			
▪ 10. Unfair treatment		.317	**.529**			
▪ 23. Trouble sleeping at night				**.765**		
▪ 19. Thinking about work problems				**.752**		
▪ 22. Work still on mind				**.614**	.337	.403
▪ 18. Overwhelmed by time pressure	.377			**.551**		
▪ 14. Adequate position		.305			**.706**	
▪ 21. Sacrifice too much for job				.301	**.616**	
▪ 20. Relax and switch off work						**.741**
Percentage of variance explained (56.59%)	23.89	10.03	7.23	5.98	4.98	4.47

According to the Varimax rotated component matrix factor loadings shown in Table 4.6, there are seven items with considerable loadings (≥ ±0.3) on two factors (items 2, 4, 10, 14, 15, 18, and 21) and one item with loadings on three factors (items 22). Items with substantial factor loadings on a single factor were assigned to that factor whereas items with considerable loadings on more than one factor were assigned to the factor with the highest loading. Because the item groupings of the factors of the Thai ERIQ were mainly the same as in the English version, the name for each factor remained similar to that of the English ERIQ (see Table 4.7).

As a result (see Table 4.6), all six original items of effort construct (items 1, 2, 3, 4, 5, and 6) are grouped into the first component which explained 23.9% of the variance. Six items of the original 10 items reward construct (items 11, 12, 13, 15, 16, and 17) loaded on a second component that accounted for 10.0% of the variance (namely, Reward2). The third component explained 7.2% of the variance and consisted of the remaining four items of the original reward construct (items 7, 8, 9, and 10 namely, Reward1). Four items from the original overcommitment construct (items 18, 19, 22, and 23) loaded on the fourth component (namely, OVCn) that accounted for 5.9% of the variance. Three remaining items, two items of overcommitment (item 20 ‘relax and switch off work’) and item 21 (‘sacrifice too much for work’) loaded on the fifth component; and one item of reward (item 14 ‘adequate position’) loaded on the sixth component, which explained 4.9% and 4.5% of the variance, respectively. Although these last two factors were derived, they were undefinable. In such a situation where the factor derived solution cannot be labeled, those factors that are less meaningful or undefined are disregarded (Hair, Anderson, Tatham, & Black, 1998). Four factors with 20 items of the Thai-ERIQ, therefore, were extracted and interpreted with meaningful relationships in this study. These new constructs were only slightly different from the original construct in the components themselves (see Table 4.7) and may lead to a slightly more concise instrument.

Table 4.7 Comparison between the English and Thai versions of the 23-item ERIQ loaded

The English version of ERIQ			The Thai version of ERIQ		
Scales	# of items	Items loaded	Items loaded	# of items	Scales (Given name)
Effort	6	1, 2, 3, 4, 5, 6	1, 2, 3, 4, 5, 6	6	*Effort*
Reward	11	7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17	7, 8, 9, 10	4	*Reward1*
			11, 12, 13, 15, 16, 17	6	*Reward2*
			14	1	*No given name*
Overcommitment	6	18, 19, 20, 21, 22, 23	18, 19, 22, 23	4	*OVCn*
			20, 21	2	*No given name*

1.4 Criterion-related validity (Predictive validity)

Predictive validity was assessed by computing correlations between the constructs of the ERI and psychological health problems and psychological well-being (i.e., psychosomatic symptoms, anxiety, depression, and job satisfaction). Logistic regression analysis (LRA) was used to test the probable contributions of effort, reward, and overcommitment scales. Results are presented in Table 4.8.

The Effort-Reward ratio was computed between the effort and reward scales, using the standard algorithm. However, because of the low prevalence of at risk scores for the ERI ratio, the scores of effort, reward, and overcommitment were grouped into tertiles for analysis. Furthermore, because the developed instrument is intended to be used as a tool for prevention, risk was interpreted broadly. Thus, based on tertile score distribution, subjects scoring moderate or high on the effort scale or low or moderate on the reward scale were considered to be an at risk group.

Table 4.8 Associations of ERI subscales with psychological outcomes (N = 828)

	Psychosomatic symptoms			Anxiety			Depression			Low job satisfaction		
	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value
Effort												
• Low effort	1.00			1.00			1.00			1.00		
• High effort	**1.57**	**1.08-2.29**	.018	**2.01**	**1.36-2.96**	<.001	NA			NA		
Reward												
• Low reward	**2.46**	**1.72-3.52**	<.001	**2.05**	**1.43-2.94**	<.001	**2.13**	**1.46-3.10**	<.001	**2.12**	**1.57-2.85**	<.001
• High reward	1.00			1.00			1.00			1.00		
Overcommitment (OVC)												
• Low OVC	1.00			1.00			1.00			1.00		
• High OVC	NA			NA			NA			**1.47**	**1.09-1.98**	.013

NA: means that the variable was not available in the model.

LRA was performed with different core constructs of the original ERIQ (Table 4.8). It revealed that effort components had associations with both psychosomatic symptoms and anxiety with statistically significant odds ratios. The results revealed that the risk of psychosomatic symptoms for subjects reporting high effort was 1.57 times (95%CI 1.08 to 2.29) greater than for those reporting low effort. The risk of anxiety for subjects reporting high effort was 2.01 times (95%CI 1.36 to 2.96) greater than for those reporting low effort. The effort component did not show significant associations with depression or job satisfaction.

Only the reward component had associations with all four psychological outcomes (i.e., psychosomatic symptoms, anxiety, depression, and job satisfaction) with statistically significant odds ratios. The risk of psychosomatic symptoms for subjects with low reward was 2.46 times (95%CI 1.72 to 3.52) greater than for those with high reward. The risk of anxiety for subjects with low reward was 2.05 times (95% CI 1.43 to 2.94) greater than for those with high reward. The risk of depression for subjects reporting low reward was 2.13 times (95% CI 1.46 to 3.10) compared to those reporting high reward. The risk of low job satisfaction for subjects reporting low reward was 2.12 times (95% CI 1.57 to 2.85) greater than for those with high reward.

The overcommitment component was only associated with job satisfaction with statistically significant odds ratios. The risk of low job satisfaction for subjects who reported high overcommitment was 1.47 times (95% CI 1.09 to 1.98) greater than for those with lower overcommitment. Significant associations between the overcommitment component and all psychological health problems (i.e., psychosomatic symptoms, anxiety, and depression) were not found.

In summary, the reward component demonstrated statistically significant odds ratios with all psychological outcomes.

1.5 Stability

Two to four weeks following the first survey, a test-retest study was undertaken with a subsample to estimate stability, using Pearson's correlation coefficients. Correlation coefficients between two tests are presented in Table 4.9.

Table 4.9 Correlation coefficients of the construct of ERI scales between test and retest study (n = 828)

	retest_Effort	retest_Reward	retest_Overcommitment
Effort	**.496****		
Reward		**.524****	
Overcommitment			**.576****

** Statistical significant level at 0.01

Correlation coefficients between constructs of the ERI for the first and the follow up surveys displayed statistically significant relationships at moderate levels ($p<.001$): effort construct, r = .496; reward construct, r = .524; and overcommitment construct, r = .576 at two to four week interval.

Specific research question 1.2: Does the Thai version of the Job Content Questionnaire (Thai-JCQ) demonstrate adequate validity in terms of content, construct, and criterion-related validity, and demonstrate adequate reliability in terms of internal consistency and stability?

2) The Job Content Questionnaire (JCQ)

2.1 Content Validity

2.1.1 Translation and back-translation process

The translation and back-translation method was employed to the original English JCQ (the 52-item recommended version) with the same process by four experts who translated and back-translated the ERIQ. Both the translated and the back-translated questionnaires were mostly congruent. In a translation process, some discrepancies were found in semantic equivalence. For examples, 'I am free from conflicting demands that others make' was translated into Thai *'I am free from conflict among other staffs'* and *'I am independently and free from others' conflicting demands'*; 'awkward positions' existed in two items and was translated into Thai *'clumsy positions'* and *'uncomfortable positions'*; 'hostility' existed in two items and was translated into Thai *'impolite'* and *'intend to do harm'*; 'successful' was translated to *'achievement'* and *'ability'*; 'competent' was translated to *'confident'* and *'skilled'*; and 'encourage' was translated to *'promote'* and *'support'*. An inconsistent translation was found in only one item 'I have a lot of say about

what happens on my job', which was translated into Thai *'I can say a lot of things on my work'* and *'I have many things to say about my job'*.

To solve these problems, the researcher rechecked concepts with the original version and consulted with the bilingual experts. Discrepant items were then clarified and rectified to be close meanings with the original and fit to Thai context. For instances, *'I am free from conflict among other staff'* was selected to use for 'I am free from conflicting demands that others make'; *'not good/uncomfortable positions'* was selected to use for 'awkward positions'; *'unfriendly'* was selected to use for 'hostility'; *'achievement'* was selected to use for 'successful'; *'skilled'* was selected to use for 'competent'; *'support/promote'* was selected to use for 'encourage'; and *'I can say all the things about my job'* was selected to use for 'I have a lot of say about what happens on my job'. Then, the translated version was submitted to back-translated process.

Similarly, back translations identified differences for three items in word choices and literary style, two items in semantic equivalence, and one item relating to inconsistent back-translation. For instance, 'My job allows me to make a lot of decision on my own' was back-translated into English *'In my work, I am the one who makes the decision most of the time'* and *'Most of the time, I generally make my own decisions at work'*; 'People I work with take a personal interest in me' was back-translated into English *'The people I work with have interest/care about me personally'* and *'My coworkers either pay attention or take care of me'*; and 'People I work with are helpful in getting the job done' was back-translated to *'My colleagues help me accomplish work'* and *'My coworkers are part of the team in getting the job done'*.

Problems on semantic equivalence were also found 'the welfare' was back-translated into English *'safety and well-being'* and *'the benefits';* and 'conflict' was back-translated to *'struggle'* and *'disagreement'*. Inconsistency was found for only one item: 'I am not asked to do an excessive amount of work' was back-translated into English *'I am not requested to work too hard/too much'* and *'I do not get bother to assist others during my work'*.

Ultimately, *'I generally make my own decisions at work most of the time'* was selected to use for 'My job allows me to make a lot of decision on my own'; *'The*

people I work with have interest/care about me personally' was selected to use for 'People I work with take a personal interest in me'; *'The people I work with are part of the team in getting the job done'* was selected to use for 'People I work with are helpful in getting the job done'; *'the benefits'* was selected to use for 'the welfare'; *'struggle'* was selected to use for 'conflict'; and *'I am not requested to work too hard/too much'* was selected to use for 'I am not asked to do an excessive amount of work'. Similarly, semantic equivalence was a notable problem in both translation and back-translation processes. All questionable translated and back-translated items were resolved before they were submitted for expert review.

2.1.2 Expert review

Ratings by five experts were mainly on 4 on a 1-4 scale (highly/very relevant), although a very few items were rated 2 (somewhat relevant) and 3 (quite relevant). A Content Validity Index (CVI) was also examined for the purpose of identifying the extent of agreement on all items of Thai JCQ (52 items). It showed a score of .94 for the entire questionnaire (ranged from .65 to 1.00 on the items). Suggestions and comments were returned to guide the revision and refine the developed questionnaire. Major concerns were problems relating to rhetorical wordings, response style, and work and social context sensitivity.

For instance, item *'I am not requested to work too hard/too much'* was recommended to be replaced with *'I am not assigned to work too much'* and item *'Does your job require you to be emotionally involved?'* was recommended to be replaced with *'Your job needs you to get emotionally involved'*. These two items were modified as suggested because the optional wordings provided better understanding. One item *'I am free from conflicting demands that others make'* was very difficult to translate into Thai to express its actual meaning. However, it was replaced with *'I am independent of the conflicting demands that others make'* to better understanding.

Response format was criticized as consisting of various forms, for example, macro-level decision authority requires rating scales and multiple choices, whereas the questions relating to labor unions requires yes/no answer and rating scales. This variation might lead to confusing responses. These problems were resolved by the researcher through adding statements to clarify the instructions for each item with different responses.

2.1.3 Key informants interviewing

To meet face validity, interviewing with key informants was performed from March to April 2007. After signing the informed consent form, they were asked to complete the first version of the instrument, which took 30-60 minutes. Then, one-on-one interviews were conducted to ask about wording, clarity, and comprehension of the Thai JCQ items. Survey administration took 1.30-2 hours for each individual interview. Major comments focused on word clarification, response style and format, and frequency of occurrence of work situations.

'Physical effort,' for example, was translated into Thai *'put effort'* and was recommended to be replaced with *'put physical effort'*. The question about job security 'Sometimes people permanently lose jobs they want to keep. How likely is it that during the next couple years you will lose your present job with your employer?' was translated into Thai *'Sometimes people have to leave desired job forever, do you tend to leave your current job during the next 2-3 years'*. It was commented by three key informants that they did not understand this question of confusion about being fired from versus intending to quit the job. They also suggested that the first sentence should be skipped to better understanding because these two statements do not go along. Finally, the translated item was used because most subjects reflected that it indicated the meaning of loosing the job.

The statement 'my work requires rapid and continuous physical activity' was seen as an occasional work situation occurring and it was suggested that the response should reflect frequency. It was not modified because the original needed to be retained. This question might be an example of context sensitivity. The item 'I have at least some chances that my ideas will be considered about company policy (e.g., …)' was another example of where key informants suggested that response should be related to the frequency of occurrence. Most of them also suggested that the responses should be the extent of agreement, such as very large, large, somewhat, small, very small, and totally disagree). The mentioned response style was likely to be familiar with Thais.

Response format was recommended to be table-format substitute line-by-line format to improve readability. The response style was not modified and the original was retained, although the response format was modified to be table format. Furthermore, an alternative choice *'job needed experience and did not require any education'* was suggested

to be additional response for the item 'What level of skills are required on your job in terms of years of forma training. (Not necessarily the same as your education'. The developed instrument was clarified and revised based on key informants' comments and suggestions before being distributed to the study subjects.

2.2 Internal Consistency

Cronbach's alpha coefficients were used to estimate the internal consistency reliability of the Thai JCQ. The internal consistency reliabilities and item-total correlation coefficients were calculated for the unique scales of the constructs. They were evaluated for the pilot study and the main cross-sectional study and are given in Table 4.10.

Table 4.10 Item-total correlations and Cronbach's alpha coefficients of the scales and subscales of Thai version of JCQ (n = 790)

Scales	Items	Item-total correlation		Cronbach's alpha coefficient	
		Pilot study	Cross-sectional study	Pilot study	Cross-sectional study
Job demands	**Job demands scale** (psychological job demand + physical job demand)			.7142	.7330
	Psychological demand				
	▪ Work fast	.3448	.1218	.4229	.4713
	▪ Work hard	.3582	.3362		
	▪ No excessive work	.3387	.1598		
	▪ Enough time	.1023	.4059		
	▪ Conflicting demands	.0302	.2596		
	Physical demand	.4378	.5118	.7713	.7555
	▪ Much physical effort	.6190	.4245		
	▪ Lift heavy loads	.4570	.6290		
	▪ Rapid physical activity	.6178	.5556		
	▪ Awkward body positions	.6011	.4971		
	▪ Awkward arm positions				
	Emotional demand			.6792	.5622
	▪ Work put in emotionally disturbing situations	.4083	.1428		
	▪ Work emotionally demanding	.6234	.4766		
	▪ Get emotionally involved in work	.4707	.5467		
Job control (Decision latitude)	**Job control scale** (skill discretion + decision authority)			.7920	.6637
	Skill discretion (Skill utilization)			.8026	.6148
	▪ Learn new things	.4305	.3074		
	▪ Repetitive work	.1157	.1287		
	▪ Requires creative	.7676	.5672		
	▪ High skill level	.6299	.2802		
	▪ Variety	.7400	.2446		
	▪ Develop own abilities	.8032	.6179		
	▪ Education required by job*				

Table 4.10 Item-total correlations and Cronbach's alpha coefficients of the scales and subscales of Thai version of JCQ (n = 790) (Cont.)

Scales	Items	Item-total correlation		Cronbach's alpha coefficient	
		Pilot study	Cross-sectional study	Pilot study	Cross-sectional study
	Decision authority			.4470	.4869
	▪ Allows own decision	.5046	.4267		
	▪ Little decision freedom	.1284	.2969		
	▪ Lot of say	.2514	.2053		
	Macro-level decision authority*				
	▪ Some influence/company				
	▪ Work group size				
	▪ Significant influence in group				
	▪ Democratic group				
	▪ Supervise others				
	▪ Union number				
	▪ Union influence/company				
	▪ Have union influence				
Social support	**Total social support scale** (supervisor support + coworker support)			.7105	.6739
	Supervisor support			.6602	.6021
	▪ Supervisor is concerned	.5475	.2026		
	▪ Supervisor pays attention	.6610	.5273		
	▪ Helpful supervisor	.4697	.4768		
	▪ Supervisor good organizer	.1788	.4092		
	Coworker support			.7247	.5960
	▪ Coworker competent	.7279	.3964		
	▪ Coworkers interest in me	.2197	.2529		
	▪ Friendly coworkers	.6707	.4760		
	▪ Coworkers helpful	.5782	.4444		

* Cronbach's alpha coefficients were not examined because of the variation in alternative choices and values.

In a pilot study which was conducted to determine the initial psychometric properties of Thai JCQ, it was found that the internal consistencies ranged from .42 to .80. Item-total correlations were mostly greater than .30, with the exception of seven items: two items of the psychological job demand subscale; item 4 'Enough time (r = .1023)' and item 5 'Conflicting demand (r = .0302), one item of skill discretion; item 12 'Repetitive work (r = .1157)', two items of decision authority; item 18 'Little decision freedom (r = .1284)' and item 19 'Lot of say (r = .2514)', one item of supervisor support; item 44 'Supervisor good organizer (r = .1788)', and one item of coworker support; item 22 'Coworkers interest in me (r = .2197)'. These indicated weak relationships among items.

Cronbach's alpha coefficients showed good reliability for three subscales: .7713 for the 5 items of physical job demand, .8026 for the 6 items of skill discretion, and .7247 for the 4 items of coworker support. The 3 items of emotional job demand subscale showed a marginal value at .6792. Similarly, the 4 items of the supervisor support subscale showed a marginal value at .6602. There were rather low internal consistencies among items of psychological job demand (α = .4229) and decision authority subscales (α = .4470). However, these two subscales were used in the cross-sectional survey because each subscale has only a relatively small number of items (5 items for psychological demand and 3 items for decision authority) which could account for the low internal consistency reliabilities. Moreover, there were acceptable internal consistency reliabilities for both subscales when reliabilities of job demands and job control scales were considered (α = .7142 for 10 items and α = .7920 for 9 items, respectively).

In the cross-sectional study, results were mostly lower than existing in a pilot study. Item-total correlations were partly higher than .30, with the exception of eleven items: three items of the psychological job demand subscale; item 1 'Work fast (r = .1218)', item 3 'No excessive work (r = .1598), and item 5 'Conflicting demand (r = .2596), one item of emotional job demand subscale; item 45 'Work put in emotionally disturbing situations (r = .1428)', three item of skill discretion; item 12 'Repetitive work (r = .1287)', item 14 'High skill level (r = .2802)', and item 15 'Variety (r = .2446)', two items of decision authority; item 18 'Little decision freedom (r = .2969)' and item 19 'Lot of say (r = .2053)', one item of supervisor support; item 40 'Supervisor is concerned (r = .2026)', and one item of coworker support; item 22 'Coworkers interest in me (r = .2529)'. These indicated that rather weak relationships existed among items.

The Cronbach's alpha coefficients results almost were lower than in the pilot study. They showed good reliability for only one subscale: .7555 for the 5 items of physical job demand. When alpha at 0.50 was used (as recommended by Helmstadter, 1964 quoted in Bhuttarowas P., 2001), there were marginal values of internal consistency for the 3 items of emotional demand (α = .5622), the 6 items of skill discretion (α = .6148), the 4 items of supervisor support (α = .6021), and the 4 items of coworker support (α = .5960). Two remaining subscales (i.e., psychological job demand

and decision authority) showed rather low internal consistency among items at .4713 and .4869. However, these two subscales were used in the cross-sectional survey because each subscale has a relatively small number of items (5 items for psychological demand and 3 items for decision authority), which could account for the low internal consistency reliabilities. However, there were acceptable internal consistency reliabilities for both subscales when reliabilities of job demands and job control scales were considered (α = .7330 for 10 items and α = .6637 for 9 items, respectively).

2.3 Construct validity

The initial version of Thai JCQ was administered to female and male workers in a cross-sectional survey during April to June 2007. A total of 790 subjects were included in the final analysis of construct validity of JCQ after either incomplete or variance data were disregarded. This yielded a response rate of 87.8%. Mean, standard deviation, median, and minimum and maximum scores of the JCQ scales and subscales are shown in Table 4.11.

Table 4.11 Mean scores, standard deviation, median, and minimum and maximum of the scales and subscales of job demands, job control (decision latitude), and social support (N = 790)

Variables	Mean	SD	Median	Min-Max
Job demand				
• Psychological job demand	30.27	4.178	29.99	18-48
• Physical job demand	11.26	2.204	11.26	5-20
• Emotional job demand	7.25	2.051	7.02	3-15
• Job demands (psychological demand + physical demand)	41.53	5.575	41.17	25-63
Job control (Decision latitude)				
• Skill discretion (skill utilization)	31.69	4.614	32.17	16-46
• Decision authority	30.37	5.056	30.24	12-48
• Macro-level decision authority	4.39	1.023	4.23	1.33-8.50
• Job control (skill discretion + decision authority)	62.09	7.954	62.19	32-94
Social support				
• Supervisor support	11.24	1.707	11.44	4-16
• Co-worker support	11.65	1.228	11.58	4-16
• Total social support (supervisor support + coworker support)	22.89	2.433	22.99	11-32

The mean score of psychological job demand was found at the middle tertile of score distribution (30.27±4.178). Similarly, the mean score of physical job demand and emotional job demand were found at the middle tertile of score distribution (11.26±2.204 and 7.25±2.051, respectively). When the total score of job demands was considered, it also showed the mean score at the middle tertile level (41.53±5.575). These were similar to the mean scores of skill discretion (31.69±4.614), decision authority (30.37±5.056), macro-level decision authority (4.39±1.023), and total score of job control (62.09±7.954), which showed mean scores at the middle tertile of score distribution as well. The mean scores of supervisor support, coworker support, and total social support were found at the middle tertile of score distribution (11.24±1.707, 11.65±1.228, and 22.89±2.433, respectively). Exploratory factor analysis (EFA) was employed to determine construct validity. The principle components method with orthogonal rotation and eigenvalues greater than 1 was used to examine the factor structure. To determine the appropriateness of factor analysis, the first step was to search the correlations matrix for all variables, indicating low to moderate correlations ($r = -.010$ to $.567$, $p<.05$). It was likely they share some common factors. To identify the degree of interrelationships among variables in the Anti-Image Correlation Matrix (AIC), the Measure of Sampling Adequacy (MSA) was used to quantify the intercorrelations and the appropriateness of factor analysis with the meaning of reaching 1, when each variable is perfectly predicted without error by the other variables (Hair, Anderson, Tatham, & Black, 1998). Results indicated that the variables are multivariate normal distribution (ranged from .569 to .883). The Barlette test of sphericity was also examined in which used to provides the statistical probability of significant correlations at least some of the variables, indicating there were some relationships between the variables needed in the analysis ($p<.001$). The Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) was employed to confirm the relevancy and representativeness of the variables or items (Field, 2000). It indicates that the patterns of correlations are relatively compact and yields distinct and reliable factors when greater than 0.5. In this study, KMO showed great value at .807, and therefore factor analysis is appropriate. In this study, the items relating job demand, job control, and social support were selected for analysis. A total of 39 items of the Thai JCQ were analyzed. Based on EFA and item factor loadings above ± 0.3, an eleven factor solution remained and found that accounted for 58.49% of total variance. Items loaded on eleven factors with Varimax rotated factor matrix are presented in Table 4.12.

Table 4.12 Factor analysis and factor loadings of recommended version of JCQ (39 items) using principal component analysis with varimax rotation (n = 790)

	Factor										
	1	2	3	4	5	6	7	8	9	10	11
▪1. Work fast	**.550**										
▪ 2. Work hard	**.721**										
▪ 3. No excessive work									**.699**		
▪ 4. Enough time									**.552**		
▪ 5. Conflicting demands									**.651**		
▪ 6. Much physical effort	**.690**										
▪ 7. Lift heavy loads	**.656**										
▪ 8. Rapid physical activity	**.754**										
▪ 9. Awkward body position	**.585**				*.356*						
▪ 10. Awkward arm positions	**.531**					*-.508*					
▪ 45. Work put in emotionally disturbing situations											**-.625**
▪ 46. Work emotionally demanding								**.815**			
▪ 47. Get emotionally involved in work								**.862**			
▪ 11. Learn new things				**.646**							
▪ 12. Repetitive work	*.382*					**.396**					
▪ 13. Requires creative		*.350*	*.328*	**.431**		*-.402*					
▪ 14. High skill level				**.650**							
▪ 15. Variety				**.567**							
▪ 16. Develop own abilities		*.404*		**.628**							
▪ 17. Allows own decisions		**.624**									
▪ 18. Little decision freedom		**-.444**									
▪ 19. Lot of say		**.500**				*.406*					
▪ 20. Some influence/company		**.580**									.326
▪ 30. Work group size										**-.622**	
▪ 31. Significant influence in group		**.717**									
▪ 32. Democratic group		**.562**									
▪ 33. Supervise others		**.520**									*-.327*
▪ 34. Union member						**.554**					
▪ 35. Union influence/company					**.803**						
▪ 36. Have union influence					**.810**		**.707**				
▪ 21. Coworkers competent							**.361**				
▪ 22. Coworkers interest in me							**.714**			*.353*	
▪ 24. Friendly coworkers							**.745**				
▪ 26. Coworkers helpful											
▪ 40. Supervisor is concerned						**.575**					
▪ 41. Supervisor pays attention			**.711**								
▪ 43. Helpful supervisor			**.708**								
▪ 44. Supervisor good organizer			**.725**								
▪ 52. Education required by job										**.690**	
Percentage of variance explained (58.49%)	14.93	7.97	6.84	5.07	4.42	3.80	3.70	3.31	2.98	2.85	2.63

According to the Varimax rotated component matrix factor loadings shown in Table 4.12, there are seven items loaded simultaneously with considerably higher loadings (≥ ±0.3) on two factors (items 9, 10, 12, 16, 19, 20, 22, and 33) and one item with loadings on four factors (item 13). Items with substantial factor loadings on a single factor were assigned to that factor whereas items with considerable loadings on more than one factor were assigned to the factor with the highest loading. As a result, all ten items of the original 10 items job demand construct (items 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10) loaded on a first and a ninth factor. Fourteen items of the original 18 items job control construct (items 11, 13, 14, 15, 16, 17, 18, 19, 20, 31, 32, 33, 35, and 36) loaded on a second, a fourth, and a fifth factor. Seven items of the original 8 items social support construct (items 21, 22, 24, 26, 41, 43, and 44) loaded on a third and a seventh factor. Because the item groupings of the factors of the Thai JCQ were mainly the same as in the English version, the name for each factor remained similar to that of the English JCQ (see Table 4.13).

Seven original items of the job demand construct (items 1 and 2 of the psychological demand subscale, and item 6, 7, 8, 9, and 10 of the physical demand subscale) are grouped into the first component which explained 14.9% of the variance (namely, *Physical-related job demand)*. Seven original items of the job control construct (all three items of the decision authority subscale; items 17, 18, and 19, and four items of the macro-level decision authority subscale; items 20, 31, 32, and 33) loaded on a second component that accounted for 7.9% of the variance (namely, *Decision authority-T*). The third component explained 6.8% of the variance and consisted of three items of the original supervisor support subscale (items 41, 43, and 44 namely, *Supervisor support-T*). The fourth component explained 5.1% of the variance and contained five of seven items of the original skill discretion subscale (items 11, 13, 14, 15, and 16 namely, *Skill utilization-T*). The fifth component includes two items of the macro-level decision authority subscale (items 35 and 36) and accounted for 4.4% of the variance, namely *Macro-level decision authority relating to union influence*. The sixth component explained 3.8% of the variance and encompassed one item of the skill discretion subscale (item 12 ‘Repetitive work’), one item of the macro-level decision authority subscale (item 34 ‘Union member’),

and one item of the supervisor support subscale (item 40 ‘Supervisor is concerned’) and a name could not be assigned.

All four items of the original coworker support subscale (items 21, 22, 24, and 26) loaded on a seventh component that accounted for 3.7% of the variance (namely, *Coworker support*). Two items of the emotional demand subscale (items 46 and 47) loaded on an eighth component that accounted for 3.3% of the variance (namely, *Emotional demand-T*). Three remaining original items of the job demand construct (items 3, 4, and 5 of psychological demand subscale) are grouped into the ninth component which explained 2.9% of the variance (namely, *Psychological demand-T*). The tenth component explained 2.9% of the variance and was composed of two items (one item of the macro-level decision authority; item 30 ‘Work group size’ and another one item of the skill discretion; item 52 ‘Education required by job’) and a name could not be assigned. The last component, the eleventh component, holds only one item of emotional demand (item 45 ‘Work put in emotionally disturbing situations’) and accounted for 2.6% of the variance, resulting in no name assignment. Although three factors with a total of six items were derived (component 2, 3, and 11), they were not definable. In such a situation of a factor derived solution that could not be labelled, those factors that are less meaningful or undefined are disregarded (Hair, Anderson, Tatham, & Black, 1998). Eight factors, therefore, were interpreted with meaningful relationships in the present study. In summary, there are eight factor solutions with 33 items which were extracted with a meaningful relationship. The new set of subscales of JCQ was relatively similar to the original (see Table 4.13).

Table 4.13 Comparison between the English and Thai versions of the 39-item JCQ loaded

The English version of JCQ			The Thai version of JCQ		
Scales	# of items	Items loaded	Items loaded	# of items	Scales (Given name)
Job demands	13	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 45, 46, 47	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 46, 47	12	***Job demands-T***
• Psychological demand	5	1, 2, 3, 4, 5	3, 4, 5	3	*Psychological job demand-T*
• Physical demand	5	6, 7, 8, 9, 10	1, 2, 6, 7, 8, 9, 10	7	*Physical-related job demand*
• Emotional demand	3	45, 46, 47	45	1	*No given name*
			46, 47	2	*Emotional job demand-T*
Job control (Decision latitude)	18	11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 30, 31, 32, 33, 34, 35, 36, 52	11, 13, 14, 15, 16, 17, 18, 19, 20, 31, 32, 33, 35, 36	14	***Job control-T***
• Skill discretion (Skill utilization)	7	11, 12, 13, 14, 15, 16, 52	11, 13, 14, 15, 16	5	*Skill utilization-T*
• Decision authority	3	17, 18, 19	17, 18, 19, 20, 31, 32, 33	7	*Decision authority-T*
• Macro-level decision authority	8	20, 30, 31, 32, 33, 34, 35, 36	35, 36	2	*Macro-level decision authority relating to union influence*
			12, 34, 40	3	*No given name*
			30, 52	2	*No given name*
Social support	8	21, 22, 24, 26, 40, 41, 43, 44	21, 22, 24, 26, 41, 43, 44	7	***Social support-T***
• Coworker	4	21, 22, 24, 26	21, 22, 24, 26	4	*Coworker support*
• Supervisor	4	40, 41, 43, 44	41, 43, 44	3	*Supervisor support-T*

* *Given name-T* means this name was given relating to Thai sample in this study.

2.4 Criterion-related validity (Predictive validity)

Predictive validity was assessed by computing associations between the constructs of the JCQ and psychological health problems and psychological well-being (i.e., psychosomatic symptoms, anxiety, depression, and job satisfaction). Subscales of the JCQ were also investigated for correlations with these psychological outcomes. Logistic regression analysis (LRA) was used to test the probable contributions of scales of job demands, job control (decision latitude), and social support. Results are presented in Table 4.14.

The scores of job demand were grouped into the upper tertile whereas the lower tertile scales of job control and social support were applied for analysis as recommended in the literature (Landsbergis et al., 1994 cited in Rugulies & Krause, 2005). Based on tertile score distribution, subjects scoring at the upper tertile of job demands were considered to be the at risk group, whereas subjects scoring at lower tertile of job control and social support were considered to be at risk groups.

Table 4.14 Association of JCQ scales with psychological outcomes (N = 790)

	Psychosomatic symptoms			Anxiety			Depression			Low job satisfaction		
	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value
▪ Job demands (psd+phd)[1]												
• Low job demands	1.00			1.00			1.00			1.00		
• High job demands	**0.69**	**0.48-0.99**	.042	NA			NA			**2.61**	**1.76-3.85**	<.001
▪ Emotional job demand												
• Low emotional demand	1.00			1.00			1.00			1.00		
• High emotional demand	**1.71**	**1.23-2.38**	.002	**2.17**	**1.55-3.05**	<.001	**1.49**	**1.01-2.20**	.043	NA		
▪ Job control (skd+da)[2]												
• Low job control	NA			NA			NA			**1.83**	**1.24-2.70**	.002
• High job control	1.00			1.00			1.00			1.00		
▪ Macro-level decision authority												
• Low macro-level decision authority	NA			NA			NA			NA		
• High macro-level decision authority	1.00			1.00			1.00			1.00		
▪ Total social support (ss+cs)[3]												
• Low support	NA			NA			NA			**4.70**	**3.23-6.85**	<.001
• High support	1.00			1.00			1.00			1.00		

[1] Job demands means the formula of psychological job demand (psd) + physical job demand (phd).
[2] Job control means the formula of skill discretion (skd) + decision authority (da).
[3] Total social support means the formula of supervisor support (ss) + coworker support (cs).
NA: means the variable was not available in the model.

LRA was performed with different scales of the JCQ (see Table 4.14). The analysis was tested for the core constructs and subscales of the JCQ model. There were statistically significant odds ratios for the associations between job demands scale and both risk of psychosomatic symptoms and risk of low job satisfaction. Higher job demands were considered to be the protective factor in the present study (OR = 0.69, 95%CI = 0.48 to 0.99). The risk of low job satisfaction for subjects who had high job demands was 2.61 times (95% CI 1.76 to 3.85) greater than those with low job demands. The job demands scale did not show significant relationships with either anxiety and depression.

The results revealed that only emotional job demand had associations with all psychological health problems (i.e., psychosomatic symptoms, anxiety, and depression) with statistically significant odds ratios. The risk of psychosomatic symptoms in subjects subjected to high emotional job demand was 1.71 times (95%CI 1.23 to 2.38) greater than those with low emotional job demand. The risk of anxiety in subjects with high emotional job demand was 2.17 times (95%CI 1.55 to 3.05) greater than those with low emotional job demand. The results also revealed that the risk of depression for subjects who had high emotional job demand was 1.49 times (95% CI 1.01 to 2.20) compared to those who had low emotional job demand. There was not a significant relationship found between the emotional job demand scale and job satisfaction.

Job control displayed a relationship with statistically significant odds ratios only with job satisfaction. The risk of low job satisfaction for subjects who had low job control was 1.83 times (95% CI 1.24 to 2.70) compared to subjects who had high job control. Significant relationships between job control scale and all psychological health problems were not found, and macro-level decision authority scale did not show significant relationships with any psychological outcome (i.e., psychosomatic symptoms, anxiety, depression, and job satisfaction).

There were statistically significant odds ratios for the association between total social support and job satisfaction. The risk of low job satisfaction for subjects who had low total social support was 4.70 times (95% CI 3.23 to 6.85) greater than those with high total social support. However, no significant relationship was found for total support scale with any psychological problem.

2.5 Stability

Two to four weeks following the first survey, a test-retest study was undertaken with a subsample to estimate stability, using Pearson's correlation coefficients. Correlation coefficients between two tests are presented in Table 4.15.

Table 4.15 Correlation coefficients among scales of Thai JCQ between test and retest study (n = 790)

	retest_ Job demands	retest_Emotional job demand	retest_Job control	retest_Macro-level decision authority	retest_Total social support
Job demands (psychological job demand + physical job demand)	**.134****				
Emotional job demand		**.337****			
Job control (skill discretion + decision authority)			**.454****		
Macro-level decision authority				**.639****	
Total social support					**.382****

** Statistical significant level at 0.01

At the two to four week interval, there was the strongest correlation between macro-level decision authority scale for the first and the follow up surveys, which indicated statistically significant relationships at moderate level ($r = .639$, $p<.001$). The correlation coefficient between job control for the first and the follow up surveys, which indicated statistically significant relationship at moderate level ($r = .454$, $p<.001$). Correlation coefficients between total social support and emotional job demand scales for the first and the follow up surveys also displayed a statistically significant relationship at low level ($r = .382$ and .337, respectively, $p<.001$). Correlation coefficient between job demands scale for the first and the follow up surveys displayed statistically significant relationship at the lowest level ($r = .134$, $p = .008$).

Specific research question 1.3: Does the additional section of the developed instrument demonstrate adequate reliability in terms of internal consistency and stability, and demonstrate adequate validity in terms of content, construct, and criterion-related validity?

3) The Additional Section on Organizational Factor

3.1 Content Validity

3.1.1 Items development

Based on literature review, the additional items on organizational factor were constructed to measure the organizational aspects that might affect employees' health and well-being. A total of thirty items comprised policies and practices (7 items), organizational climate (12 items: 3 items on climate support, 3 items on climate participation, 3 items on climate communication, and 3 items on climate safety and health), and environmental and physical work environment (11 items). The additional section was reviewed by the experts before it was tried out in a pilot study.

3.1.2 Experts reviewing

Rating by five experts were mostly on 4 on a 1-4 scale (highly/very relevant), although a few items were rated 3 (quite relevant) and a very few items were rated 2 (somewhat relevant). A Content Validity Index (CVI) was also examined for the purpose of identifying the extent of agreement. It showed a score of .96 for the entire questionnaire (ranged from .80 to 1.00 on the items). Suggestions and comments were returned to revise and refine the developed questionnaire. The major concern was words clarification.

For example, item 'I have received a health examination and safety training at least annually through the company' was suggested to separate into two items because it was double-barreled and included both health examination and safety training. To improve readability, it was separated into '*I have received a health examination at least annually through the company*' and '*I have received safety training at least annually through the company*'. These suggestions were taken by the researcher. However, the majority of organizational questions were not modified because they were intended to evaluate general instead of specific aspects of the organization. The additional section was also refined by a professional editor to improve its readability level before a trial with a group of key informants.

3.1.3 Key informants interviewing

To meet face validity, key informants were asked to complete the first version of the instrument, which took 5-30 minutes each. Then, one-on-one interviews were conducted to ask about wording, clarity, and comprehension of the additional items to meet face validity. Survey administration took 10-20 minutes for each individual interview. Most of key informants reflected that the additional items on organizational factor were easy to understand and respond to because these questions clearly related to their job and concrete work conditions. Nevertheless, it was recommended to replace the response format with a table format instead of line-by-line format to improve readability. The additional section was reviewed and revised based on their comments and suggestions before being distributed to the study subjects.

3.2 Internal Consistency

Cronbach's alpha coefficients were used to estimate the internal consistency reliability of the additional section. The internal consistency reliabilities and item-total correlation coefficients were calculated for the unique scales and subscales of the constructs. They were evaluated for the pilot study and the main cross-sectional study and are presented in Table 4.16.

Table 4.16 Item-total correlations and Cronbach's alpha coefficients of the scales and subscales of the additional section (n = 828)

Scales	Items	Item-total correlation		Cronbach's alpha coefficient	
		Pilot study	Cross-sectional study	Pilot study	Cross-sectional study
Policies and practices	▪ Receive notification from the company	.6841	.7005	.8200	.8703
	▪ Comply with the company's policies on health and safety	.7252	.6962		
	▪ Potential hazards are identified by the manager	.5118	.6378		
	▪ Unit has been designed and adjusted to promote safety at work	.5156	.6663		
	▪ Knowledge about safety procedures and PPE practices	.5024	.6947		
	▪ Receive annual health examination	.5337	.5476		
	▪ Receive annual safety training	.5318	.6099		
Organizational climate				.9048	.8686
	Climate support	.5842	.5592	.7633	.7523
	▪ Speak up own ideas and act on problem solving	.7329	.5887		
	▪ Have standards for the protection of employees	.6260	.6848		
	▪ Have standards for assistance of employees				
	Climate participation			.5962	.6975
	▪ Friendly atmosphere at work	.7301	.6154		
	▪ Feel free to share ideas with supervisors	.8086	.5499		
	▪ Participating in company activities	.2535	.5206		
	Climate communication			.8146	.7368
	▪ Receive essential information about important changes	.6002	.5499		
	▪ Receive useful information and feedback	.6057	.6173		
	▪ Exchange information on health and safety	.7629	.5754		
	Climate safety and health			.6999	.5645
	▪ Feeling security and safety climate at work	.7988	.6115		
	▪ Have potential hazards or unsafe conditions at work	.4695	.2406		
	▪ Health information was always informed	.6388	.5416		

Table 4.16 Item-total correlations and Cronbach's alpha coefficients of the scales and subscales of the additional section (n = 828) (Cont.)

Scales	Items	Item-total correlation		Cronbach's alpha coefficient	
		Pilot study	Cross-sectional study	Pilot study	Cross-sectional study
Environmental and physical work conditions	▪ Tools and equipments are maintained and checked	.6189	.6885	.9345	.9112
	▪ Accidents trends are always investigated	.6908	.6866		
	▪ The company accident report is posted annually	.7228	.5809		
	▪ Noise is always assessed and is adequately adjusted	.7567	.6952		
	▪ Light is always assessed and is adequately adjusted	.8293	.6152		
	▪ Temperature is always assessed and is adequately adjusted	.8245	.6193		
	▪ Work station is always assessed and is adequately adjusted	.8068	.7023		
	▪ Signs about work and safety are posted	.4990	.6875		
	▪ Signs about work and safety are easy to read	.6574	.6940		
	▪ Work area is always clean	.8122	.6576		
	▪ Work area is always conveniently arranged	.7471	.6992		

In the pilot study, which was conducted to determine the initial psychometric properties of the additional section, it was found that the internal consistencies were acceptable. All item-total correlations were mostly greater than .40, with the exception of one item of the organizational climate scale 'participating in company activities (r = .2535),' suggesting weak relationship with other items. Cronbach's alpha coefficients showed satisfactory reliability for all three scales: .8200 for the 7 items of policies and practices, .9048 for 12 items of organizational climate, and .9345 for the 11 items of environmental and physical work conditions.

In the cross-sectional study, all item-total correlations were mostly higher than .50, with the exception of one item of the organizational climate scale, 'Have potential hazards or unsafe conditions at work (r = .2406), suggesting weak relationship with other items. Cronbach's alpha coefficients were satisfactory for all three scales of

policies and practices (α = .8703), organizational climate (α = .8686), and environmental and physical work conditions (α = .9112).

3.4 Construct validity

The initial version of the additional section was administered to female and male workers in a cross-sectional survey from April to June 2007. Mean, standard deviation, median, and minimum and maximum score of the additional section on organizational factor and its subscales are shown in Table 4.17.

Table 4.17 Mean scores, standard deviation, median, and minimum and maximum of the scales and subscales of the additional section (N = 828)

Variables	Mean	SD	Median	Min-Max
Policies and practices	24.68	5.00	25.05	7-35
Organizational climate	37.39	7.20	37.35	13-58
• Climate support	9.87	2.26	9.83	3-15
• Climate participation	9.21	2.29	9.41	3-15
• Climate communication	8.53	2.26	8.52	3-15
• Climate safety and health	9.80	2.06	9.90	3-15
Environmental and physical work conditions	36.00	7.90	35.81	13-55

The mean score of policies and practices was found at the middle tertile of score distribution (24.68±5.00). The is similar to the mean scores of organizational climate (37.39±7.20) and environmental and physical work conditions (36.00±7.90), which were also found in the middle tertile of score distribution. Among the subscales of organizational climate, the climate support subscale showed the highest mean score (9.87±2.26) whereas the climate communication subscale showed the lowest mean score (8.53±2.26).

Exploratory factor analysis (EFA) was employed to determine construct validity. The principle components method with orthogonal rotation and eigenvalues greater than 1 was used to examine the factor structure. To determine the appropriateness of factor analysis, the first step was to search the correlations matrix for all variables, indicating low to moderate correlations (r = .060 to .666, $p<.05$). It was likely they share some common factors. To identify the degree of interrelationships among variables in the Anti-Image Correlation Matrix (AIC), the Measure of Sampling Adequacy (MSA) was used to quantify the intercorrelations and

the appropriateness of factor analysis with the meaning of reaching 1, when each variable is perfectly predicted without error by the other variables (Hair, Anderson, Tatham, & Black, 1998). Results indicated that the variables are multivariate normal distribution (ranged from .881 to .980).

The Barlette test of sphericity was also examined in which used to provides the statistical probability of significant correlations at least some of the variables, indicating there were some relationships between the variables needed in the analysis ($p<.001$). The Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) was employed to confirm the relevancy and representativeness of the variables or items (Field, 2000). It indicates that the patterns of correlations are relatively compact and yields distinct and reliable factors when greater than 0.5. In this study, KMO showed great value at .945, and therefore factor analysis is appropriate. Based on EFA and item factor loadings above $\pm$ 0.3, a five factor solution was remained and found that accounted for 61.59% of total variance. Items loaded on five factors with Varimax rotated factor matrix are presented in Table 4.18.

Table 4.18 Factor analysis and factor loadings of additional items of organizational factor (using VARIMAX rotation)

	Factor				
	1	**2**	**3**	**4**	**5**
▪ 1.Receive notification about health and safety policies	**.816**				
▪ 2.Comply with the company's policies on health and safety	**.696**				
▪ 3.Potential hazards are identified by the manager	**.747**				
▪ 4.Unit has been designed and adjusted to promote safety at work	**.660**				
▪ 5.Knowledge about safety procedures and PPE practices	**.718**				
▪ 6.Receive annual health examination	*.330*			**.719**	
▪ 7.Receive annual safety training	*.388*			**.677**	
▪ 8.Speak up own ideas and act on problem solving			**.573**		
▪ 9.Have standards for the protection of employees	**.621**			*.377*	
▪ 10.Have standards for assistance of employees	**.505**		*.348*	*.367*	
▪ 11.Friendly atmosphere at work			**.575**	*.332*	*.347*
▪ 12.Feel free to share ideas with supervisors			**.708**		
▪ 13.Participating in company activities			**.598**		*.344*
▪ 14.Receive essential information about important changes			**.688**		
▪ 15.Receive useful information and feedback	*.468*		**.631**		
▪ 16.Exchange information on health and safety	**.531**		*.453*		
▪ 17.Feeling security and safety climate at work	*.445*		*.308*		**.450**
▪ 18.Have potential hazards or unsafe conditions at work					**.687**
▪ 19.Health information was always informed	**.483**			*.338*	
▪ 20.Tools and equipments are maintained and checked	**.578**	*.301*			*.326*
▪ 21.Accident trends are always investigated	**.515**	*.347*		*.386*	
▪ 22.The company accident report is posted annually		*.434*		**.525**	
▪ 23.Noise is always assessed and is adequately adjusted		**.715**			
▪ 24.Light is always assessed and is adequately adjusted		**.600**			
▪ 25.Temperature is always assessed and is adequately adjusted	*.576*	**.765**			
▪ 26.Work station is always assessed and is adequately adjusted		**.714**			
▪ 27.Signs about work and safety are posted		*.500*		*.354*	**.515**
▪ 28.Signs about work and safety are easy to read		*.480*		*.369*	**.514**
▪ 29.Work area is always clean		*.432*			**.599**
▪ 30.Work area is always conveniently arranged*****	**.479**	*.450*			*.462*
Percentage of variance explained (61.59%)	41.25	7.08	5.39	4.20	3.67

* conceptually assigned to 5th factor

According to the Varimax rotated component matrix factor loadings shown in Table 4.18, there are ten items loaded simultaneously with considerable loadings (≥ ±0.3) on two factors (items 6, 7, 9, 13, 15, 16, 19, 21, 22, and 25) and seven items with loadings on three factors (items 10, 11, 17, 20, 27, 28, and 30). Items with substantial factor loadings on a single factor were assigned to that factor whereas items with considerable loadings on more than one factor were assigned to the factor with the highest loading, with the exception of item 30, which was assigned to the fifth factor. Although the item 30 was loaded on the first factor with greater factor loading, its concept is similar to others items which were loaded on the fifth factor.

As a result, five of the original seven items policies and practices construct (items 1, 2, 3, 4, and 5) loaded on a first factor whereas two remaining items (items 6 and 7) loaded on a fourth factor. The original 12 items organizational climate construct loaded on a first (items 9, 10, 16, and 19), a third (items 8, 11, 12, 13, 14, and 15), and a fifth factor (items 17 and 18). The original 11 items of environmental and physical work conditions construct loaded on a first (items 20 and 21), a second (items 23, 24, 25, and 26), a fourth (item 22), and a fifth factor (items 27, 28, 29, and 30).

Five items of the policies and practices construct (items 1, 2, 3, 4 and 5), four items of organizational climate construct (items 9, 10, 16, and 19), and two items of environmental and physical work conditions construct (items 20 and 21) are grouped into the first component which explained 41.3% of the variance (namely, *Health and safety policies)*. Four original items of environmental and physical work conditions construct (items 23, 24, 25, and 26) loaded on a second component that accounted for 7.1% of the variance (namely, *Monitoring and control health hazards at work*). The third component explained 5.4% of the variance and consisted of six items of the original organizational climate construct (item 8 of the climate support subscale, items 11, 12, and 13 of the climate participation subscale, and items 14 and 15 of the climate communication subscale namely, *Organizational climate*). The fourth component explained 4.2% of the variance and contained two of seven items of the original policies and practices construct (items 6 and 7) and one item of environmental and physical work conditions construct (namely, *Health and safety activities*). The fifth component included six items (two items of the original organizational climate construct; items 17 and 18 and four items of the original environmental and physical work conditions construct; items 27, 28, 29, and 30) and accounted for 3.7% of the variance, namely *Safe working environment*. All five factors resulted from the EFA solution, therefore, were interpreted with meaningful relationships in the present study. According to the exploratory analysis (EFA), there are five factor solutions with 30 items were extracted with meaningful relationships. (see Table 4.19). The factors called for some conceptual reorganization of the scale.

Table 4.19 Comparison between the first version of the additional section and the new constructs loaded

The first version of additional section			The new constructs		
Scales	# of items	Items loaded	Items loaded	# of items	Scales (Given name)
Policies and practices	7	1, 2, 3, 4, 5, 6, 7	1, 2, 3, 4, 5, 9, 10, 16, 19, 20, 21	11	*Health and safety policies*
			6, 7, 22	3	*Health and safety activities*
Organizational climate	12	8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19	8, 11, 12, 13, 14, 15	6	*Organizational climate*
▪ Climate support	3	8, 9, 10			
▪ Climate participation	3	11, 12, 13			
▪ Climate communication	3	14, 15, 16			
▪ Climate safety and health	3	17, 18, 19			
Environmental and physical work conditions	11	20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30	17, 18, 27, 28, 29, 30	6	*Safe working environment*
			23, 24, 25, 26	4	*Monitoring and control health hazards at work*

3.4 Criterion-related validity (Predictive validity)

Predictive validity was assessed by examining associations between the constructs of the organizational factor and psychological health problems and psychological well-being (i.e., psychosomatic symptoms, anxiety, depression, and job satisfaction). The original scales of the additional section were used in the analyses because the new scales were needed for further replication. Logistic regression analysis (LRA) was used to test the probable contributions of scales of policies and practices, organizational climate, environmental and physical work conditions on psychological outcomes. Scores of organizational constructs were grouped based on tertile score distributions. Because the developed instrument is intended to be used as a tool for prevention, risk was interpreted broadly. Thus based on tertile score distribution, subjects scoring low and moderate on the additional scales were considered to be at risk groups. The results are presented in Table 4.20.

Table 4.20 Associations of the scales of the first version of additional section with psychological outcomes (N = 828)

	Psychosomatic symptoms			Anxiety			Depression			Low job satisfaction		
	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value
Policies and practices												
• Low level	NA			NA			NA			**1.99**	**1.34-2.94**	.001
• High level	1.00			1.00			1.00			1.00		
Organizational climate												
• Low level	**1.89**	**1.35-2.66**	<.001	NA			NA			**3.50**	**2.36-5.19**	<.001
• High level	1.00			1.00			1.00			1.00		
Environmental and physical work condition												
• Low level	NA			NA			**2.71**	**1.72-4.26**	<.001	NA		
• High level	1.00			1.00			1.00			1.00		

NA: means the variable was not available in the model.

According to Table 4.20, results revealed that policies and practices component had an association with statistically significant odds ratios only with job satisfaction. The risk of low job satisfaction for subjects reporting low level on policies and practices was 1.99 times (95%CI 1.34 to 2.94) greater than for those reporting a better level on policies and practices. Significant associations between policies and practices component and all psychological health problems (i.e., psychosomatic symptoms, anxiety, and depression) were not found.

The organizational climate component had an association with both psychosomatic symptoms and job satisfaction with statistically significant odds ratios. The risk of psychosomatic symptoms for subjects reporting low level on organizational climate was 1.89 times (95%CI 1.35 to 2.66) greater than for those reporting a better level on organizational climate. The risk of low job satisfaction for subjects reporting low level on organizational climate was 3.50 times (95%CI 2.36 to 5.19) greater than for those reporting a better level on organizational climate. Organizational climate component did not show any associations with either anxiety and depression.

The environmental and physical work conditions component had significant association only with depression. The risk of depression for subjects reporting low level on environmental and physical work conditions was 2.71 times (95%CI 1.72 to 4.26) greater than for those reporting a better level on environmental and physical work conditions. This component did not show significant associations with psychosomatic symptoms, anxiety, or job satisfaction.

In summary, no scales of the additional section showed significant associations with anxiety.

3.5 Stability

Two to four weeks following the first survey, a test-retest study was undertaken to estimate stability, using Pearson’s correlation coefficients with a subsample. Correlation coefficients between two tests are presented in Table 4.21.

Table 4.21 Correlation coefficients of the scales of the additional section between test and retest study (n = 828)

	retest_ Policies and practices	retest_ Organizational climate	retest_ Environmental and physical work conditions
Policies and practices	**.495****		
Organizational climate		**.596****	
Environmental and physical work conditions			**.619****

** Statistical significant level at 0.01

Correlation coefficients between constructs of the additional section for the first and the follow up surveys displayed statistically significant relationships at moderate levels ($p<.001$): policies and practices construct, $r = .495$; organizational climate construct, $r = .596$; and environmental and physical work conditions construct, $r = .619$ at a two to four weeks' interval.

Research Question 2: To what extent are the characteristics of the psychosocial work environment associated with psychosomatic symptoms, anxiety, and depression?

Specific research question 2.1: To what extent are the subscales of ERIQ associated with psychosomatic symptoms, anxiety, and depression?

The associations between the effort, reward, and overcommitment scales and psychosomatic symptoms, anxiety, and depression were examined by Pearson's Product Moment Correlation coefficients. Results are presented in Table 4.22.

Table 4.22 Correlation coefficients between the construct of ERI scales and psychological health problems (n = 828)

Variables	Psychosomatic symptoms	Anxiety	Depression
Effort	.199**	.329**	.184**
Reward	-.317**	-.347**	-.252**
Overcommitment	.145**	.267**	.149**

** Statistical significant level at 0.01

Results revealed that the effort scale showed slight but statistically significant associations with psychosomatic symptoms (r = .199, p<.001), anxiety (r = .329, p<.001), and depression (r = .184, p<.001). The reward scale showed modest but statistically significant negative associations with psychosomatic symptoms (r = -.317, p<.001), anxiety (r = -.347, p<.001), and depression (r = -.252, p<.001). The overcommitment scale showed weak correlations but statistically significant associations with psychosomatic symptoms (r = .145, p<.001), anxiety (r = .267, p<.001), and depression (r = .149, p<.001).

Specific research question 2.2: To what extent are the subscales of the JCQ associated with psychosomatic symptoms, anxiety, and depression?

The associations between scales of job demands, job control, and total social support and psychological health problems (i.e., psychosomatic symptoms, anxiety, and depression) were examined by Pearson's Product Moment Correlation coefficients. Table 4.23 shows the correlations between the scales of the Thai version of JCQ and psychological health problems, respectively.

Table 4.23 Correlation coefficients between the scales of JCQ and psychological health problems (n = 790)

Variables	Psychosomatic symptoms	Anxiety	Depression
Job demands (psychological job demand + physical job demand)	-.022	.088*	.020
Emotional job demand	.167**	.252**	.115**
Job control (Decision latitude) (skill discretion + decision authority)	.008	.040	-.004
Macro-level decision authority	-.044	.048	.021
Total social support (supervisor support + coworker support)	-.045	-.106**	-.110**

** Statistical significant level at 0.01
* Statistical significant level at 0.05

The job demands scale showed weak correlation but statistically significant relationship with anxiety (r = .088, p = .015). Only the emotional job demand scale displayed slight but statistically significant associations with all psychological health problems: psychosomatic symptoms (r = .167, p<.001), anxiety (r = .252, p<.001), and depression (r = .115, p = .001). The total social support scale showed statistically

significant negative relationships with both anxiety (r = -.106, p = .003) and depression (r = -.110, p = .002). The scales of job control and macro-level decision authority displayed weak but statistically non-significant relationships with all psychological health problems.

Specific research question 2.3: To what extent are the subscales of the additional section of the developed instrument associated with psychosomatic symptoms, anxiety, and depression?

The associations between scales and the new constructs of the additional section and psychosomatic symptoms, anxiety, and depression were examined by Pearson's Product Moment Correlation coefficients. Table 4.24 shows the correlations between the scales of the additional section and all psychological health problems.

Table 4.24 Correlation coefficients between the initial construct of the additional section and psychological health problems (n = 828)

Variables	Psychosomatic symptoms	Anxiety	Depression
Policies and practices	-.036	-.136**	-.133**
Organizational climate	-.200**	-.187**	-.294**
Environmental and physical work conditions	-.136**	-.174**	-.222**

** Statistical significant level at 0.01

There were negative but statistically significant associations between the policies and practices scale and both anxiety (r = -.136, p<.001) and depression (r = -.133, p<.001). The organizational climate scale demonstrated slight but statistically significant negative associations with all psychological health problems: psychosomatic symptoms (r = -.200, p<.001), anxiety (r = -.187, p<.001), and depression (r = -.294, p<.001). Similarly, the environmental and physical work conditions scale showed statistically significant negative associations with all psychological health problems: psychosomatic symptoms (r = -.136 to -.222, p<.001), anxiety (r = -.174, p<.001), and depression (r = -.222, p<.001).

In conclusion, all three scales of effort, reward, and overcommitment of the ERIQ, emotional demand scale from the JCQ, as well as scales of organizational

climate and environmental and physical work conditions from the additional section had significant correlations with psychosomatic symptoms.

All three scales of effort, reward, and overcommitment of the ERIQ, three scales of job demands, emotional demand, and total social support from the JCQ, as well as all three scales of policies and practices, organizational climate, and environmental and physical work conditions from the additional section had significant associations with anxiety.

Finally, all three scales of effort, reward, and overcommitment of the ERIQ, two scales emotional demand and total social support from the JCQ, as well as all three scales of policies and practices, organizational climate, and environmental and physical work conditions from the additional section had significant relationships with depression.

Research Question 3: To what extent are the characteristics of the psychosocial work environment associated with job satisfaction?

Specific research question 3.1: To what extent are the subscales of ERIQ associated with job satisfaction?

The associations between the effort, reward, and overcommitment scales and job satisfaction were examined by Pearson's Product Moment Correlation coefficients. Results are presented in Table 4.25.

Table 4.25 Correlation coefficients between the subscales of ERIQ and job satisfaction (n = 828)

Variables	Job satisfaction
Effort	-.231**
Reward	.304**
Ovecommitment	-.132**

** Statistical significant level at 0.01

Results revealed that the effort scale showed negative correlation but statistically significant associations with job satisfaction ($r = -.231$, $p<.001$). The reward scale showed a modest but statistically significant association with job

satisfaction (r = .304, p<.001). The overcommitment scale showed a slight but statistically significant negative association with job satisfaction (r = -.132, p<.001).

Specific research question 3.2: To what extent are the subscales of the JCQ associated with job satisfaction?

The associations between scales of job demands, job control, and total social support and job satisfaction were examined by Pearson's Product Moment Correlation coefficients. Table 4.26 shows the correlations between the scales and subscales of the Thai version JCQ and job satisfaction, respectively.

Table 4.26 Correlation coefficients between the scales of JCQ and job satisfaction (n = 790)

Variables	Job satisfaction
Job demands (psychological demand + physical demand)	-.358**
Emotional demand	.011
Job control (Decision latitude) (skill discretion + decision authority)	.420**
Macro-level decision authority	.279**
Total social support (supervisor support + coworker support)	.499**

** Statistical significant level at 0.01

There was negative correlation but a statistically significant relationship between the total job demands scale and job satisfaction (r = -.358, p<.001). Results also revealed that there were modest but statistically significant associations between job satisfaction and the total job control scale (r = .420, p<.001), the macro-level decision authority subscale (r = .279, p<.001), and the total social support scale (r = .499, p<.001).

Specific research question 3.3: To what extent are the subscales of the additional section of the developed instrument associated with job satisfaction?

The associations between scales and the new constructs of the additional section and job satisfaction were examined by Pearson's Product Moment Correlation coefficients. Results are presented in Table 4.27.

Table 4.27 Correlation coefficients between the subscales of additional section and job satisfaction (n = 828)

Variables	Job satisfaction
Policies and practices	.478**
Organizational climate	.410**
Environmental and physical work conditions	.400**

** Statistical significant level at 0.01

Job satisfaction showed modest but a statistically significant association with the policies and practices scale (r = .478, p<.001), the organizational climate scale (r = .410, p<.001), and the environmental and physical work conditions scale (r = .400, p<.001).

In summary, similar findings were also found for the significant associations between all three scales of effort, reward, and overcommitment from the ERIQ and job satisfaction. With an exception for only emotional demand scale from the JCQ, all scales of job demands, job control, macro-level decision authority, and total social support had significant associations with job satisfaction whereas all three scales of policies and practices, organizational climate, and environmental and physical work conditions from the additional section had significant associations with job satisfaction.

Research Question 4: What is the most parsimonious set of domains that can be used to comprehensively represent the key characteristics of the psychosocial work environment in Thailand?

All scale of the ERI model, Job Demand-Control-Support model, and the additional section were put altogether into analyses to determine the key characteristics of the psychosocial work environment. Multicollinearity was examined and it was confirmed that there was no evidence of multiple correlation among variables. Logistic regression analyses (LRA) were then used to test the probable contributions of these scales to psychological outcomes (i.e., psychosomatic symptoms, anxiety, depression, and job satisfaction). Table 4.28 shows the associations of effort, reward, and overcommitment scales of ERIQ, job demands, emotional demand, job control, macro-level decision authority, and total social support scales of JCQ, and policies and practices, organizational climate, and environmental and physical work condition scales of the additional section with the four psychological outcomes.

Table 4.28 Associations of scales of ERIQ, JCQ, and the additional section with psychological outcomes (N = 796)

	Psychosomatic symptoms			Anxiety			Depression			Low job satisfaction		
	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value
▪Effort												
• Low effort	1.00			1.00			1.00			1.00		
• High effort	**1.51**	**1.01-2.26**	.045	**1.54**	**1.05-2.28**	.029	NA			NA		
▪Reward												
• Low reward	**2.57**	**1.73-3.81**	<.001	**2.11**	**1.46-3.04**	<.001	**2.02**	**1.35-3.04**	.001	NA		
• High reward	1.00			1.00			1.00			1.00		
▪Overcommitment (OVC)												
• Low OVC	1.00			1.00			1.00			1.00		
• High OVC	NA			NA			NA			NA		
▪Job demands												
• Low job demands	1.00			1.00			1.00			1.00		
• High job demands	**0.61**	**0.43-0.87**	.006	NA			NA			**1.87**	**1.31-2.67**	.001
▪Emotional job demand												
• Low emotional demand	1.00			1.00			1.00			1.00		
• High emotional demand	**1.71**	**1.22-2.40**	.002	**1.90**	**1.36-2.65**	<.001	NA			NA		
▪Job control												
• Low job control	NA			**0.64**	**0.44-0.91**	.014	NA			NA		
• High job control	1.00			1.00			1.00			1.00		
▪Macro-level decision authority												
• Low macro-level decision authority	NA			NA			NA			NA		
• High macro-level decision authority	1.00			1.00			1.00			1.00		
▪Total social support												
• Low total support	**0.69**	**0.48-0.99**	.042	NA			**0.66**	**0.44-0.98**	.040	**3.03**	**2.04-4.49**	<.001
• High total support	1.00			1.00			1.00			1.00		
▪Policies and practices												
• Low level	NA			NA			NA			**1.91**	**1.30-2.80**	.001
• High level	1.00			1.00			1.00			1.00		
▪Organizational climate												
• Low level	**2.53**	**1.67-3.83**	<.001	NA			NA			**2.29**	**1.56-3.37**	<.001
• High level	1.00			1.00			1.00			1.00		
▪Environmental and physical work condition												
• Low level	NA			NA			**3.35**	**2.01-5.58**	<.001	NA		
• High level	1.00			1.00			1.00			1.00		

NA: means the variable was not available in the model.

Both effort and reward scales of the Thai ERIQ showed statistically significant associations with psychological health problems (Table 4.28). The effort scale displayed statistically significant associations with both psychosomatic symptoms and anxiety with significant odds ratios, whereas the reward scale demonstrated statistically significant associations with all psychological health problems (i.e., psychosomatic symptoms, anxiety, and depression) with significant odds ratios. Overcommitment was only scale of ERIQ that was not found the associations with all psychological outcomes (i.e., psychosomatic symptoms, anxiety, depression, and job satisfaction).

Results revealed that job demands scale of Thai JCQ had statistically significant associations with both psychosomatic symptoms and job satisfaction. The emotional demand scale also showed statistically significant associations with both psychosomatic symptoms and anxiety. The association between the job control scale and anxiety demonstrated significant odds ratios, whereas total social support demonstrated associations with psychosomatic symptoms, depression, and job satisfaction with significant odds ratios. Macro-level decision authority was only scale of JCQ that did not show significant associations with any psychological outcome (i.e., psychosomatic symptoms, anxiety, depression, and job satisfaction).

Based on the additional section on organizational factors, the policies and practices scale displayed statistically significant associations only with job satisfaction. The organizational climate scale showed statistically significant associations with both psychosomatic symptoms and job satisfaction. A statistically significant association was also found between environmental and physical work conditions scale and depression.

In summary, the most parsimonious set might consist of 9 of 11 no-overlapping domains. They included both effort and rewards scales of ERIQ, job demands, emotional job demand, job control, and total social support scales of JCQ, and all three scales of policies and practices, organizational climate, and environmental and physical work conditions of the additional section. In the present study, these nine domains comprehensively represent the key characteristics of the psychosocial work environment in explaining psychological outcomes.

CHAPTER V
DISCUSSIONS

In this chapter, the results are discussed in corresponding to the objectives and research questions of study. Strengths and limitations of study were also given at the end of the chapter.

1. Discussion corresponding to research questions

Research Question 1: Do the subscales of the developed instrument demonstrate adequate validity and reliability to measure the key domains of the psychosocial work environment for Thai garment workers?

Specific research question 1.1: Does the Thai version of the Effort-Reward Imbalance Questionnaire (Thai-ERIQ) demonstrate adequate validity in terms of content, construct, and criterion-related validity, and demonstrate adequate reliability in terms of internal consistency and stability?

The Thai ERIQ was supported by good content validity (CVI = .95), suggesting that the items can be represented the domains of effort, reward, and overcommitment measures. It might be resulted from careful procedures of translation and back-translation. However, the influences of cultural and linguistics on the translated instrument were found. These were similar to other studies employed this technique, which the linguistic and cultural differences create challenges for cross-cultural research, particularly in translating existing questionnaires (Hilton & Skretkowski, 2002; Sperber, 2004; Wang, Lee, & Fetzer, 2006).

There are a number of possible issues that might affect the validity of the instrument translation in this study, including concept interpretation, semantic equivalence, cultural nuances in emotionally toned words across cultures, response styles word usage, discrepancy in language, clarity of wording, and word meanings. For instances, the interpretation of ‘promotion prospects’ in the original English

version became ‘career advancement’ in the back-translated questionnaire, reflecting variations related to future expectations. Other differences, for example, were found when face-to-face interviewing with key informants, such as when the English word ‘distress’ was translated into Thai and then back-translated into ‘unhappy’. These two English words are not equivalent in meaning, suggesting that the selection of word alternatives can be very sensitive (Perneger, Leplège, & Etter, 1999). Key informants also reflected that ‘distress’ describes more serious situation than ‘unhappy’. They indicated that if they experienced work-related distress, they would leave their jobs.

In addition, long statements and the use of formal wording in some statements might be inappropriate for workers who received only fundamental education. Key informants also expressed that these questions required a lot of thinking so that they took long time in reading and understanding. Word level, therefore, might be one of the challenging issues in this study. ‘Difficult situations,’ for example, was regarded by Thai informants as too broad, indicating problems with word clarification. Similar problems were found in studies from Thailand (Nilchaikovit, Lotrakul, & Phisansuthideth, 1996), India (Thomas et al., 2005), and Iran (Montazeri, Vahdaninia, Okamura, & Uchitomi, 2003) that used the same questionnaire.

The use of response formats may also differ across cultures (Hilton & Skretkowski, 2002). One study by Ichikawa and Natpratan (2004), for example, confronted differences in expressions and activities for people in the northern part of Thailand, where they are familiar with ‘1 month’ but not the notion of ‘4 weeks.’ To decrease these problems, it may be important in future research to use qualitative methods to explore and clarify cognitive concepts. Some groups may also be more prone to respond in a moderate way while others may prefer the extreme ends of a response scale (Martin & Martin, 1991). Some key informants in this study expressed a preference for rating scales rather than multiple-choices answers. Some were uncomfortable with long statements and some of the literal translations in the questionnaire.

Exploratory factor analysis demonstrated a six factor solution. Nevertheless, four factors with meaningful relationships were considered. These findings indicated that the effort, reward, and overcommitment constructs of the Thai ERIQ were slightly different from the previous studies, particularly from European countries,

which have shown strong evidence in tests of the ERI model. In this study, with the division of reward into two components, four constructs were identified using factor analysis as opposed to three. The constructs of reward and overcommitment might be affected by socio-cultural and linguistic differences. In comparison with other Asian populations, the subjects in this study reported a lower mean score of effort than Chinese and Korean employees (Eum et al., 2007; Li et al., 2005) but higher than Japanese employees (Tsutsumi et al., 2001). Reward showed the highest mean score for all four countries, whereas the mean score of Thai overcommitment was higher than that for Korean employees and lower than for Japanese and Chinese employees.

Construct validity was only partially supported in this study. Overall, the factor structure was consistent and the results reflected the theoretical constructs of the ERI model quite well; however, three items were exceptions. Two items of the overcommitment scale and one item of the reward scale were extracted from the original constructs. It might be possible that 'relax and switch off work' and 'sacrifice too much for work' of overcommitment were more related to personal and family life rather than other items, which directly affected work. Similarly, the reward item 'adequate position' may have been uniquely related to educational level and training specific to the job; whereas other reward items focused on respect, prospect of promotion or financial gain, and job security. As a result, these three items were loaded independently and did not fit to theoretical constructs. These findings represent minor differences from previous research in other countries in which the ERI constructs were strongly support in various occupations (Eum et al., 2007; Li et al., 2005; Siegrist et al., 2004; Tsutsumi, et al., 2001). The final 23-item Thai ERIQ should be tested further across a variety of occupations and industries.

In this study, only 2% of workers (n = 16) reported an ERI ratio ≥ 1 (median = 0.40), indicating little effort-reward imbalance in this sample of industrial manufacturing workers. Consequently, the scales of effort, reward, and overcommitment were examined. Predictive ability was examined based on examining each of the three ERI constructs. Although all ERI scales were significantly correlated with health outcomes, reward was only component that was statistically significantly associated with all the health outcomes (i.e., psychosomatic symptoms, anxiety, depression, and job satisfaction). Overcommitment was the only scale that did not associate with all psychological health problems. It is

possibly that the subjects in the present study did not perceive their job in the way of stressful situations, as well as the nature of job characteristics of garment task, which were routine procedures and piece-work so that they did not require great exertion to cope with those work-related problems. They might also think the stressful work situations at that time data collection were common problems and can handled through basic simple coping style, such as go to shopping and see movies. Therefore, the overcommitment was not a significant predictor of psychosomatic symptoms, anxiety, and depression. Previous studies were somewhat different that those supported a strong association between all ERI scales and psychological outcomes (Bakker, Killmer, Siegrist, & Schaufeli, 2000; Godlin, Kittle, Coppieters, & Siegrist, 2005). This difference also might be related to the nature of job characteristics, context of work environment, and cultural sensitivity/differences, as well as specific factors that might be affect psychological health among Thai industrial manufacturing workers.

Results from analysis using reward subscales also supported the significant role of reward component. Esteem reward was only key domain that associated with all psychological outcomes (Appendix D). Likewise, financial and status related aspects of reward were found strong associations with all psychological outcomes with the exception for depression. Findings from this study differed from western studies, which almost all used the ERI ratio to investigate associations with adverse health outcomes. A possible explanation for these findings is that by the typical Thai natures the subordinates were more likely to trust in their supervisors and believed that the supervisors had powerful decision over workers' performance evaluation. Thus, most of workers needed to be accepted by colleagues, specifically by supervisors and managers who considered salary and career promotions. As expectedly, reward financial and status related aspect were emerged as a vital predictor. It is truly that monetary issue is increasingly considerable due to it provides the accessibility of essential fundamental need for lives.

Cronbach's alpha coefficients showed satisfactory reliability for all three scales (α = .66 to .81), although the overcommitment scale displayed a marginal value (α = .66). All item-total correlations were higher than .30, with the exception of two items of the overcommitment scale, 'relax and switch off work (.2062)' and 'sacrifice

too much for job (.2995)' suggesting weak relationships. The internal consistency of the Thai ERIQ was sufficient for effort and reward scales. Overcommitment demonstrated a slightly lower alpha coefficient, which may be related to the weak internal associations of 2 of 6 scale items, indicating needs for further refinement. Similar findings were found in the results of EFA that these two items were separated from the original. It is possible that these two items were perceived by Thai workers as they were much more related to coping in personal and family life rather than working life in other four items of overcommitment scale. These findings suggested that the internal consistencies and construct validity of the developed instrument could be affected each other. This result is in contrast to prior European and Asian studies, which showed Cronbach's alpha coefficients greater than .70 for all three scales (Eum et al., 2007; Hasselhorn, Tackenberg, & Peter, 2004; Li et al., 2005; Siegrist et al., 2004; Tsutsumi et al., 2001).

Correlation coefficients between constructs for the first and the follow up surveys displayed statistically significant relationships at moderate levels ($r = .496$-$.576$, $p<.001$) between two tests at two to four weeks interval. The Thai ERIQ had modest correlations for stability ($r <.5$). This alternative form of reliability is not frequently reported in the ERIQ studies (Eum et al., 2007; Hanson et al., 2000; Li et al., 2005; Siegrist et al., 2004; Tsutsumi et al., 2001). According to Nunnally and Bernstein (1994), trait variation and context differences are assumed to be the major sources of unreliability by the retest method. Stability scores may be less reliable if individuals' traits are temporally unstable: for example, measurements related to mood may produce more change than those related to long term personality traits or attributes. One's reflections about work may vary over time with variations in mood. It is also possible that Thai ERIQ items asked for the respondent's opinions on work events that called for too much interpretation of the frequency of occurrence in those situations. The situations might affect attitudes and judgments that can change, and thus which can attenuate correlations (Warnecke et al., 1997). It is also possible that the characteristics of the actual psychosocial work environment may change over time, depending upon the context of the job.

Specific research question 1.2: Does the Thai version of the Job Content Questionnaire (Thai-JCQ) demonstrate adequate validity in terms of content, construct, and criterion-related validity, and demonstrate adequate reliability in terms of internal consistency and stability?

Content validity of Thai JCQ demonstrated good content validity with high CVI (0.94) as well as good face validity. These results might be explained in the same way of the Thai ERIQ development that was conducted carefully in the process of translation and back-translation. Cultural and linguistics differences were still found to be major problems. There are potential factors influencing on the Thai version of JCQ, such as the discrepancies in semantic equivalence when the translation and back-translation was conducted. Comments on language difficulties were indicated by the experts. These problems were solved with an agreement on the educational issue. Prior study by Johnson et al. (2006) confirmed that reading level was associated more strongly with respondents' comprehension problems. Many concerns were emerged during key informants interviewing, such as word clarification, responses, and frequency of work situations. These issues were raised in some studies as significant aspects in surveys of culturally populations.

The exploratory factor analysis yielded an eleven factor solution. However, eight factors with meaningful relationships were considered. These findings tended to be slightly different from previous studies both in Western and Asian countries, which the factor solutions were closely to the theoretical structure (three to four factor solutions) (Cheng, Luh, & Guo, 2003; Eum, et al., 2007; Li, Yang, Liu, Xu, & Cho, 2004; Sanne, Torp, Mykletun, & Dahl, 2005). It should be noted that social and cultural differences play a significant role in subjects' conceptualization and perceived interpretability. These might be lead to different subjectivity of scoring. For instances, two items of psychological demand 'work fast' and 'work hard' were positively loaded on physical demand instead of loaded as remaining three items. It might be possible that the subjects in this study perceived these two items in a way of an amount rather than an abstract pressure in their working experiences. Others 'repetitive work' and 'supervisor is concerned' were also found to be the problematic items that did not load along with the theoretical structure. An explanation is possibly that the subjects might perceive their repetitive job as the actual steps of job task,

which could not be modified. In addition, they might also perceive supervisors' concern as his/her duty not in terms of supervisor support at work.

Nevertheless, similar results were observed to Korean study for the macro-level decision authority in which loaded as an independent factor with a loading above 0.8 and consisted of two union-related items 'union influence over company' and 'have union influence' in addition to other four items in which loaded together with the usual task-level decision authority: 'some influence over company,' 'significant influence in group,' 'democratic group,' and 'supervise others' (Eum, et al., 2007). It was surprisingly in the present study that three items of psychological demand loaded as an independent factor ('no excessive work,' 'enough time,' and 'conflicting demands') whereas other two items 'work fast' and 'work hard' loaded together with the physical demand. These two latter questions were possibly explicit to assess physical and psychological loads (Karasek, Brisson, Kawakami, Bongers, & Amick, 1998). The subscales of physical demand, emotional demand, and decision authority closely followed the original structure. It was to note that only item 'repetitive work' loaded apart from the skill discretion, which clearly followed the usual structure. Although supervisor support and coworker support subscales closely loaded as in the theoretical structure, they clearly existed on two-dimensional structure. These results were similar to the studies by Kawakami et al. (1995) and Niedhammer (2002) in which differed from the studies in recently by Cheng, Luh, and Guo (2003) and Li, Yang, Liu, Xu and Cho (2004) that reported social support as one scale.

Interestingly, five dimensions were posted to be important role in respondent comprehension (Johnson et al., 2006). They consisted of question length, reading difficulty level, response format, abstraction level, and request of qualified judgments. In this study, increased number of words and the more abstract question were expressed comprehension problems. The responding style was recommended by the informants to be frequency rating instead of express degree of opinion. This can be explained in terms of socially undesirable avoidance behaviors (Chen, Horner, & Percy, 2003) and non-western cultures that those are willing or less able to express emotional distress (Kochhar, Rajadhyaksha, & Suvarna, 2007). In the other hand, this might be correlated with subjects' responses that those questions were likely to be occasionally occurred. A possible explanation for this may be a study by Warnecke et

al. (1997) that indicated the relationship between frequency of event and estimations. Therefore, the study subjects were prone to familiar with frequency rating style rather than expressing their opinions on the job. Linguistics and cultural differences played significant role in cross-cultural study.

Predictive validity demonstrated some surprising results. Job demands were found low prevalence for the risk of psychosomatic symptoms in this study (OR = 0.69, 95%CI = 0.48-0.99) instead of to be an important risk factor. Nonetheless, the additional JCQ subscales analyses demonstrated that physical job demand was found to be a risk factor for the onset of psychosomatic symptoms (OR = 1.73, 95%CI = 1.18-2.52) whereas psychological job demand showed an unexpected association with psychosomatic symptoms (OR = 0.43, 95%CI = 0.28-0.64). This unexpected association between job demand and psychosomatic symptoms might be caused by the attribute of measure psychological job demand. It should be noted that psychological job demand in this study was at low level (30.27±4.18). This can be viewed as encouraging working condition and produce the positive effects on psychological health rather than being perceived as stressful working condition.

Emotional demand displayed the significant role in predicting the associations with all psychological health problems whereas job control, macro-level decision authority, and total social support were not. These findings were inconsistent with several prior studies that supported strong relationships between job demand, job control, and social support with psychological disorders (Bourbonnais, Comeau, & Vézina, 1999; Bultmann, Van Den Brandt, & Kasl, 2002; De Croon et al., 2004; Karasek et al., 1998; Pikhart et al., 2004; Storms et al., 2001; Williams et al., 1997). These results might be due to the reason that the questions on emotional demand were clearly relevant to subjects' moods and directly affect psychological health functions. Interestingly, although it was directly to psychological health, it did not associate with job satisfaction. This might be explained that job demands, job control, and total social support played dominantly in explaining the risk of poor job satisfaction.

It should be noted that job strain hypothesis was mostly employed in the previous studies, while in this study separate individual components of JCQ were examined for the associations with psychological outcomes. Nevertheless, the job strain using the combinations of psychological job demand and job control was

additionally tested in this study and provided similar unexpected results as individual component testing. Results of additional analysis revealed that physical job demand still played the significant risk factor for the association with psychosomatic symptoms (OR = 1.82, 95%CI = 1.29-2.56) whereas psychological job demand was found low prevalence for the risk of psychosomatic symptoms (OR = 0.28, 95%CI = 0.16-0.48) and anxiety (OR = 0.53, 95%CI = 0.33-0.85). It might be possible that physical job demand was perceived by Thai garment workers as stressful working experience rather than psychological job demand.

The associations between both physical demand and job control (or decision latitude) with low job satisfaction were supported. Similarly, French study by Niedhammer (2002) found strong associations with physical demand, skill discretion, decision latitude, supervisor support, coworker support, and social support. The same findings were found in the associations between both job control (decision latitude) and total social support with job satisfaction as existed in the study in Korean workers (Eum et al., 2007). The relationship between social support and job satisfaction was also found in agreement with Taiwanese employees in studies by Cheng et al. (2003). Macro-level decision authority, which was rarely studied in the earlier studies, did not found the relationship with job satisfaction in the present study. This result was incongruently with Korean study by Eum et al. (2007) that reported this relationship.

The internal consistency reliabilities of Thai JCQ were acceptable; however, they seemed to be lower than that those were reported in other studies. Possibly, Thai workers perceived psychosocial aspects at work differently from workers in other countries. For instances, ‘work fast’ and ‘work hard’ might be perceived by the participants in this study as quantitative physical job demand rather than ‘psychological job demand’ as stated in the original version. This is supported by findings based on the EFA in which showed that these two items were extracted from other items of psychological job demand to physical job demand scale. Similar findings were also found for ‘repetitive work’ of skill utilization scale that the workers might perceive ‘repetitive work’ as the nature characteristic of garment job instead of non-skill utilization. Another possible explanation is that some items were non-work specific statements, such as ‘supervisor is concerned’ of supervisor support scale and ‘coworkers interest in me’ of coworker support scale.

Consistency of instrument requires sufficient variation. Low reliability values might be explained by variations in terms of both participants' characteristics and variances of test. In this study, the majority of participants were relatively similar (e.g.,female with the same age range) led to a tendency of similar response. Psychological demand displayed the lowest Cronbach's alpha coefficient. In this study, the internal consistency of psychological demand was lower than .50, suggesting to be considered for common characteristics of each item. Results from the EFA were confirmed for two items of this subscale. It might be possible that both items 'work fast' and 'work hard' implied distinctive aspects of psychological job demand in which the sample of this study can be perceived and interpreted in different meanings. These two items might also be considered in terms of quantitative workloads rather than qualitative workloads as shown in the results of EFA (Table 4.11) that they were loaded with physical demand. This finding was similarly to Asian studies, particularly in China, α = .55-.56 (Cheng, Luh, & Guo, 2003; Li et al., 2004), Korea, α = .63 (Eum et al., 2007), and Japan α = .64-.90 (Kawakami & Fujigaki, 1996) but was inconsistent with Western studies that ranged from .73 to .77 (Niedhammer, 2002; Sanne et al., 2005; Storms et al., 2001). Physical demand showed satisfactory internal consistency coefficient as reported in some studies in France and the Netherlands that ranged from .79 to .86 (Karasek et al., 1998; Niedhammer, 2002).

The internal consistency coefficient of skill discretion subscale was sufficient. This finding was similarly to the Japanese (male employees), Korean, and Swedish studies (Eum et al., 2007; Karasek et al., 1998; Kawakami & Fujigaki, 1996; Sanne et al., 2005) but it was lower than in Chinese, Japanese (female employees), Dutch, French, and other studies in Western (Cheng, Luh, & Guo, 2003; Karasek et al., 1998; Kawakami & Fujigaki, 1996; Li et al., 2004; Niedhammer, 2002; Storms et al., 2001). Cronbach's alpha coefficient of decision authority was lower than .50 and demonstrated the lowest value compared to among these countries. This subscale indicated that it is needed to considering for common characteristics of each item. Similar results were also observed for supervisor support and coworker support subscales that reported acceptable internal consistency coefficients ($\alpha \approx .60$), with the

exception for the internal consistency of coworker support subscale in a Korean study that reported coefficient at .65 (Eum et al., 2007).

The most consistently troublesome questions on items ‘repetitive work’ and ‘conflicting demands’ in across international studies were also found in the present study that showed the item-total correlations lesser than 0.2 (Cheng, Luh, & Guo, 2003; Eum et al., 2007; Karasek et al., 1998; Li et al., 2004; Niedhammer, 2002; Storms et al., 2001). The implications for these two problematic questions have not been documented yet although excluding these items resulted in an increase of the alpha value (Storms et al., 2001). One item ‘no excessive work’ was also found low the item-total correlations in this study. Another important point on the lack of conceptual clarity on demand scales was mentioned to explain that they were often demonstrated the psychometric problems in low Cronbach’s alpha reliability (Wännström, Nygren, Åsberg, & Gustavsson, 2007). This also might be resulting in frequently poor correlations between the demands and various health measures. In addition to an aspect that whether the operationalization encompasses subjective strain reaction to the demand, differences in people perception was indicated that whether a given task is overly demanding or merely a welcome challenge (Steenland, Johnson, & Nowlin, 1997).

Im et al. (2004) supported that all characteristics of culture can be threaten quantitative cross-sectional studies in terms of the validity and reliability due to culture cannot be isolated from socioeconomic status and educational background. Different conceptualizations of terms might be resulted from differences in cultures. It is perhaps demonstrated in no exact terms to describe certain concepts. Consistently, respondent culture was found moderate effect relating to questionnaire design, including response format, question length, and reading levels (Johnson et al., 2006).

Instability was also found for test-retest reliability. Pearson’s correlation coefficients demonstrated modest with the adequate ranges of .34 to .64, exceptionally job demands scale that reported low value. It is possibly that job demands, which consisted of psychological and physical demand. Both subscales emphasized on subjects’ attitudes and perceptions to the job that may be easily changed from day to day. Another possible explanation is that questions of JCQ asked about the workers perception to their present job without specific time frame. This might affect the

participants to recall work situations in different time period of their work. Thus, they were likely to show unstable values of stability reliability. These findings were similarly as found in a Korean study, which ranged from 0.35 to 0.60 at 4.5 months interval (Eum et al., 2007). Furthermore, one possibility that might affect to instrument stability was employees' perception to psychosocial work environment is subjected to variance overtime.

Specific research question 1.3: Does the additional section of the developed instrument demonstrate adequate validity in terms of content, construct, and criterion-related validity, and demonstrate adequate reliability in terms of internal consistency and stability?

The construction of the organizational questionnaire was made after a literature review. The developed additional section demonstrated good content validity with an excellent CVI (0.96). It also demonstrated good face validity during the interviewing with key informants that might be possible that questions almost were regular events and assessed objective factors within organization. These results indicated that the developed items can be representatives of organizational aspects to measure psychosocial work environment. It is noted that these items were constructed based on the selected concepts of the conceptual 'healthy work organization (HWO)' model (Wilson, DeJoy, Vanderberg, Richardson, & McGrath, 2004). The clarification of concepts, using simple language, and containing common terms or word usage might be leading to easy understanding on questions that can be resulted in fewer problems in the instrument development process and psychometrics evaluation.

All 30 items of three scales were included in the initial constructs of the additional organizational section and then were analyzed by the exploratory factor analysis (EFA) to determine the constructs structure. Five factors were altogether accounted for 61.59% in explain the variance, called as the new constructs of organizational aspects. These factors clearly displayed their unique characteristics although there were several items simultaneously loaded on more than two items, indicating they were shared some common values. It is recognized that the additional section was developed based on the selected concepts of the HWO model, which was established in Western. The subjectivity of scoring among Thai workers may be reflected in the distinctive attributes of the constructs that would be found in new

situations testing. These might be resulted from social and cultural sensitivity. As noted by Thorndike, Cunningham, Thorndike, and Hagen (1991), the tests has construct validity as they behave in the way that such a trait should reasonably be expected to behave (p. 141).

Predictive validity resulted in the associations between policies and practices, organizational climate, and environmental and physical work conditions with different psychological outcomes, exceptionally with anxiety in which did not associate with all organizational scales. A potential explanation for the findings of policies and practices may be that it was not a powerful predictor for influencing psychological health problems but was directly to the subjects satisfied with their job. Although organizational climate scale can predicted for both psychosomatic symptoms and job satisfaction, it did not show the associations with both chronic psychological health problems (i.e., anxiety and depression). It is possible that organizational climate had strongest predictor for psychosomatic symptoms and job satisfaction, which were proxy measures of immediate psychological outcomes in this study because it was easily to effect on subjects' perceptions and moods. Lastly, environmental and physical work conditions demonstrated a significant association with only depression. It is surprisingly that environmental and physical work conditions scale was the only organizational aspect that associated with chronic psychological health problems as depression.

It is also interesting that anxiety did not show the associations with all aspects of organization. These may be other factors that had more power in predicting anxiety among a sample, such as individual differences and family support (Levi, 1997; Sangon, S., 2001; Williams et al., 1997). These findings may be call for future longitudinal studies for testing the associations between organizational aspects and psychological health disorders. Nevertheless, dissimilar results were found when subscales of organizational climate were examined. Organizational climate participation subscale showed to be an important risk factor predicting all psychological health problems whereas other subscales had associations with only low job satisfaction. With the exception for environmental and physical work conditions, it did not associate with all psychological outcomes indicating it was not a significant risk factor (Appendix D).

The new constructs based on the EFA consisted of five domains, including health and safety policies, physical work conditions, organizational climate, health and safety activities, and environmental work conditions. They were clearly explained the associations with all psychological outcomes (Appendix D). It might be suggested that the new constructs with 5 domains are more appropriate for further investigation rather than the initial constructs with 3 domains. Furthermore, organizational policies and practices and safety climate were recently accepted to be predictive of work outcomes and were included in a scale development (Niellson & MacDermid, 2005).

The internal consistency coefficients of the additional section were satisfactory, although the new five constructs were more satisfactory than reported in the initial three constructs, suggesting good relationships with others among those items (Cronbach's alpha ranged from .73 to .92). Similar internal consistencies were observed in the prior study by Wilson et al. (2004), which the original concepts of HWO model were tested and reported good internal consistencies for selected concepts (α = .77 to .93). These results suggested that there were internally consistent (homogeneous) among items. Nevertheless, the new constructs seemed to providing better Cronbach's alpha values. This might be resulted from the EFA that led to the new constructs consisting of more homogeneity of items.

Test-retests stability showed clearly sufficient correlations over a period of time for both the initial constructs and the new constructs of additional section (Pearson's correlations > 0.5, ranged from .495 to .619), suggesting a moderate relationship between them (Appendix D). A potential point may be these variables were unchangeable from day to day but unstable in long time period. They were also likely more objective measures. Therefore, the subjects reflected these organizational issues in the same way as they responded in the first time.

The additional section can be concluded that it had satisfactory psychometric for both validity and reliability. A potential explanation may be those items expressed less comprehension difficulties and do not need cognitive thinking. They almost referred objectively to work-related conditions, which were usual events. Questions also shown to be less abstract, easy responding style and format (frequency rating with table-format), and did not request of qualified judgments. According to a study by Johnson et al. (2006), these factors can be leaded to errors in respondents' comprehension. Therefore, the additional section was considered to be a fair

questionnaire design and had sufficient comprehension characteristics. Likewise, subjects took a short time to complete this section (about 5-15 minutes). This was consistent with experts review and key informants interview that found fewer problems during process of instrument development.

Research Question 2: To what extent are the characteristics of the psychosocial work environment associated with psychosomatic symptoms, anxiety, and depression?

Specific research question 2.1: To what extent are the subscales of ERIQ associated with psychosomatic symptoms, anxiety, and depression?

In this study, results revealed that all components of ERIQ- effort, reward, and overcommitment- were statistically correlated with all psychological health problems (i.e., psychosomatic symptoms, anxiety, and depression). Both effort and overcommitment components were positively correlated with all psychological health problems whereas only reward showed negative correlations (Table 4.22). These findings may be explained that the psychosocial work environment (i.e., effort, reward, and overcommitment) might be perceived by the sample of this study as significant situations at work. These unpleasant situations might triggered emotional and pathophysiological responses and resulted in adverse health outcomes in both short-term and long-term mental health problems, such as psychosomatic symptoms and anxiety and/or depression, respectively.

These findings are consistent with results from the GAZEL study in which the cross-sectional analysis reported effort-reward imbalance (ERI ratio), reward, and overcommitment were significantly associated with self-reported health (Niedhammer, Tek, Starke, & Siegrist, 2004). In the same study, ERI and reward were still found to be significant factors of poor self-reported health in a prospective analysis. Most prior studies provided evidences supportive the ERI hypothesis (in combination of high effort spent and low reward received) and the risk of poor psychological health (e.g., depression, anxiety, somatisation, psychosomatic and physical health complaints, and chronic fatigue), in particular depressive symptoms (Godlin, Kittel, Coppreters, & Siegrist, 2005; Knesebeck & Siegrist, 2003; Larisch et al., 2003; Pikhart et al., 2004; Vearing & Mak, 2007; Vegchel, de Jonge, Meijer, &

Hamers, 2001; Watanabe, Iries, & Kobayashi, 2004). In the studies by Watanabe, Iries, and Kobayashi (2004) and Weyers et al. (2006) indicated that a high level of work-related overcommitment exhibited an additionally effect on intensified depressive state and poor self-rated health, respectively.

Specific research question 2.2: To what extent are the subscales of the JCQ associated with psychosomatic symptoms, anxiety, and depression?

Results of this study revealed that job demands component was positively correlated with anxiety (Table 4.23). Emotional demand component was positively correlated with all psychological health problems (i.e., psychosomatic symptoms, anxiety, and depression). Total social support was negatively correlated with anxiety and depression. It is interestingly to see that job control (decision latitude) and macro-level decision authority showed non-statistically significant correlation with all psychological health problems, indicating less power in relation.

These findings suggested that emotional demand was found to be a significant factor in correlating with all psychological health problems. One possible explanation for this finding is that emotional demand could worsen mental health functions through emotional arousals in which the workers perceived as the significant threatening situation at work. The emotional responses could be occurred when the individual attempted to cope and mange the negative moods, resulting in mental health problems. The next significant factor was total social support that demonstrated correlations with both anxiety and depression. Lower total social support might also be perceived by the workers as negative work events or harmful situations at work. In this study, results indicated that JCQ components provided correlations with different psychological health problems in both scales and subscales analyses (Appendix D).

Several factors were acknowledged as the causes of the onset psychological health disorders. Personality trait and cultures, for example, are evidenced to be the important individual differences for anxiety and depression disorders (Grendell, 2008; Hagerty & Patusky, 2008; Marcus, 2008; Williams et al., 1997). Specifically, a review of the literature documented substantial empirical evidence that support the onset of depressive state (Sangon, S., 2001). In a study of predictors of depression in Thai women by Sangon S. (2001), results showed that family history of depression, perceived stress, and sense of belonging could predict depression. Among these

factors, perceived stress was the strongest direct effect on severity of depression. In the present study, job demands, job control, and macro-level decision authority might not be perceived and appraised by the sample as crisis experiences at work. Therefore, the significant correlations between these psychosocial work environments and depression did not found in the JCQ scales analyses.

When JCQ subscales were analyzed, nevertheless, psychological job demand displayed weakly and negatively correlated with psychosomatic symptoms whereas physical job demand was positively correlated with both psychosomatic symptoms and anxiety. It might indicate that the subscales of job demands, particular in physical demand showed stronger power than its scale in explaining the relationship with psychological health problems. It might be possible that the sample in this study perceived physical demand more important stressor than psychological demand when the job demands subscales were considered. Skill discretion was positively correlated with psychosomatic symptoms and depression in the additional JCQ subscales analyses. Decision authority was also found negative correlations with both psychosomatic symptoms and depression.

It is noted that total social support component was found the relationships with both anxiety and depression. Similarly, both supervisor support and coworker support were negatively correlated with both anxiety and depression in the additional JCQ subscales analyses (Appendix D). Evidences provided to believe that interactive effects between stressful life events, in particular times of crises and considerably social support needed and lack of social support at that time, especially from a core tie (husband or someone identified very close) may be more important in the development of depression. These findings yielded the supportive evidence that social support at work, mainly from supervisor and coworkers, are the key resources in preventing mental health problems. Another explanation for social support is that it was directly related to the interpersonal relationship among colleagues, as well as employer and employees/subordinates in the workplace, which can be impact on positive and negative mental health functions.

Findings of this study yielded the supportive evidences for the correlations between some components of JCQ and psychological problems. These congruent with the prior studies that investigated associations between job strain (the combination of

high job demands and low decision latitude) and/or social support at work with depression, anxiety, and poor mental health (Amick et al., 1998; Bildt & Michélsen, 2002; Bourbonnais, Comeau, Vézina, & Dion, 1998; de Lange et al., 2002; Learner, Levine, Malspeis, & D'Agostino, 1994; Mausner-Dorsch & Eaton, 2000; Williams et al., 1997). These were consistent with the study by Krantz and Östergren (2000) that was found exposure of job strain and low social support had significantly increased in common symptoms and psychosomatic symptoms, respectively. In addition, supervisor support was suggested that impact on the level of psychosomatic symptomalogy in a study Amick III and Celentano (1991).

Specific research question 2.3: To what extent are the subscales of the additional section of the developed instrument associated with psychosomatic symptoms, anxiety, and depression?

In the present study, almost all additional organizational aspects were demonstrated negatively and statistically significant correlation with all psychological health problems (i.e., psychosomatic symptoms, anxiety, and depression), with the exception for the relationship between policies and practices component and psychosomatic symptoms. One possible explanation for the significant relationships is that organizational aspects might be perceived through subjective and objective appraisals by the sample as the significant or continued stressors affecting psychological mechanisms. It might be also possible that the organizational aspects were mostly objective measures and can be perceived by the sample of a study as the chronic stressful work environments. Therefore, emotional, psychological, physiological, and behavioral reactions may be apparent, including psychosomatic symptoms. If these stressful exposures were maintained, pathophysiological reactions might be occurred and resulted in general anxiety and depression. While policies and practices component of organizational aspects did not directly affect individual psychological mechanisms and did not influence the workers' perception in terms of negative view in their working life.

There are very few studies on the relationship between organizational aspects and psychological health problems. The majority of studies in organization were largely focused on management at work, commitment to company, group cohesion, risk-taking and injuries/accidents, and job satisfaction, as well as employee health and

well-being (DeJoy & Southern, 1993; Harvey et al., 2002; Lim & Murphy, 1999; Steinhardt et al., 2003). A study by Hall and Johnson (1989) provided information that the prior research confirmed the linkage between long-term exposure to stressful work organization and depression.

In summary, all psychological health problems (i.e., psychosomatic symptoms, anxiety, and depression) were demonstrated the significant correlations with different components of the ERIQ, JCQ, and the additional organization aspects. All components (effort, reward, and overcommitment) of ERIQ, only emotional demand from JCQ, and both organizational climate and environmental and physical working conditions of organizational aspects showed correlation with psychosomatic symptoms. All components of ERIQ, job demands, emotional demand, and total social support of JCQ, as well as all components of organizational aspects (i.e., policies and practices, organizational climate, and environmental and physical working conditions) was found the significant correlations with anxiety. Finally, all components of ERIQ, emotional demand and total social support of JCQ, as well as all components of organizational aspects was statistically significant correlated with depression.

Although, the relationships between the psychosocial work environment and psychological health problems were relatively modest, they suggested the key components of psychosocial work environment to be concerned in the prevention of mental health problems in the workplace. Based on the findings of this study, three components of ERIQ and organizational aspects, as well as emotional demand from JCQ seemed to be the strongest factors that correlated with all psychological health problems.

Research Question 3: To what extent are the characteristics of the psychosocial work environment associated with job satisfaction?

Specific research question 3.1: To what extent are the subscales of ERIQ associated with job satisfaction?

As expectedly, all components of ERIQ (i.e., effort, reward, and overcommitment) showed statistically significant correlations with job satisfaction. Both effort and overcommitment components were negatively correlated with job satisfaction whereas

reward component was positively correlated. It is clearly that the higher effort and overcommitment level led to the worsen job satisfaction perception. The greater reward led to the greater job satisfaction.

Effort implied workers' perception regarding their effort investment while overcommitment meant to their exertion for striving in over-demanding situations due to commitment to work. Thus the apparent of correlations between job satisfaction and both effort and overcommitment were displayed in negative directions. In the other hands, reward provided positive meaningful fairness so that its correlation showed a positive direction. These suggested that feeling associated with appropriate reward, appreciation, respect, support, and achievement can improve motivation and job satisfaction, as well as job performance and productivity, eventually.

Effort-reward imbalance was tested to determine the association with job dissatisfaction that supported for the hypothesis in a study by Vegchel, de Jonge, Meijer, & Hamers, 2001). Overcommitment was also investigated but did not support for the association. The study by Sousa-Poza and Sousa-Poza (2000) suggested that whether employees find their job interesting, have good relationships with their managers and colleagues, have a high income, are allowed to work independently, and has clearly defined career advancement opportunities all were the most important determinants of job satisfaction. Evidently, job satisfaction have been found strongly positively correlated with satisfy in salary, praise delivered by supervisors, and promotional opportunities (Martin & Schinke, 1998).

Specific research question 3.2: To what extent are the subscales of the JCQ associated with job satisfaction?

Interestingly, all components of JCQ except emotional demand were found fairly and statistically significant correlations with job satisfaction. Job demands component was negatively with job satisfaction whereas the others were positively correlated. These findings showed the expected directions. Total social support demonstrated the strongest correlation with job satisfaction. The next strong correlation was found with job control. When the JCQ subscales were analyzed, however, supervisor support and skill discretion presented for the strongest correlations (Appendix D). Coworker support was also another important variable that was found the strong correlation with job satisfaction.

It is not surprising that job demands was negatively related whereas job control and macro-level decision authority were positively related to job satisfaction. According to Burton (2006), job satisfaction itself is rather to be subjective feeling and perception. In today's business, employees are expected to confront with high demands and a lot of sustained effort (Burton, 2006). Most of workers can cope with these high demands if they are gained appropriate control over the way they do their job. The balance might be occurred and reflected in fairness- job satisfaction as well.

In this study, findings were clearly affirmed that social support at work (i.e., total social support, supervisor, and coworker support) had relationships with the employee job satisfaction. One of the possible explanations is that supportive from the important person are valued in Thai cultures. In the workplace, supervisor and coworkers are key persons and directly obviously influence employee psychological health and well-being. Adequate support from both supervisor and coworkers might be resulted in positive emotions. This is in line with a study by Baruch-Feldman, Brandoloo, Ben-Dayan, and Schwartz (2002) which found that social support was positively correlated with satisfaction. Supervisory performance rating also reported as the relation with job satisfaction (Wright, Cropanzano, & Bonett, 2007).

It is interesting to see in this study that emotional demand was non-statistically significant correlated with job satisfaction. One of the possible reasons is that emotional demand was subjective measure that depends largely on norms and values of both the organization and the worker (Söderfeldt et al., 1996). It can be affected by a special kind of role conflict in their task. The nature of the particular jobs, such as health care services was unavoidable to contact with the customers at most of the time (de Jonge, Mulder, & Nijhuis, 1999). In such situation, the conflicting contact may be frequently occurred and can be shown in job dissatisfaction. Comparably, garment workers in this study were trained to do their task individually without direct contact with the customer. Therefore, the problems on emotional demand might be less among this sample of a study.

Findings of this study were congruent with an earlier study in England and Wales (Evans et al., 2006) in which indicated that excessive job demands and limited latitude in decision-making were independently correlated with poor job satisfaction while medium and high social support were associated with greater job satisfaction.

De Jonge, Mulder, and Nijhuis (1999) reported that psychological job demands and job autonomy related with job satisfaction. Supervisor support was suggested to be the most effective way for prevention strategies at the workplace in affecting person's job satisfaction (Amick III & Celentano, 1991).

Specific research question 3.3: To what extent are the subscales of the additional section of the developed instrument associated with job satisfaction?

Results revealed that all components of the organizational factor in the additional section demonstrated statistically significant correlations with job satisfaction. The components of policies and practices, organizational climate, and environmental and physical work conditions were positively correlated with job satisfaction. These findings supported the previous evidences on the associations between organization factors and job satisfaction (Brown, Warnock, & Boykin, 2000; Harvey et al., 2002; Lim & Murphy, 1999; Steinhardt et al., 2003; Tei & Yamazaki, 2003). Furthermore, the organizational aspects provided the strong positive correlations with job satisfaction when they were compared among other psychosocial factors at work in this study.

The potential explanation for these findings may be employed the descriptions about the nature characteristics of job satisfaction. As definition of job satisfaction given by Dawis and Lofquist (1984 cited by Schleicher, Watt, & Greguras, 2004), it referred to a person's appraisal of the fit of the work environment with his or her needs or expectations. It might be possible that these organizational aspects can be perceived and appraised by the sample in terms of both objective and subjective work context. As definition of job satisfaction given by Dawis and Lofquist (1984 cited by Schleicher, Watt, & Greguras, 2004), it referred to a person's appraisal of the fit of the work environment with his or her needs or expectations. The potential explanation for these findings may be these organizational aspects can be perceived and appraised by the sample in terms of both objective and positive work context. These aspects were directly affected employees' perception on satisfaction to their job. Environment at work was documented to be a vital factor that may impact on person's appraisal.

These findings of the present study are concordant with the several previous studies. Adequate policies and practice was significantly associated with improvements in global job satisfaction (Brown, Warnock, & Boykin, 2000).

Organizational climate seemed to be a predominant factor that affected healthy work organization and organizational outcomes, as well as health and well-being, such as job satisfaction and employer satisfaction (Lim & Murphy, 1999; Park et al., 2004; Väänänen et al., 2004). Adequate policies and practice was significantly associated with improvements in global job satisfaction (Brown, Warnock, & Boykin, 2000). Liorente and Mocias (2005) indicated that workers' expectations with respect to the job and the objective conditions of the job were considered to be more important for the greatest relation to job satisfaction.

In conclusion, all components of psychosocial work environment based on the ERIQ, JCQ, and organizational aspects presented modest to fairly correlations with job satisfaction, with the exception for emotional demand from JCQ. These results guided that employees' job satisfaction correlated with multi-dimension of psychosocial at work. Various components of psychosocial work environment, such as effort, reward, overcommiment of ERIQ, job demands, job control, macro-level decision authority, and total social support of JCQ, and policies and practices, organizational climate, and environmental and physical work conditions should be considered and incorporated in promoting employees' psychological well-being, including job satisfaction.

Research Question 4: What is the most parsimonious set of domains that can be used to comprehensively represent the key characteristics of the psychosocial work environment in Thailand?

The present study seeks the parsimonious psychosocial work environment dimensions that may influence employees' psychological health and well-being. All scales from ERIQ (effort, reward, and overcommitment), JCQ (job demands, emotional demand, job control or decision latitude, macro-level decision authority, and total social support), and the additional section on organizational factors (policies and practices, organizational climate, and environmental and physical work conditions) were simultaneously examined to identify the associations with four psychological outcomes, including psychosomatic symptoms, anxiety, depression, and job satisfaction.

Based on three theoretical models, the risk of psychosomatic symptoms were predicted by six components of psychosocial work environment: effort and reward components of ERIQ, job demands, emotional demand, and total social support components of JCQ, and organizational climate component of the organizational factor. Low reward and low level of organizational climate were presented to be the strongest predictors for psychosomatic symptoms.

It is clearly that the sample in this study perceived the components of psychosocial work environment, including high effort, low reward, high emotional demand, and low level of organizational climate as the stressful work experiences that might affect individual through the pathway of emotional, physiological, and pathological reactions and resulted in mild psychological health problem, such as psychosomatic symptoms. When the individual perceived these psychosocial work characteristics as stressful experiences at work, they might attempt to cope or defend against the unpleasant situations, ultimately, resulted in psychosomatic health complaints. These findings were inconsistent with a study by De Jonge, Bosma, Peter, and Siegrist (2000) which found that efforts were the strongest predictors of psychosomatic health complaints and physical health symptoms when efforts, rewards, and job control were simultaneously controlled.

Although high job demands and low social support were expected to be the predictors for the risk of psychosomatic symptoms, both of them were found to be the predictors for the low prevalence for the onset of psychosomatic problems. The possible explanation is that the variables might conceptually overlap and could suppress others. For example, effort might have conceptually overlapped to three types of job demands, including psychological ($r=.322$, $p<.001$), physical ($r=.278$, $p<.001$), and emotional demands ($r=.142$, $p<.001$). Likewise, the similar concepts were found among total social support, reward, and organizational climate ($r=.299$-$.460$, $p<.001$). It might be possible that either psychological and/or physical job demands were affected by effort whereas total social support was suppressed by social aspects from both reward and organizational climate, which showed the strongest ability in predicting.

A possible explanation is that this study was a cross-sectional design that could not explain in terms of causal directions of associations. The workers with

psychosomatic complaints might already receive help and support to release tension. Consequently, the prevalence of psychosomatic problems was lessen. Computing individual scales of JCQ might be another possible explanation due to their formula were established and tested in the western and European countries. These JCQ formulae might not be fit in Thai context so that they might yield the odd direction of associations between job demands and total social support and psychosomatic symptoms when the JCQ subscales were examined among Thai sample in this study. Nevertheless, the findings of the unexpected association between high job demands and psychosomatic symptoms was congruent with a study by Kobayashi et al. (2005) which found that high job demands were associated with low prevalence of high diastolic blood pressure (OR = 0.45-0.86, 95%CI = 0.27-1.14) in a study of coronary risk factors among Japanese female employees.

In this study, results revealed that the risk of anxiety was predicted by four components of psychosocial work environment, including effort and reward components of ERIQ and emotional demand and job control components of JCQ. Low reward was the strongest predictor for anxiety. The components of psychosocial work environment, including high effort, low reward, and high emotional demand might be perceived as retained stressful work experiences and affected individual psychological mechanisms in term of emotional, physiological, and pathological reactions, resulting in chronic or long-term psychological disease, such as anxiety.

Interestingly, low job control was the predictor for low prevalence of anxiety. Unexpected results were also found for the associations between low job control and psychosomatic symptoms and depression in which job control did not display as the risk factor for both psychological health problems. The possible explanation is that workers in low control jobs tend to care less about job performance and were not likely to experience anxiety. Regarding with the nature of job characteristic in garment factory, the workers might not need much more authority in their job since they had responsibility to do the task independently. This finding was supported by a study that was found that job control had the lowest power in predicting employees' well-being (de Jonge, Bosma, Peter, Siegrist, 2000). Results of this study were inconsistent with some previous studies that reported job control could improve men's physical health status (OR = 0.56) in a study of Chinese physicians (Li, Yang, & Cho,

2006) and high job control was associated with low prevalence of high systolic blood pressure (OR = 0.43-0.75, 95%CI = 0.26-1.15) in a study of Japanese female employees (Kobayashi et al., 2005).

Job demands and total social support did not show predictive associations with anxiety. Although there were no multicollinearity among variables, it may be possible that the observed associations as found in the present study were mediated through other variables that overlap to some extent with the dimensions of JCQ. For example, effort and esteem reward in the ERIQ are similar to the operationalization of job demands and social support from supervisor and coworker in the JCQ, respectively (Li, Yang, & Cho, 2006).

Although all organizational aspects were associated with most psychological outcomes, they did not display an association with anxiety. A possible explanation is that some aspects of organization were partly overlapped to other variables, such as effort ($r=-.202$ to $.256$, $p<.001$), reward ($r=.266$-$.397$, $p<.001$), job demands ($r=-.118$ to $-.195$, $p\leq.001$), job control ($r=.143$-$.256$, $p<.001$), and total social support ($r=.398$-$.460$, $p<.001$). The organizational factors would be suppressed by the variables with stronger power which were taken into the model, like effort, reward, and job control. Another explanation is that organizational context might be unpleasant situations in which the workers can cope through an adaptive mechanism. Therefore, the association between organizational factor and anxiety was not found.

Findings of this study demonstrated that the risk of depression was predicted by three components of psychosocial work environment from three theoretical models: reward component of ERIQ, total social support component of JCQ, and environmental and physical work conditions component of the organizational section. Low level of environmental and physical work conditions was the strongest predictor for depression. The process of individual perception, interpretation, and psychological mechanisms was used to describe the possible explanation for the onset of depression in the workplace in this study. Low reward and low level of environmental and physical work conditions might be perceived by the sample in this study as the significant or crisis stressors in their working life that can increase negative process in cognitive thinking. In the pathway of mechanisms, depression occurred based on crisis stressors affect emotional, psychological, and, and pathophysiological reactions.

Lack of social support is the key contributor to depressive moods (Hagerty & Patusky, 2008). However, low social support in this study shown to be the predictor for low prevalence of depression. One possible explanation is that once reward and environmental and physical work conditions were in the model, the impact of emotional demand diminishes and the odd role of low social support becomes consequential. Moreover, whenever effort and reward are controlled for, the workers who do not meet the criterion of potential depression case might not require or seek as much social support. On the other hand, it might also be possible that the causal relationship could not be explained for the direction between low social support and depression in this study because of the nature of cross-sectional design. The workers who were prone to be depressed obtained more social support from either supervisor and/or coworkers. Another possible explanation is that social support in this study focused specifically on support at work from supervisor and coworkers, which excluded support outside workplace such from core ties (e.g., husband or wife, family members, and close friends). Support from these core ties are relatively strengths within Thai contexts, specifically when life crises occurred. Therefore, low social support at work might be not found as a predictor for the risk of depression.

Results revealed that the risk of poor job satisfaction was predicted by four components of psychosocial work environment: job demands and total social support components of JCQ and policies and practices and organizational climate components of the organizational section. Low social support at work was the strongest predictor for poor job satisfaction. Somehow the roles of job demands, social support, policies and practices, and organizational climate were more important and sufficiently overlapped the factors that dropped out. Nonetheless, total social support component of JCQ might make a unique contribution above and beyond the social elements of the organizational climate scale in the model with the highest odd value (OR=3.03), the contributions of organizational climate went down with the lower odd (OR=2.29) These findings would suggest that the overall organizational level of work, which included the social aspects of organizational climate was more important to job satisfaction that the characteristics of the individual job. Additionally, another possible explanation is that these factors might influence the workers' satisfaction in

their job through their perception to these organizational aspects as conditions at work that they expose in daily life.

Surprisingly, three components of ERIQ, emotional demand, and job control were not the predictors for the risk of poor job satisfaction. These results differed from the prior mentioned study by Calnan, Wainwright, and Almond (2000), which demonstrated that both (extrinsic) effort and reward statistically significant associated with job satisfaction. These findings were also inconsistent with most studies (Calnan, Wainwright, & Almond, 2000; de Jonge, Bosma, Peter, Siegrist, 2000; Ostry et al., 2003; Ota et al., 2005) in which the overcommitment played vital roles in predicting various adverse health outcomes when scales of ERIQ combined with JCQ in analyses. It might be possible that the translated ERIQ and JCQ in the present study had lower internal consistencies for some scales, such as overcommitment of ERIQ, psychological job demand, skill utilization, and social support at work of JCQ that could be affect the validity of the instrument measures. Therefore, the associations between ERIQ and JCQ scales and psychological outcomes could be reported in weaker relationships and some unexpected findings.

In addition, findings of this study were inconsistent with the prior studies which found that job control appeared to be the strongest predictor of job satisfaction (Calnan, Wainwright, & Almond, 2000) and emotional demand was shown to be an important source of work stress (de Jonge, Mulder, & Nijhuis; Rugulies et al., 2004; van Vegchel, de Jonge, Meijer, & Hamers, 2001). One possible explanation is that this study was conducted with the operational blue-collar workers who would consider as unskilled workers. Furthermore, garment job characteristic is relatively routine job that the workers might not need more control over work. Hence, job control (both skill discretion and decision authority) was not perceived as the important aspect of work among the sample of this study. Moreover, it might be possible that other aspects of psychosocial at work would be perceived by these participants as the significant factors in their working life, such as reward, social support at work, and organizational factors that showed strong association with psychological health problems and job satisfaction.

Unexpectedly, two components- overcommitment and macro-level decision authority- did not correlate with any psychological outcomes. The overcommitment is

an individual personal coping when people confront with excessive work overload. Overcommitment itself might be inapparent conceptual measure due to its measures was reduced to one coping characteristic- need for control and approval. This might be affecting the workers perception that this coping style did not fit in Thais. Furthermore, subjects in this study might not perceive their job as overly demanding and they did not need to spend exertion to cope with these situations at work. Besides, when the nature of job task was considered, job task in garment industry did not require complicate procedures and high responsibilities. Another possible explanation is that there are a number of authors who wrote that overcommitment may not be cleanly conceptualized, nor measured. This would influence its ability to predict. Likewise, the lower levels of factor loadings for some items, as well as their low levels of reliability would lower the level of correlations with the outcome measures, turned out to not predict well at all.

Macro-level decision authority was the only variable of JCQ that did not associate with all psychological outcomes. A possible explanation for this may be questions on the macro-level decision authority relevant to decision authority at organizational level and union influence rather than decision authority at task-level. Key informants reflected that the macro-level issues were less recognized among Thai workers.

Previously, several studies supported that the combination of psychosocial aspects from both the ERI model and the Job Demand Control Support (DCS) models provided more efficient predictors or improve risk estimation in various health outcomes (Bobak et al., 2005; Bosma, Peter, Siegrist, & Marmot, 1998; Calnan, Wainwright, & Almond, 2000; Kivimäki et al., 2002; Peter et al., 2002; Ostry et al., 2003; Ota et al., 2005; Stansfeld, Fuhrer, Shipley, & Marmot, 1999). The ERIQ measures emotional stressful work environment in terms of subjective while the JCQ measures objective stressful work environment (Calnan et al., 2004). The ERI with the overcommitment seemed to be the strongest in predicting health outcomes in most of studies when the components of ERIQ and JCQ were combined together in the investigations (Bobak et al., 2005; de Jonge, Bosma, Peter, & Siegrist, 2000; Kabayashi et al., 2005; Li, Chang, & Cho, 2006; Pikhart et al., 2001; Ostry et al., 2003).

There might have possible factors that could impact on the associations between psychosocial work environment and psychological outcomes. Socioeconomic status (SES) can be affecting the variation in health trends, such as increased prevalence of hectic/monotonous among low income and blue-collar workers (Vogel, 2002 as cited in Landsbergis, 2003). Downsizing and long work hours have also been documented the associations with minor psychiatric disorders, burnout, psychosomatic symptom, and unhealthy behaviors. As ILO (2000) noted, in addition to the origins of mental disorders are complex, the workplace practices and income and employment patterns differ widely among the countries and changes in labor market due partly to economic globalization, resulting in a number of common problems related to high prevalence of stress, burnout, and depression.

Increasingly, the promotion of employees' health has been shifted towards a more holistic view (Kivimäki et al., 2002). Consequently, structural or organizational factors are increasingly considered as important determinants of public health. Research on organizational intervention also have been arisen the needed evaluation of more dimensions and the additional gains achievable from efforts to change work life (de Jonge, Bosma, Peter, Siegrist, 2000; Kivimäki et al., 2002). In this study, therefore, the additional aspects of organizational factor were incorporated into the combined two models for more holistic view on psychosocial work environment.

All organizational aspects manifested the significant associations with psychological outcomes with an exception for anxiety. Policies and practices components showed an association with only job satisfaction while organizational climate played the strongest predictors of organizational aspects that revealed the associations with both psychosomatic symptoms and job satisfaction. Environmental and physical work conditions demonstrated the only organizational component, which associated with depression. As mentioned above, organizational aspects seemed to be an important factor that can be directly and indirectly impact on employees' job satisfaction in this study whereas other dimensions based on ERIQ and JCQ (with an exception for job demands) did not found the associations. It was clearly that the organizational aspects might be the strongest predictors for job satisfaction.

The evidences in this current study suggested for some supports that the conceptual model of "healthy work organization" was a useful concept for the study

of organizational health in which it was expanded the viewpoint of psychosocial characteristics at work. These results were in line with the earlier studies that highlighthened the important roles of organizational characteristics, including organizational policies, procedures, and actions (Browne, Warnock, & Boykin, 2000; Wilson et al., 2004), and organizational climate in the associations with employee health and organizational effectiveness (Lim & Murphy, 1999; Park et al., 2004; Väänänen et al., 2004; Wilson et al., 2004).

In conclusion, findings of the present study showed that both effort and reward of the ERIQ and emotional demand from the JCQ altogether can be predicted the risk of psychological health problems whereas both job demands and total social support of the JCQ can be predicted the risk of poor job satisfaction. The associations between all predictors from ERIQ, JCQ and organizational aspects and psychological outcomes were mostly as expected and as evidenced in previous investigations. The unexpected results as mentioned above might have been caused by differences in various psychosocial dimensions measured. Overcommitment or individual coping that was the only personal characteristics aspect of psychosocial work environment in this study did not found the associations with all psychological outcomes. Macro-level decision authority was the only aspect of decision latitude at organizational level of psychosocial work environment in this study. However, it was not a predictor for any psychological outcomes. Findings of this study were supported the evidences that the combination of more overview in characteristics of psychosocial work environment provided comprehensive dimensions, a broad range of stressful experiences at work, and better understanding in predicting employees' psychological health. It might be concluded that effort, reward, job demands, emotional demand, total social support, policies and practices, organizational climate, and environmental and physical work conditions could represent the key domains of psychosocial work characteristics in predicting the associations with psychological outcomes in Thai industrial manufacturing workers, particularly in garment workers.

2. Strengths and limitations of the study

2.1 Strengths of the study

This study is the initial testing for the instrument to measure the psychosocial work environment and seeking the key characteristics of psychosocial work environment in Thailand, in particular manufacturing industrial workers. Using the standardized questionnaires, the Effort-Reward Imbalance Questionnaire (ERIQ) and Job Content Questionnaire (JCQ) were translated and back-translated carefully by four qualified bilingual experts. Furthermore, a group of representatives was individually interviewed for the comprehension of the questionnaires. The Thai ERIQ, JCQ, and the additional section on organizational aspects had adequate psychometric properties and could be applied to measure the psychosocial work characteristics in other occupations and population. Based on a large sample, the results of study were strong evidences for enhance the knowledge on psychosocial work environment in Thai industrial workers.

2.2 Limitations of the study

There are some limitations that should be mentioned. Firstly, the individual components were employed to analyses in this study instead of using the ratio of ERI, the combination of high job demands and low job control (job strain condition), and the combination of job strain and low social support (iso-strain condition). These might affect the power in predicting adverse health outcomes that could be strongly predicted through the formulations of Effort-Reward imbalance ratio (ERI ratio), job strain (high job demands combined with low job control), and iso-strain (high job strain combined with lack of social support). Secondly, this study was based on cross-sectional design. It limited explaining the observed associations among variables in terms of causal relationships as these variables were measured at one point of time.

Thirdly, the length of questionnaire was another point to consider. Even though the subjects had time to finish the questionnaire for a week, they could be fatigued, which in turn, impacted on the responses. Additionally, most of subjects frequently completed the questionnaire after work in the evening or before bedtime. The fourth limitation related to the generalizability should be concerned because most of subjects were female. This study was also conducted with in garment industry.

Gender differences and the nature of job characteristics should not be ignored. Lastly, testing the fit of model was not examined because the investigation on psychosocial work environment in Thailand is in the early stage, particularly in the industrial workers. The analyses were limited to exploratory factor analysis, which the results could not allow for the model fit for both the sample of this study and general working population.

CHAPTER VI
CONCLUSIONS

This chapter provides a summary of major findings in this study and implications for practice, further research direction, and policy.

1. Summary of major findings

Research Question 1: Do the subscales of the developed instrument demonstrate adequate validity and reliability to measure the key domains of the psychosocial work environment for Thai garment workers?

Specific research question 1.1: Does the Thai version of the Effort-Reward Imbalance Questionnaire (Thai-ERIQ) demonstrate adequate validity in terms of content, construct, and criterion-related validity, and demonstrate adequate reliability in terms of internal consistency and stability?

The Thai version of ERIQ showed the satisfactory psychometric properties. The CVI was high with the value at .95, although some difficulties in linguistics differences in translation and back-translation were found. There were slightly differences in the construct validity based on the exploratory factor analysis (EFA). Results revealed that a four meaningful factor with 20 items. Using the logistic regression analysis (LRA), both effort and reward presented the significant predictors in the risk of psychological health problems whereas overcommitment displayed the important predictor for job satisfaction. Importantly, reward demonstrated the significant associations with all psychological outcomes.

The internal consistency reliability showed satisfactory with the Cronbach's alpha coefficients greater than .7, exceptionally the overcommitment that still be questioned with the coefficient at .66. The stability reliability demonstrated relatively high at the values of .5 for all scales of effort, reward, and overcommitment. Results of this study documented the Thai ERIQ was appropriate in the application for psychosocial work environment investigation in Thai manufacturing industrial

workers. However, low Cronbach's alpha coefficient of overcommitment scale indicated that the internal consistency of this construct should be improved. This finding was concordant with the results of EFA, which reported 2 items (item 20 *'relax and switch off work'* and item 21 *'sacrifice too much for job'*) did not load on the overcommitment as in the core construct in the theoretical model. These findings suggested for further improvement of overcommitment scale.

Specific research question 1.2: Does the Thai version of the Job Content Questionnaire (Thai-JCQ) demonstrate adequate validity in terms of content, construct, and criterion-related validity, and demonstrate adequate reliability in terms of internal consistency and stability?

The Thai version of JCQ showed the acceptable psychometric properties. The CVI was high with the value at .94. Similarly, some difficulties in linguistics differences were found in the translation and back-translation process. Based on EFA, there were some differences in the construct validity. Results revealed that an eight meaningful factors with 33 items. Using the logistic regression analysis (LRA), emotional demand presented the significant predictor in the risk of psychological health problems whereas job demands, job control, and total social supports displayed the important predictors for job satisfaction. Interestingly, emotional demand demonstrated the significant associations with all psychological health problems.

The internal consistency reliability showed adequate Cronbach's alpha coefficients from .47 to .76. Physical demand showed the only subscale that the internal consistency coefficient was higher than .7 with the highest value among JCQ subscales whereas psychological job demand showed the lowest value. The stability reliability demonstrated acceptable at the values of .34 to .64, with the exception for job demands that displayed the lowest correlation value at .13. Results of this study documented the Thai JCQ was suitable in the application for psychosocial work environment investigation in Thai manufacturing industrial workers. Nevertheless, the interpretation should be cautioned for Thai version of JCQ because of troubles in factor solution in EFA that somewhat was not in line with the theoretical model and low internal consistencies for most of subscales. These findings also suggested for further refinement of JCQ subscales.

Specific research question 1.3: Does the additional section of the developed instrument demonstrate adequate validity in terms of content, construct, and criterion-related validity, and demonstrate adequate reliability in terms of internal consistency and stability?

Unlikely, the additional section was developed based on the literature review for organizational aspects measures. It presented the high value of CVI at .96 and was found fewer problems in the process of validity testing. Regarding the additional section was a new tool; the EFA demonstrated a five factor solution that provided more meaningful in the components of organizational aspects. The original constructs of the additional section were examined in the LRA for the predictive criterion-validity testing. Both organizational climate and environmental and physical work conditions presented the significant predictors for psychosomatic symptoms and depression whereas job satisfaction can be predicted by two predictors: policies and practices and organizational climate. Considerably, organizational climate demonstrated predominantly in predicting psychological outcomes. Nevertheless, there were no associations between organizational aspects and anxiety.

The internal consistency reliability showed satisfactory with the Cronbach's alpha coefficients higher than .8 for all scales of policies and practices, organizational climate, and environmental and physical work conditions. The stability reliability demonstrated relatively high at the values of .5 for all scales. Results of this study were also suggested that the organizational section was appropriate in the application for psychosocial work environment investigation in Thai manufacturing industrial workers. It is important to note that the additional section of organizational factor should be replicated in further studies because it is new tool that was added for comprehensive view on psychosocial work environment.

Research Question 2: To what extent are the characteristics of the psychosocial work environment associated with psychosomatic symptoms, anxiety, and depression?

Specific research question 2.1: To what extent are the subscales of ERIQ associated with psychosomatic symptoms, anxiety, and depression?

All scales of ERIQ were statistically significant correlated with all psychological health problems (psychosomatic symptoms, anxiety, and depression). Only reward component showed negative correlations whereas both effort and overcommitment showed positive correlations.

Specific research question 2.2: To what extent are the subscales of the JCQ associated with psychosomatic symptoms, anxiety, and depression?

Data analyses of JCQ presented different relationships among variables. Psychosomatic symptoms outcome was found the positive correlation with only emotional demand. Anxiety was found the positive correlations with both job demand and emotional demand whereas the negative correlation was found with total social supports. Depression displayed the positive correlation with emotional demand and the negative correlation with total social supports. Job control and macro-level decision authority did not show the significant relationships with psychological health problems. It is interesting that emotional demand demonstrated statistically significant correlated with all psychological health problems.

Specific research question 2.3: To what extent are the subscales of the additional section of the developed instrument associated with psychosomatic symptoms, anxiety, and depression?

All scales of the additional section of organizational factor were statistically significant correlated with all psychological health problems (psychosomatic symptoms, anxiety, and depression), exceptionally the correlation between policies and practices and psychosomatic symptoms. The directions of the relation among all variables were negative.

Research Question 3: To what extent are the characteristics of the psychosocial work environment associated with job satisfaction?

Specific research question 3.1: To what extent are the subscales of ERIQ associated with job satisfaction?

All components of ERIQ (effort, reward, and overcommitment) were also found the significant correlations with job satisfaction. In contrast with the relationships with psychological health problems, reward was positively correlated whereas both effort and overcommitment were negatively correlated with job satisfaction.

Specific research question 3.2: To what extent are the subscales of the JCQ associated with job satisfaction?

Similar findings were found in the JCQ data analyses. The majority components of JCQ were found the significant correlations with job satisfaction, with the exception for the correlation with emotional demand. Only job demands showed negative correlation with job satisfaction whereas job control, macro-level decision authority, and total social supports were positively correlated. It is notably that only emotional demand did not display the significant relationship with job satisfaction whereas it demonstrated the significant correlations with all psychological health problems.

Specific research question 3.3: To what extent are the subscales of the additional section of the developed instrument associated with job satisfaction?

As expectedly, all components of the organizational aspects (policies and practices, organizational climate, and environmental and physical work conditions) were positively correlated with job satisfaction with statistical significance.

Research Question 4: What is the most parsimonious set of domains that can be used to comprehensively represent the key characteristics of the psychosocial work environment in Thailand?

All components of ERIQ, JCQ, and the organizational section were taken into the LRA at the same time to determine the parsimonious set of the psychosocial work characteristics. In sum, effort and reward components demonstrated predominantly in the significant predictors for the onset of psychological health problems. Some

components of other two theoretical models- from JCQ and the additional section- were also considered in explaining the risk of psychological health problems. For example, emotional demand from JCQ can predicted the risk of both psychosomatic symptoms and anxiety. For the additional section, organizational climate was found to be an important predictor of psychosomatic symptoms whereas environmental and physical work conditions component was found to be an important predictor of depression.

Four components were the significant predictors of the poor job satisfaction. They consisted of job demands and total social supports of JCQ, as well as policies and practices and organizational climate of the organizational aspects. These results implied that the components of JCQ and the organizational aspects played the important roles in predicting job satisfaction in this study. It is important to note that job demands, total social supports, and organizational climate components displayed the vital roles in predicting both psychological health problem (psychosomatic symptoms) and psychological health well-being (job satisfaction).

In sum, the parsimonious key domains consisted of eight variables from three theoretical models that could be comprehensively represent psychosocial work characteristics among Thai garment workers in this study in which the associations were found with psychological outcomes. They were effort, reward, job demand, emotional demand, total social supports, policies and practices, organizational climate, and environmental and physical work conditions.

2. Implications for practice, further research direction, and policy

2.1 Implications for practice

Findings from this study emphasized the importance of the psychosocial work environment in prevention and promotion employees' health and well-being. Special attention was emphasized on the application of the developed instrument, including the Thai ERIQ, Thai JCQ, and the organizational section. These questionnaires were recommended to use for the investigation and monitoring the psychosocial work environment in the manufacturing industrial workers. All three developed questionnaires can be employed periodically at work and can be used independently or combining depending upon the objectives of study. Nonetheless, findings of this

study clearly demonstrated that combining these instruments yielded comprehensive aspects of psychosocial at work and their associations with psychological outcomes.

Results based on the ERIQ, JCQ, and the organizational aspects suggested the possibility to identify more comprehension on stressful experiences at work. The ERIQ was used to measure subjective work environment in terms of both task and personal characteristics. The JCQ was rather to be used for objective task-oriented measure. The organizational section was focused on general aspects within organization affecting health and well-being, as well as safety.

When three theoretical models were combined, the significant predictors of psychological health problems were predominantly presented in ERIQ, specifically effort and reward. Likewise, emotional demand from JCQ was one of the important components in predicting psychological health problems. Clearly, the significant predictors of job satisfaction were predominantly presented in organizational section. Moreover, job demands and total social supports of JCQ were also the important components in predicting job satisfaction. These findings suggested the employers and employees to concern about the relationships between the psychosocial work environment and mental health and well-being that could impact on health care cost and productivity.

Additionally, these components of psychosocial work environment could be integrated into the intervention in the workplace, such as the work-related stress reduction program for improving employees' mental health and preventing mental health problems in the workplace. These dimensions of psychosocial work environment are also valued and should be addressed in the workplace policy in health prevention and promotion. They may capture a broad range of stressful work experiences and provide more holistic view for organizational intervention. Emphasis on reward, total social supports, and organizational climate may be possible to implement and yield the effectiveness in a short period of time.

Finally, the knowledge on psychosocial work environment should be widely disseminated, especially among employees, employers, health personnel or relevant sectors that have responsibility for employee health and to enhance understanding and awareness on the work environment.

2.2 Implications for policy

Findings of this study clearly indicated that the psychosocial work environment should be more concerned from the authority and relevant sectors. In Thailand, workplace surveillance is currently limited to lead poisoning, hearing loss, silicosis, byssinosis, solvent poisoning, and work-related injuries. In addition, workplace surveillances and monitoring in Thai factories mainly emphasize on physical and chemical hazards to meet the national regulations for industries. These affirm that psychosocial aspects of work and their adverse effects have been overlooked in the surveillance system. Consequently, there were very few reports on work-related mental health problems, such as job stress among Thai workers.

Systematic surveillance information is recommended to develop and to use for practical and effective action plan as set up in the developed countries. As recommendations by Dollard, Skinner, Tuckey and Bailey (2007), national surveillance system should consist of three core contents of psychosocial risks that associated with employees' health and well-being: 1) job characteristics and nature of work, 2) social and organizational context of work, and 3) outcomes. In the present study, findings suggested that effort, reward, job demands (specifically, physical demand), emotional demand, social support at work, and organizational factors (i.e., policies and practices, organizational climate, and environmental and physical work conditions) were found as key psychosocial work environment among Thai garment workers. These aspects were recommended to include in the national surveillance system for industrial manufacturing workers in Thailand.

Results in this study revealed that there were the prevalence of psychological health problems among Thai garment workers. The compensation claims should be extended to work-related psychological problems (e.g., occupational stress). In the developed countries (e.g., the United States, the United Kingdom, and Australia), it is clearly that the workers' compensation claims cover job stress although some difficulties in the workers compensation system have been documented (Steven & Shanahan, 2002). Most of successful cases have been evidenced that they had upholding by the court, consulting with experienced solicitors, and assistance by trade union (Hall, 2008; NIOSH, 1998). If it is possible, findings of this study suggested that mental health problems should be covered by the workers' compensation claims

through the diagnosis by physicians or occupational physicians who have understood the psychosocial risks at work and the associations with employees' health. These physicians should have adequate information on stressful working conditions that help to assure the significant contribution to adverse health effects through effective surveillance information system. Negative outcomes might be identified by the physicians in terms of observed symptoms of work-related psychological strain, such as physical and psychosomatic health complaints, sickness absence from work, anxiety, and depression. Health care professional would act as advocacy to assure the workers rights under compensation legislation to receive benefits for work-related illnesses and injuries, as well as provide advice for workers confidentiality. Labour/trade union should be supported to know their rights and to enhance knowledge on psychosocial issues in the workplace and the relationships with their health and well-being.

Furthermore, relevant authority sectors, including department of labour protection and welfare, Ministry of Labour and Ministry of Public Health, Thailand should act as major sectors to set up the national agenda and to conduct the initial national survey and research on the psychosocial risks among Thai working population. The national agenda should be posed the importance of identifying psychosocial risks and at-risk occupations groups, monitoring work-related psychological illnesses, addressing the employee mental health and well-being, supporting grant for research on these topics, setting the priorities of policies, regulations, and interventions and/or campaigns, informing prevention policies and practice relevant to protective program and measures, and developing national standards for the organization. Large-scale data collection on the risk factor of psychosocial work environment was also recommended to conduct as a primary prevention strategy, particularly at individual and organizational assessment. Most importantly, the high-risk occupations are recommended to conduct in the early survey due to job strain were found the most prevalent (LaMontagne, Ostry, & Shaw, 2006). These groups include workers in health care and service sectors. Obtained information should be disseminated to all stakeholders (e.g., employers, employees, relevant sectors, labour/trade union, workers advocates, and researchers) to have more understanding and evidence-based knowledge on psychosocial aspects of job. These

might be enhancing the consideration for employees' health and well-being in comprehensive view. Raising awareness and motivating to conduct periodical investigation, monitoring, and setting up preventive program are also important in the later phase.

2.3 Implications for nursing

Findings of this study supported the relationships between psychosocial work environment and psychological outcomes. These suggested that occupational health nurses should be aware of these issues among Thai industrial manufacturing workers. Three developed instruments, Thai ERIQ, Thai JCQ, and organizational section, could be employed to obtain data on psychosocial work characteristics. Database and surveillance system in the workplace should be set up to monitor the psychosocial issues and employee psychological health and well-being. The annual plan was also recommended for preventing stressful work environment and promoting workers' health. Information on psychosocial issues and its effects should be periodically disseminated within organization. The intervention to promote mental heath at organizational level (e.g., enhance communication skills and promote safety climate and work conditions), and at individual level (e.g., strengthening individual coping, relaxation, and stress management skills) should be conducted. All stakeholders, such as employers, managers, supervisors, relevant authority sectors and employees should be involved in planning for effective implementation.

2.4 Implications for further research

Further instrument testing were recommended to place emphasis on the overcommitment scale of ERIQ and almost subscales of JCQ due to the results showed low internal consistency coefficients. If it is possible, these items should be firstly improved through the refinement from the workers, who would be employed for the discourse that usually use in the workplace. The replication should be done for all three questionnaires (ERIQ, JCQ, and the additional section) in various occupation settings to more generalizability and strengthen the body of knowledge in Thailand. Nevertheless, the retest study for stability reliability might be reconsidered for both ERIQ and JCQ due to the characteristics of psychosocial aspects that can be changed

over period of time depending upon the contexts of work. Stability testing might not be appropriate as presented the relative low correlation values between two tests in the results of this study. It is also recommended that future studies should include more male participants and workers in various job positions. This is due to the post hoc analyses in which significant differences in workers' perception toward the psychosocial work characteristics were found in this study ($p<.05$, Appendix E) when the sample was classified by gender and job position. Therefore, the issues on a variety of occupations by nature, job position, and gender differences should not be ignored. Replication of the instrumental testing in various occupation settings and population might be help to examine the influence of possible selection bias and to generalize the present findings.

Confirmatory factor analysis (CFA) was recommended for further study to enhance the knowledge on psychosocial work environment in Thailand. The CFA using the structural equation model might help the researcher to better understand the complex relationships between psychosocial work environment and health because it can document the fit or appropriate of model. Through the CFA data analysis, the measurement errors would be accommodated for the overall fit of the model among Thai working population.

Eight key components of the psychosocial work characteristics, which were found in the combining analyses, should be concerned in the future research because they might be the significant psychosocial factors in preventing mental health problems at work. The associations between psychosocial work environment and various health outcomes should also be investigated to strengthen the body of knowledge. For example, the relationship with sleep disturbance, sickness absence, presenteeism, general self-reported health, and physical health complaints, as well as musculoskeletal disorders and cardiovascular risks. The ERI ratio, job strain, and iso-strain were also suggested to test for the improvements in predicting the negative health outcomes. Computing methods of JCQ subscales that was developed in western countries should also be explored whether it fits with Thai context.

To provide better understanding about the meaningful psychosocial work environment within Thai context, using qualitative study (e.g., phenomenology) and mixed methodology were also recommended because of social and cultural

sensitivity. These study designs might help to gain more useful information on psychosocial at work within particular workplace (e.g., in manufacturing industry) and socio-cultural that fit with Thai working population. Qualitative methods, including focus group and in-depth interview, might be helpful to explore the concepts of psychosocial work environment among Thai workers. Obtained qualitative data could be helpful to clarify its meanings and to refine word using in the statement. These might strengthen and improve both validity and reliability of the developed instrument.

Additionally, results of this study suggested that a cross-sectional deign might not be adequate to comprehend the complexity of psychosocial at work and the complicated relationships between psychosocial work environment and health and well-being. The prospective or longitudinal study, therefore, would be useful for future research because the long-term design can be yielded the causal relationships. However, the cross-sectional study is still needed because it is necessary to replicate the Thai ERIQ, JCQ, and the organizational section in various groups of occupation and working population to strengthen the body of knowledge on psychosocial work environment.

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APPENDIX

APPENDIX A
LIST OF EXPERTS

1. Associate Professor Orawan Kaewboonchoo, Ph.D. (Social Medicine)
   Department of Public Health Nursing
   Faculty of Public Health
   Mahidol University
2. Assistant Professor Pimsupa Chandanasotthi, Ph.D. (Nursing)
   Department of Public Health Nursing
   Faculty of Public Health
   Mahidol University
3. Lecturer Thanee Kaewthummanukul, Ph.D. (Nursing)
   Department of Public Health Nursing
   Faculty of Nursing
   Chiang Mai University
4. Doctor Somrak Santibenjakul, M.D.
   Queen Savang Vadhana Memorial Hospital
   Department of Out-patient and Accident
   Sriracha, Chonburi
5. Assistant Professor Pitchaya Phakthongsuk, M.D.
   Department of Community Medicine
   Faculty of Medicine
   Prince of Songkla University

APPENDIX B

Study Approval from the Institute Review Board of Mahidol University

No. MU 2007-075

Documentary Proof of Ethical Clearance
The Committee on Human Rights Related to
Human Experimentation
Mahidol University, Bangkok

Title of Project: Development of the Instrument for Measuring Psychosocial Work Environment in Thai Garment Workers
(Thesis for Ph.D.)

Principle Investigator: Miss Aporntip Buapetch

Name of Institution: Faculty of Public Health

Approved by the Committee on Human Rights Related to Human Experimentation

Signature of Chairman: .....
(Professor Dr.Srisin Khusmith)

Signature of Head of the Institute: .....
(Professor Dr.Pornchai Matangkasombut)

Date of Approval: 20 APR 2007

Date of Expiration: 19 APR 2009

APPENDIX C

ความหมายของสิ่งแวดล้อมในการทำงานด้านจิตสังคมตามความเข้าใจของกลุ่มผู้ให้ข้อมูลหลัก(จากการสัมภาษณ์และให้เขียนตามความเข้าใจและทำแบบสอบถาม)

■ ก่อนการทำแบบสอบถามและสัมภาษณ์ ผู้วิจัยได้สอบถามเกี่ยวกับความเข้าใจหรือเคยได้ยินเกี่ยวกับคำว่า "*สิ่งแวดล้อมในการทำงานด้านจิตสังคม*" มาก่อนหน้านี้หรือไม่ ส่วนใหญ่บอกว่าไม่เคยได้ยินและไม่ทราบว่าความหมายคืออะไร แต่ทราบว่าต้องเกี่ยวข้องกับสภาพในการทำงาน มีเพียงไม่กี่คนที่บอกว่าเคยได้ยินบ้าง (จากการอบรมพนักงาน) แต่ไม่ทราบว่าคืออะไร เพราะไม่มีใครอธิบายและไม่สามารถยกตัวอย่างหรืออธิบายให้ฟังว่าเข้าใจอย่างไร ("*ไม่รู้จะบอกยังไง เพราะไม่รู้ว่าคืออะไร*") รวมถึงไม่ทราบถึงผลกระทบด้วย ผู้วิจัยจึงพูดให้ฟังอย่างคร่าวๆตามแนวคิดหลักของปัจจัยด้านจิตสังคมในการทำงาน และหลังจากที่ผู้ให้ข้อมูลหลักทำแบบสอบถามเสร็จแล้ว ผู้วิจัยได้เปิดโอกาสให้ซักถามและขอให้ กลุ่มผู้ให้ข้อมูลหลักให้ข้อมูลเพิ่มเติมในส่วนที่เกี่ยวข้องกับเรื่องดังกล่าว โดยให้พูดตามความเข้าใจหรือประเด็นที่อยากแลกเปลี่ยนเพื่อนำข้อมูลไปใช้ในการปรับปรุงแบบสอบถาม (ข้อสรุปอยู่ในเล่ม) หลังจากนั้นจึงให้กลุ่มผู้ให้ข้อมูลหลักเขียนความหมายของ "ปัจจัยสิ่งแวดล้อมในการทำงานด้านจิตสังคม" ลงในกระดาษที่แจกให้โดยเน้นย้ำว่าคำตอบไม่ผิดหรือถูก แต่เป็นการให้ความหมายตามความเข้าใจของผู้ที่ปฏิบัติงานจริงเท่านั้น

หมายเหตุ PSWE- Psychosocial Work Environment

ช- เพศชาย, ญ-เพศหญิง

L- Large-sized factory

M- Medium-sized factory

SMP- Samut Prakan province

SMSK- Samut Sakorn province

รหัส-เพศ-แผนกงาน	ขนาดโรงงาน -จังหวัด	ความเข้าใจเกี่ยวกับ PSWE
001-ญ (QA)	L-SMP	- *ปัจจัยสิ่งแวดล้อมในการทำงานด้านจิตสังคม*-สภาวะของการทำงานด้านต่างๆที่มีผลต่อสภาพจิตใจในการทำงานโดยสภาพสิ่งแวดล้อมรอบด้านจากการทำงาน
002-ญ (กระดุม)	L-SMP	- ทำงานไม่เครียด ทำจิตใจให้สบาย ไม่ต้องไปเครียดกับงานให้มาก
003-ช (Packing)	L-SMP	- เกี่ยวกับในด้านการทำงาน - ความปลอดภัย - ความสะดวกของการทำงาน
004-ช (Packing)	L-SMP	- อุปกรณ์ความปลอดภัย ภูมิอากาศ ฝุ่นละออง และความปลอดภัยในการทำงาน การทำความสะอาด ที่จะมีต่อสุขภาพร่างกายในอนาคต และอยากจะให้ปรับปรุงสิ่งแวดล้อมต่างๆในโรงงาน
005-ญ (ตัด)	L-SMP	- ความเข้าใจของดิฉันมีองค์ประกอบหลายอย่างที่ทำให้สภาพจิตใจคนเราเสื่อมโทรม ไม่ว่าจะเป็นในการทำงานหรือชีวิตส่วนตนหรือคนรอบข้างที่ทำให้สุขภาพจิตของคนเราไม่ดี ส่วนประกอบถึงสภาพแวดล้อมของงานที่เราทำ เพื่อนร่วมงาน สามี คนรอบข้างทุกคน
006-ช (โกดังผ้า)	L-SMP	- *ปัจจัยด้านสิ่งแวดล้อมในการทำงานด้านจิตสังคม*- ก็ถือว่าเป็นปัจจัยและองค์กรที่ดี เพื่อการแก้ปัญหาที่เกิดขึ้นกับคนใช้แรงงาน เพราะปัญหาบางอย่างที่เกิดขึ้นกับคนหลายคนแตกต่างนั้นกัน
007-ช (Screen)	M-SMSK	- หลังจากทำแบบสอบถามเสร็จแล้วข้าพเจ้าได้เข้าใจว่า *ปัจจัยสิ่งแวดล้อมในการทำงานด้านจิตสังคม* คือ การทำงานร่วมกับผู้อื่นโดยไม่มีข้อ

		อคติ และทำงานร่วมกับผู้อื่นได้อย่างเสมอ และสภาวะโดยรอบการทำงานและที่อยู่อาศัย ต้องรวมหมดในการพัฒนาจิตใจและปรับปรุงการทำงาน ความคิดในการปรับปรุงถึงเหตุผลต่างๆ
008-ช (ออกแบบ)	M-SMSK	ไม่แสดงความคิดเห็น
009-ญ (ตัดเย็บ)	M-SMSK	ไม่แสดงความคิดเห็น
010-ญ (ตัดเย็บ)	M-SMSK	ไม่แสดงความคิดเห็น
011-ญ (ตัดเย็บ)	M-SMSK	ไม่แสดงความคิดเห็น
012-ช (Screen)	M-SMSK	ไม่แสดงความคิดเห็น

กลุ่มผู้ให้ข้อมูลหลักได้ทำการเก็บข้อมูลในโรงงานขนาดกลาง 1 โรงงาน (6 คน-ช3/ญ3) และขนาดใหญ่ 1 โรงงาน (6 คน-ช3/ญ3) ในเขตของพื้นที่จังหวัดที่เป็นเป้าหมาย รวมจำนวน 12 คน-ช6/ญ6

■ โรงงานขนาดใหญ่ จังหวัดสมุทรปราการได้ดำเนินการ 2 ครั้งในวันเสาร์ที่ 10 และ 17 มีนาคม 2550 โดยครั้งแรกเป็นลักษณะสัมภาษณ์ตัวต่อตัว ณ ห้องที่ทางโรงงานจัดให้เป็นสัดส่วน และใช้เวลาในการทำแบบสอบถามประมาณ 2 ชั่วโมงและพูดคุยอีกประมาณคนละ 40-45 นาที จึงเก็บข้อมูลได้เพียง 2 คน ดังนั้นในการเก็บข้อมูลครั้งที่ 2 ผู้วิจัยจึงให้เข้ามาทำแบบสอบถามครั้งละ 2 คน คนที่เสร็จก่อนก็คุยก่อน ทั้งนี้ได้มีผู้ช่วยวิจัยเป็นผู้ช่วยในการเก็บข้อมูลด้วย เนื่องจากผู้ให้ข้อมูลหลักบางคนทำแบบสอบถามเสร็จในเวลาที่ใกล้เคียงกัน ทั้งนี้ผู้ช่วยวิจัยได้ฟังการอธิบายและซักถามกันจนเข้าใจวัตถุประสงค์ของการเก็บข้อมูลครั้งนี้เป็นอย่างดี ร่วมกับการสังเกตการณ์จากการเก็บข้อมูลในครั้งแรกด้วย (เวลาในการทำแบบสอบถามคนละประมาณ 1.30-2 ชั่วโมงเช่นเดิมและพูดคุยอีกประมาณคนละ 30-45 นาที เก็บข้อมูลได้ทั้ง 4 คน)

■ โรงงานขนาดกลาง จังหวัดสมุทรสาครได้ดำเนินการ 1 ครั้งในวันอาทิตย์ที่ 1 เมษายน 2550 โดยเก็บข้อมูลพร้อมกันทั้ง 6 คน ในการเก็บครั้งนี้เป็นการนัดเก็บข้อมูลนอกเวลางานและนอกสถานที่ทำงาน (ร้านไก่ย่างส้มตำใกล้ที่พักของผู้ให้ข้อมูลหลักซึ่งสามารถมาได้สะดวก) ใช้เวลาในการทำ

แบบสอบถามประมาณ 1.30-2 ชั่วโมงและพูดคุยอีกประมาณคนละ 15-30 นาที จากการสังเกตจะเห็นความแตกต่างในการพูดคุย ครั้งนี้ดูเหมือนคนงานจะรีบร้อนในการทำแบบสอบถามและพูดคุยสัมภาษณ์มากกว่า จึงไม่ค่อยมีใครแสดงความคิดเห็น อาจจะเป็นเพราะไม่ใช่เวลางานและเป็นวันพักผ่อน และสถานที่ก็อยู่ใกล้บ้าน จึงทำให้รู้สึกอยากทำให้เสร็จจะได้กลับบ้านเร็วๆ

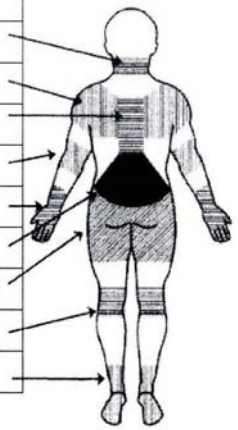
APPENDIX D

แบบสอบถามความผิดปกติของระบบกระดูกและกล้ามเนื้อ
(Modified Nordic Musculoskeletal Questionnaire)

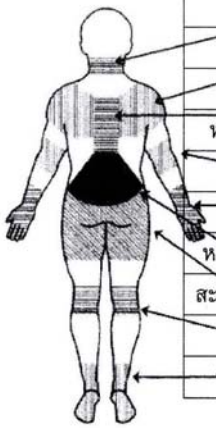
บริเวณส่วนต่างๆของร่างกายที่มีปัญหาความเจ็บปวดภายในช่วงระยะเวลา **6 เดือนที่ผ่านมา**

ซีกซ้ายของร่างกาย

%	
34.6	คอ
34.5	ไหล่
29.5	หลังส่วนบน
4.7	ข้อศอก
15.9	ข้อมือ
36.3	หลังส่วนล่าง
23.7	สะโพก/ต้นขา
29.4	ข้อเข่า
27.6	ข้อเท้า/เท้า



ซีกขวาของร่างกาย



	%
คอ	32.8
ไหล่	32.2
หลังส่วนบน	29.3
ข้อศอก	5.7
ข้อมือ	16.0
หลังส่วนล่าง	35.4
สะโพก/ต้นขา	23.9
ข้อเข่า	27.6
ข้อเท้า/เท้า	28.3

อาการเจ็บปวดนอกจากบริเวณของร่างกายที่กำหนดให้

1. ฝ่าเท้า, ส้นเท้า
2. น่อง
3. แขน
4. สายตา (ปวดตา, แสบตา)
5. ข้อเข่า
6. นิ้วมือ
7. ปวดขมับ
8. ปวดเมื่อยตามตัว
9. ปวดต้นขา

APPENDIX E

Additional Analyses

Table 1 Correlation coefficients between the effort scale, reward subscales, and overcommitment scale and psychological outcomes (N = 828)

	Psychosomatic symptoms	Anxiety	Depression	Job satisfaction
Effort	.199** (<.001)	.329** (<.001)	.184** (<.001)	-.231** (<.001)
Reward-financial and status related aspects	-.271** (<.001)	-.274** (<.001)	-.192** (<.001)	.331** (<.001)
Reward-esteem reward	-.299** (<.001)	-.295** (<.001)	-.248** (<.001)	.148** (<.001)
Reward-job security	-.190** (<.001)	-.282** (<.001)	-.170** (<.001)	.282** (<.001)
Overcommitment	.145** (<.001)	.267** (<.001)	.149** (<.001)	-.132** (<.001)

** Statistical significant level at 0.01

Table 2 Associations of effort scale, reward subscales, and overcommitment scale on psychological outcomes (N = 828)

	Psychosomatic symptoms			**Anxiety**			**Depression**			**Poor job satisfaction**		
	OR	95%CI	p-value	OR	95%CI	p-value	OR	95%CI	p-value	OR	95%CI	p-value
Effort												
• Low effort	1.00			1.00			1.00			1.00		
• High effort	**1.55**	**1.06-2.26**	.023	**1.77**	**1.20-2.62**	.004	NA			NA		
Reward-financial and status related aspects												
• Low level	**1.46**	**1.03-2.06**	.033	**1.62**	**1.14-2.31**	.007	NA			**1.63**	**1.16-2.29**	.004
• High level	1.00			1.00			1.00			1.00		
Reward-esteem reward												
• Low esteem	**2.75**	**1.95-3.89**	<.001	**2.83**	**1.98-4.05**	<.001	**3.08**	**2.07-4.57**	<.001	**1.52**	**1.11-2.08**	.009
• High esteem	1.00			1.00			1.00			1.00		
Reward-job security												
• Low job security	NA			NA			NA			**1.58**	**1.14-2.20**	.007
• High job security	1.00			1.00			1.00			1.00		
Overcommitment												
• Low OVC	1.00			1.00			1.00			1.00		
• High OVC	NA			NA			NA			**1.38**	**1.01-1.89**	.042

NA: means the variable was not available in the model.

Table 3 Correlation coefficients between the new constructs of effort, reward, and overcommitment scales and psychological outcomes (N = 828)

	Psychosomatic symptoms	Anxiety	Depression	Job satisfaction
Effort	.199**	.329**	.184**	-.231**
	(<.001)	(<.001)	(<.001)	(<.001)
Reward1	-.283**	-.283**	-.245**	.124**
	(<.001)	(<.001)	(<.001)	(<.001)
Reward2	-.299**	-.330**	-.230**	.329**
	(<.001)	(<.001)	(<.001)	(<.001)
Overcommitment	.116**	.200**	.071*	-.121**
	(.001)	(<.001)	(.043)	(.001)

** Statistical significant level at 0.01
* Statistical significant level at 0.05

Table 4 Associations of the new constructs of effort, reward, and overcommitment scales on psychological outcomes (N = 828)

	Psychosomatic symptoms			**Anxiety**			**Depression**			**Poor job satisfaction**		
	OR	95%CI	p-value	OR	95%CI	p-value	OR	95%CI	p-value	OR	95%CI	p-value
Effort												
• Low effort	1.00			1.00			1.00			1.00		
• High effort	NA			**1.72**	**1.16-2.55**	.007	NA			NA		
Reward1												
• Low level	**2.60**	**1.86-3.64**	<.001	**2.68**	**1.90-3.79**	<.001	**2.98**	**2.06-4,33**	<.001	NA		
• High level	1.00			1.00			1.00			1.00		
Reward2												
• Low esteem	**2.25**	**1. 59-3.17**	<.001	**1.73**	**1.20-2.49**	.003	NA			**2.02**	**1.50-2.73**	<.001
• High esteem	1.00			1.00			1.00			1.00		
Overcommitment_n												
• Low OVCn	1.00			1.00			1.00			1.00		
• High OVCn	NA			NA			NA			**1.46**	**1.08-1.96**	.014

NA: means the variable was not available in the model.

Table 5 Correlation coefficients between the subscales of JCQ and psychological outcomes (n = 790)

Variables	Psychosomatic symptoms	Anxiety	Depression	Job satisfaction
Psychological job demand	**-.074***	.046	.002	**-.335****
Physical job demand	**.110****	**.133****	.040	**-.278****
Emotional job demand	**.167****	**.252****	**.115****	.011
Skill discretion (Skill utilization)	**.096****	.068	**.076***	**.421****
Decision authority	**-.071***	-.001	**-.074***	**.274****
Macro-level decision authority	-.044	.048	.021	**.279****
Supervisor support	-.057	**-.098****	**-.087***	**.426****
Coworker support	-.008	**-.076***	**-.088***	**.394****

** Statistical significant level at 0.01
* Statistical significant level at 0.05

Table 6 Association of JCQ subscales with psychological outcomes (N = 790)

	Psychosomatic symptoms			Anxiety			Depression			Poor job satisfaction		
	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value
▪ Psychological job demand												
• Low psychological demand	1.00			1.00			1.00			1.00		
• High psychological demand	**0.43**	**0.28-0.64**	<.001	NA			NA			**1.83**	**1.22-2.75**	.003
▪ Physical job demand												
• Low physical demand	1.00			1.00			1.00			1.00		
• High physical demand	**1.73**	**1.18-2.52**	.005	NA			NA			**1.88**	**1.28-2.76**	.001
▪ Emotional job demand												
• Low emotional demand	1.00			1.00			1.00			1.00		
• High emotional demand	**1.64**	**1.17-2.30**	.004	**2.17**	**1.55-3.05**	<.001	**1.49**	**1.01-2.20**	.043	NA		
▪ Skill discretion												
• Low skill discretion	NA			NA			NA			**1.96**	**1.36-2.84**	<.001
• High skill discretion	1.00			1.00			1.00			1.00		
▪ Decision authority												
• Low decision authority	NA			NA			NA			NA		
• High decision authority	1.00			1.00			1.00			1.00		
▪ Macro-level decision authority												
• Low macro-level decision authority	NA			NA			NA			NA		
• High macro-level decision authority	1.00			1.00			1.00			1.00		
▪ Supervisor support												
• Low supervisor support	NA			NA			NA			**3.64**	**2.54-5.20**	<.001
• High supervisor support	1.00			1.00			1.00			1.00		
▪ Coworker support												
• Low coworker support	NA			NA			NA			**1.95**	**1.36-2.77**	<.001
• High coworker support	1.00			1.00			1.00			1.00		

NA: means the variable was not available in the model.

Table 7 Association of JCQ scales (using job strain) with psychological outcomes (N = 790)

	Psychosomatic symptoms			Anxiety			Depression			Low job satisfaction		
	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value
▪ Job strain[1]												
• Low job strain	1.00			1.00			1.00			1.00		
• High job strain	**0.28**	**0.16-0.48**	<.001	**0.53**	**0.33-0.85**	.008	NA			**1.76**	**1.03-3.01**	.038
▪ Physical job demand												
• Low physical job demand	1.00			1.00			1.00			1.00		
• High physical job demand	**1.82**	**1.29-2.56**	.001	NA			NA			**1.51**	**1.06-2.14**	.022
▪ Emotional job demand												
• Low emotional demand	1.00			1.00			1.00			1.00		
• High emotional demand	**1.42**	**1.03-1.97**	.033	**1.96**	**1.42-2.70**	<.001	NA			NA		
▪ Macro-level decision authority												
• Low macro-level decision authority	NA			NA			NA			NA		
• High macro-level decision authority	1.00			1.00			1.00			1.00		
▪ Total social support (ss+cs)[3]												
• Low support	NA			NA			NA			**4.46**	**3.07-6.48**	<.001
• High support	1.00			1.00			1.00			1.00		

[1] Job strain means high job demand (psychological job demand) + low job control[2]
[2] Job control means the formula of skill discretion (skd) + decision authority (da).
[3] Total social support means the formula of supervisor support (ss) + coworker support (cs).
NA: means the variable was not available in the model.

Table 8 Correlation coefficients between the policies and practices scale, organizational climate subscales, and environmental and physical work conditions scale and psychological outcomes (N = 828)

	Psychosomatic symptoms	Anxiety	Depression	Job satisfaction
Policies and practices	-.036	-.136**	-.133**	.478**
	(.310)	(<.001)	(<.001)	(<.001)
Organizational climate support	-.131**	-.139**	-.218**	.418**
	(<.001)	(<.001)	(<.001)	(<.001)
Organizational climate participation	-.258**	-.150**	-.268**	.187**
	(<.001)	(<.001)	(<.001)	(<.001)
Organizational climate communication	-.059	-.095**	-.185**	.393**
	(.091)	(.007)	(<.001)	(<.001)
Organizational climate safety and health	-.195**	-.229**	-.269**	.326**
	(<.001)	(<.001)	(<.001)	(<.001)
Environmental and physical work conditions	-.136**	-.174**	-.222**	.400**
	(.001)	(<.001)	(.043)	(.001)

** Statistical significant level at 0.01

Table 9 Associations of the policies and practices scale, organizational climate subscales, and environmental and physical work conditions scale on psychological outcomes (N = 828)

	Psychosomatic symptoms			**Anxiety**			**Depression**			**Poor job satisfaction**		
	OR	95%CI	p-value	OR	95%CI	p-value	OR	95%CI	p-value	OR	95%CI	p-value
Policies and practices												
• Low level	NA			NA			NA			**1.52**	**1.01-2.30**	.046
• High level	1.00			1.00			1.00			1.00		
Organizational climate support	\											
• Low level	NA			NA			NA			**2.84**	**1.93-4.18**	<.001
• High level	1.00			1.00			1.00			1.00		
Organizational climate participation												
• Low level	**4.75**	**3.18-7.08**	<.001	**2.30**	**1.61-3.27**	<.001	**2.12**	**1.36-3.31**	.001	NA		
• High level	1.00			1.00			1.00			1.00		
Organizational climate communication												
• Low level	NA			NA			NA			**1.48**	**1.01-2.17**	.046
• High level	1.00			1.00			1.00			1.00		
Organizational climate safety and health												
• Low level	NA			NA			NA			**1.84**	**1.27-2.68**	.001
• High level	1.00			1.00			1.00			1.00		
Environmental and physical work conditions												
• Low level	NA			NA			NA			NA		
• High level	1.00			1.00			1.00			1.00		

NA: means the variable was not available in the model.

Table 10 Associations of the new set of ERI subscales with psychological outcomes (N = 828)

	Psychosomatic symptoms			Anxiety			Depression			Poor job satisfaction		
	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value
Effort_n												
• Low effort_n	1.00			1.00			1.00			1.00		
• High effort_n	**1.51**	**1.03-2.19**	.033	**1.91**	**1.30-2.81**	.001	NA			NA		
Reward_n												
• Low reward_n	**2.89**	**1.97-4.22**	<.001	**2.43**	**1.66-3.56**	<.001	**2.41**	**1.61-3.60**	<.001	**1.89**	**1.40-2.55**	<.001
• High reward_n	1.00			1.00			1.00			1.00		
Overcommitment_n (OVC_n)												
• Low OVC_n	1.00			1.00			1.00			1.00		
• High OVC_n	NA			NA			NA			**1.48**	**1.10-1.99**	.010

NA: means the variable was not available in the model.

The Exploratory Factor Analysis (EFA) was used to determine the parsimonious set of the psychosocial work environment based on the organizational section. It revealed five-factor solution. The new five domains were different from the initial constructs.

Domain 1: was labeled as 'Health and safety policies' and consisted of 11 items.

PP1- Receive notification about health and safety policies
PP2- Comply with the company's policies on health and safety
PP3- Potential hazards are identified by the manager
PP4- Unit has been designed and adjusted to promote safety at work
PP5- Knowledge about safety procedures and PPE practices
PP6- Have standards for the protection of employees
PP7- Have standards for assistance of employees
PP8- Exchange information on health and safety
PP9- Health information was always informed
PP10- Tools and equipments are maintained and checked
PP11- Accidents trends are always investigated

Domain 2: was labeled as 'Monitoring and control health hazards at work' and consisted of 4 items.

PW1- Noise is always assessed and is adequately adjusted
PW2- Light is always assessed and is adequately adjusted
PW3- Temperature is always assessed and is adequately adjusted
PW4- Work station is always assessed and is adequately adjusted

Domain 3: was labeled as 'Organizational climate' and consisted of 6 items.

OC1- Speak up own ideas and act on problem solving
OC2- Friendly atmosphere at work
OC3- Feel free to share ideas with supervisors
OC4- Participating in company activities
OC5- Receive essential information about important changes
OC6- Receive useful information and feedback

Domain 4: was labeled as 'Health and safety activities' and consisted of 3 items.

OA1- Receive annual health examination
OA2- Receive annual safety training
OA3- The company accident report is posted annually

Domain 5: was labeled as 'Safe work environment' and consisted of 6 items.

EW1- Feeling security and safety climate at work
EW2- Have potential hazards or unsafe conditions at work
EW3- Signs about work and safety are posted
EW4- Signs about work and safety are easy to read
EW5- Work area is always clean
EW6- Work area is always conveniently arranged

Table 11 Item-total correlations and Cronbach's alpha coefficients of the new constructs of the additional section (n = 828)

Scales	Items	Item-total correlation	Cronbach's alpha coefficient
Policies, practices, and information affecting employees' health and safety	▪ Receive notification about health and safety policies	.7130	.9203
	▪ Comply with the company's policies on health and safety	.6950	
	▪ Potential hazards are identified by the manager	.6728	
	▪ Unit has been designed and adjusted to promote safety at work	.7000	
	▪ Knowledge about safety procedures and PPE practices	.7096	
	▪ Have standards for the protection of employees	.7152	
	▪ Have standards for assistance of employees	.7005	
	▪ Exchange information on health and safety	.5693	
	▪ Health information was always informed	.6291	
	▪ Tools and equipments are maintained and checked	.7277	
	▪ Accidents trends are always investigated	.7092	
Physical work conditions	▪ Noise is always assessed and is adequately adjusted	.6798	.8335
	▪ Light is always assessed and is adequately adjusted	.5917	
	▪ Temperature is always assessed and is adequately adjusted	.6831	
	▪ Work station is always assessed and is adequately adjusted	.7090	
Organizational climate	▪ Speak up own ideas and act on problem solving	.5394	.8047
	▪ Friendly atmosphere at work	.5824	
	▪ Feel free to share ideas with supervisors	.6001	
	▪ Participating in company activities	.5182	
	▪ Receive essential information about important changes	.5674	
	▪ Receive useful information and feedback	.5688	
Organizational activities on safety and health	▪ Receive annual health examination	.5596	.7281
	▪ Receive annual safety training	.6537	
	▪ The company accident report is posted annually	.4563	
Environmental work conditions	▪ Feeling security and safety climate at work	.5611	.8321
	▪ Have potential hazards or unsafe conditions at work	.3339	
	▪ Signs about work and safety are posted	.6903	
	▪ Signs about work and safety are easy to read	.7000	
	▪ Work area is always clean	.7005	
	▪ Work area is always conveniently arranged	.6753	

Table 12 Correlation coefficients of the new constructs of the additional section between test and retest study (n = 828)

	retest_ Health and safety policies	retest_ Monitoring and control health hazards at work	retest_ Organizational climate	retest_ Health and safety activities	retest_ Safe working environment
Health and safety policies	**.574****				
Monitoring and control health hazards at work		**.567****			
Organizational climate			**.574****		
Health and safety activities				**.502****	
Safe working environment					**.563****

** Statistical significant level at 0.01

Table 13 Correlation coefficients between the scales of the new constructs of organizational section and psychological outcomes (n = 828)

Variables	Psychosomatic symptoms	Anxiety	Depression	Job satisfaction
Health and safety policies and practices (Factor 1)	-.057	**-.140****	**-.177****	**.523****
Monitoring and control health hazards at work (Factor 2)	**-.128****	**-.129****	**-.148****	**.369****
Organizational climate (Factor 3)	**-.205****	**-.138****	**-.258****	**.290****
Health and safety activities (Factor 4)	**-.100****	**-.141****	**-.189****	**.295****
Safe working environment (Factor 5)	**-.180****	**-.240****	**-.283****	**.325****

** Statistical significant level at 0.01

Table 14 Association of the new constructs of the additional section with psychological outcomes (N = 828)

	Psychosomatic symptoms			**Anxiety**			**Depression**			**Poor job satisfaction**		
	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value
▪ Health and safety policies'(F1)												
• Low level	NA			NA			NA			**1.99**	**1.34-2.95**	.001
• High level	1.00			1.00			1.00			1.00		
▪ Monitoring and control health hazards at work (F2)												
• Low level	NA			NA			NA			**2.08**	**1.45-2.30**	<.001
• High level	1.00			1.00			1.00			1.00		
▪ Organizational climate [Climate participation, Climate communication] (F3)												
• Low level	**2.55**	**1.75-3.71**	<.001	NA			NA			**2.45**	**1.65-3.63**	<.001
• High level	1.00			1.00			1.00			1.00		
▪ Health and safety activities (F4)												
• Low level	NA			NA			NA			NA		
• High level	1.00			1.00			1.00			1.00		
▪ Safe working environment (F5)												
• Low level	NA			**1.68**	**1.18-2.40**	.004	**2.64**	**1.67-4.18**	<.001	NA		
• High level	1.00			1.00			1.00			1.00		

NA: means the variable was not available in the model.

APPENDIX F

Post hoc analyses for gender and job position

Table 1 Frequencies of sample classified by gender and job position

Gender		Job position		Total
		Supervisors	**Operational workers**	
Male	Count	16	114	130
	Expected count	10.2	119.8	130
	% within gender	12.3	87.7	100%
	% within job position	27.1	16.5	17.3
	% of total	2.1	15.2	17.3
Female	Count	43	579	622
	Expected count	48.8	573.2	622
	% within gender	6.9	93.1	100%
	% within job position	72.9	83.5	82.7
	% of total	5.7	77	82.7
Total	Count	59	693	752
	Expected count	59	693	752
	% within gender	7.8	92.2	100
	% within job position	100	100	100
	% of total	7.8	92.2	100

χ^2 value = 4.328, df = 1, p-value = .037

Table 2 Comparison of mean differences of psychosocial work characteristics between female and male garment workers

	Mean	Standard Deviation	t-value	df	p-value
Effort					
Female	11.49	3.834	.222	794	.825
Male	11.41	3.766			
Reward					
Female	48.54	5.313	.422	794	.673
Male	48.33	5.611			
Overcommitment					
Female	14.31	2.571	1.278	794	.202
Male	14.00	2.421			
Psychological job demand					
Female	30.14	4.150	-.064	794	.949
Male	30.16	3.867			
Physical job demand					
Female	10.95	2.418	-1.483	794	.138
Male	11.29	2.070			
Job demand (Psychological and physical job demand)					
Female	41.09	5.681	-.674	794	.500
Male	41.45	5.095			
Emotional job demand					
Female	7.29	2.062	-.441	794	.659
Male	7.38	2.059			
Skill discretion					
Female	31.66	4.698	-2.048	794	.041*
Male	32.58	4.703			
Decision authority					
Female	30.33	5.110	-2.489	794	.013*
Male	31.51	4.031			

Table 2 Comparison of mean differences of psychosocial work characteristics between female and male garment workers. (Cont.)

	Mean	Standard Deviation	t-value	df	p-value
Job control (Skill discretion and decision authority)					
Female	61.99	8.105	-2.756	794	.006*
Male	64.09	7.193			
Macro-level decision authority					
Female	4.40	1.054	-2.517	794	.012*
Male	4.66	1.169			
Coworker support					
Female	11.67	1.238	-1.005	794	.315
Male	11.79	1.317			
Supervisor support					
Female	11.30	1.713	.182	790	.856
Male	11.27	1.693			
Total social support (Coworker and supervisor support)					
Female	22.97	2.449	-.423	790	.672
Male	23.07	2.463			
Policies and practices					
Female	24.57	5.064	-2.797	794	.005*
Male	25.91	4.622			
Organizational climate					
Female	37.27	7.176	-2.126	794	.034*
Male	38.73	7.253			
Environmental and physical work conditions					
Female	35.83	7.863	-.983	794	.326
Male	36.58	8.288			

* Level of significance at .05

Table 3 Comparison of mean differences of psychological outcomes between female and male garment workers

	Mean	Standard Deviation	t-value	df	p-value
Psychosomatic symptoms					
Female	3.90	10.054	.526	794	.599
Male	3.43	4.961			
Anxiety					
Female	6.54	7.194	.771	794	.441
Male	6.05	2.855			
Depression					
Female	4.73	6.142	.733	794	.464
Male	4.33	2.991			
Job satisfaction					
Female	71.29	11.900	-2.418	794	.016*
Male	87.09	16.849			

* Level of significance at .05

Table 4 Comparison of mean differences of psychosocial work characteristics between operational garment workers and supervisors

	Mean	Standard Deviation	t-value	df	p-value
Effort					
Operational workers	11.41	3.845	-2.178	750	.030*
Supervisors	12.54	3.569			
Reward					
Operational workers	48.49	5.422	-.487	750	.626
Supervisors	48.85	4.799			
Overcommitment					
Operational workers	14.08	2.513	-2.236	750	.026*
Supervisors	14.83	2.143			
Psychological job demand					
Operational workers	30.17	4.111	-1.178	750	.239
Supervisors	30.83	4.503			
Physical job demand					
Operational workers	11.26	2.199	3.459	750	.001*
Supervisors	10.22	2.407			
Job demand (Psychological and physical job demand)					
Operational workers	41.43	5.538	.503	750	.615
Supervisors	41.05	5.522			
Emotional job demand					
Operational workers	7.24	2.027	-.727	750	.468
Supervisors	7.44	2.199			
Skill discretion					
Operational workers	31.45	4.610	-5.530	750	<.001*
Supervisors	34.92	4.717			
Decision authority					
Operational workers	30.18	4.779	-6.957	750	<.001*
Supervisors	34.71	5.062			

Table 4 Comparison of mean differences of psychosocial work characteristics between operational garment workers and supervisors. (Cont.)

	Mean	Standard Deviation	t-value	df	p-value
Job control (Skill discretion and decision authority)					
Operational workers	61.63	7.616	-7.638	750	<.001*
Supervisors	69.63	8.839			
Macro-level decision authority					
Operational workers	4.30	0.963	-13.562	750	<.001*
Supervisors	6.10	1.157			
Coworker support					
Operational workers	11.64	1.228	-2.053	750	.040*
Supervisors	11.98	1.371			
Supervisor support					
Operational workers	11.26	1.698	-1.195	746	.232
Supervisors	11.53	1.847			
Total social support (Coworker and supervisor support)					
Operational workers	22.89	2.431	-1.910	746	.056
Supervisors	23.53	2.879			
Policies and practices					
Operational workers	24.53	5.049	-2.743	750	.006*
Supervisors	26.39	4.503			
Organizational climate					
Operational workers	37.03	7.228	-3.330	750	.001*
Supervisors	40.29	6.906			
Environmental and physical work conditions					
Operational workers	35.62	8.013	-1.666	750	.096
Supervisors	37.42	7.589			

* Level of significance at .05

Table 5 Comparison of mean differences of psychological outcomes between operational garment workers and supervisors

	Mean	Standard Deviation	t-value	df	p-value
Psychosomatic symptoms					
Operational workers	3.99	9.935	.904	750	.367
Supervisors	2.81	4.096			
Anxiety					
Operational workers	6.46	7.081	-.038	750	.969
Supervisors	6.49	2.732			
Depression					
Operational workers	4.74	6.038	-.096	750	.924
Supervisors	4.81	3.076			
Job satisfaction					
Operational workers	73.95	7.465	-.018	750	.986
Supervisors	74.12	7.337			

* Level of significance at .05

APPENDIX G

แบบสอบถามเลขที่ □□

แบบสอบถาม
เรื่อง
ปัจจัยสิ่งแวดล้อมในการทำงานด้านจิตสังคม

จัดทำโดย
นางสาวอาภรณ์ทิพย์ บัวเพ็ชร์

โปรดอ่านคำชี้แจงในการตอบแบบสอบถามอย่างละเอียด

<u>คำชี้แจง</u>

1. แบบสอบถามฉบับนี้เป็นส่วนหนึ่งของการทำวิทยานิพนธ์ระดับปริญญาเอก หลักสูตรสาธารณสุขศาสตรดุษฎีบัณฑิต (นานาชาติ) สาขาวิชาเอกการพยาบาลสาธารณสุข คณะสาธารณสุขศาสตร์ มหาวิทยาลัยมหิดล ดังนั้นท่านจะได้รับการอธิบายเกี่ยวกับรายละเอียดของการวิจัย และสิทธิของการเข้าร่วมเป็นผู้วิจัยอย่างละเอียดและเป็นที่เข้าใจดีแล้ว ก่อนการตัดสินใจเข้าร่วมการวิจัย
2. กรุณาอ่านข้อคำถามและวิธีการตอบคำถามให้เข้าใจก่อนการเลือกคำตอบ
3. กรุณาตอบคำถามจากความคิดเห็นที่เป็นจริงของท่าน
4. คำตอบของแบบสอบถามฉบับนี้**<u>ไม่มีคำตอบที่ถูกหรือผิด</u>** เนื่องจากคำถามได้สร้างขึ้นเพื่อวัดการรับรู้และความคิดเห็นของท่านที่มีต่อปัจจัยสิ่งแวดล้อมในการทำงานด้านจิตสังคม และภาวะสุขภาพ<u>ของท่านเท่านั้น</u>
5. หากท่านมีความคิดเห็นหรือข้อเสนอแนะอื่นๆเพิ่มเติม กรุณาเขียนข้อความลงในเนื้อที่ว่างท้ายแบบสอบถาม
6. หากท่านนำแบบสอบถามกลับไปทำที่บ้าน <u>กรุณานำแบบสอบถามที่ตอบเสร็จเรียบร้อยแล้วมาคืนให้กับผู้วิจัยในการนัดครั้งต่อไปด้วย</u>
7. แบบสอบถามฉบับนี้แบ่งออกเป็น 5 ส่วน คือ

ส่วนที่ 1เป็นข้อคำถามเกี่ยวกับข้อมูลทั่วไป (จำนวน 14 ข้อ)

ส่วนที่ 2เป็นข้อคำถามเกี่ยวกับเหตุการณ์ความเครียดในชีวิต (จำนวน 43 ข้อ)

ส่วนที่ 3เป็นข้อคำถามเกี่ยวกับปัจจัยสิ่งแวดล้อมในการทำงานด้านจิตสังคม (จำนวน 105 ข้อ)

ส่วนที่ 4เป็นข้อคำถามเกี่ยวกับภาวะสุขภาพทางด้านร่างกายและจิตใจ (จำนวน 38 ข้อ)

ส่วนที่ 5เป็นข้อคำถามเกี่ยวกับความพึงพอใจในการทำงาน (จำนวน 20 ข้อ)

◈การตอบแบบสอบถามอาจใช้เวลาประมาณ 60-90 นาที

หากท่านมีข้อสงสัยหรือไม่แน่ใจเกี่ยวกับคำถามข้อหนึ่งข้อใด กรุณานำมาสอบถามกับผู้วิจัยในการนัดหมายครั้งต่อไป

แบบสอบถามส่วนที่ 1
คำถามเกี่ยวกับข้อมูลทั่วไป

1. ปีเกิดของคุณคือ พ.ศ. ..... อายุ .....ปี

2. เพศของคุณคือ ❒ ชาย ❒ หญิง

3. สถานะภาพสมรส ❒โสด ❒ สมรส/อยู่ด้วยกัน ❒ หย่า/แยกกันอยู่ ❒ สามี/ภรรยาเสียชีวิต (เป็นหม้าย)

4. ระดับการศึกษาสูงสุด
   - ❒ ประถมศึกษา
   - ❒ มัธยมศึกษาตอนต้น
   - ❒ มัธยมศึกษาตอนปลาย/ปวช.
   - ❒ อนุปริญญา/วิทยาลัย (1-2 ปี)/ปวส.
   - ❒ ปริญญาตรี
   - ❒ สูงกว่าปริญญาตรี

5. สถานภาพการทำงานของคุณในปัจจุบันคือ
   - ❒ ทำงานแบบเต็มเวลา
   - ❒ อื่น ๆ (เช่น รายวัน รายสัปดาห์ รับงานไปทำที่บ้าน)โปรดระบุ .....

6. ตำแหน่งงานของคุณคือ

❒ ผู้ควบคุมดูแล/ผู้ตรวจการ หรือ หัวหน้างาน แผนก.....

❒ พนักงาน/ลูกจ้าง (ไม่ใช้แรงงาน/ทำงานในสำนักงาน) แผนก.....

❒ พนักงาน/ลูกจ้าง (ใช้แรงงาน/ทำงานในโรงงาน) แผนก.....

7. คุณทำงานในงาน/อาชีพปัจจุบันมานาน .....ปี…….เดือน

คุณทำงานในตำแหน่งปัจจุบันมานาน ……ปี…….เดือน

ตำแหน่งงานก่อนหน้านี้ คือ (โปรดระบุ)……

8. นอกเหนือจากงานประจำ คุณมีงานอื่นหรือไม่ ❒ มี (ระบุ.....) ❒ ไม่มี

9. โดยรวม คุณทำงาน (ที่รับค่าจ้าง) ใน 1 สัปดาห์ทำงาน .....วัน วันละ.....ชั่วโมง

10. คุณทำงานเป็นกะหรือไม่ ❒ ไม่ได้ทำงานกะ แต่ทำงานล่วงเวลา(OT)ในช่วงเย็นเป็นบางครั้ง

❒ ไม่ได้ทำงานกะ และไม่ได้ทำงานล่วงเวลา(OT)ในช่วงเย็น

❒ ใช่ ทำกะกลางคืนด้วย

❒ ใช่ แต่ไม่ทำกะกลางคืน

11. รายได้ของคุณ .....บาท/เดือน (โดยประมาณ)

❒ พอใช้เหลือเก็บ ❒ พอใช้ไม่เหลือเก็บ ❒ ไม่พอใช้แต่ไม่เป็นหนี้ ❒ ไม่พอใช้และมีหนี้

12. รายได้รวมของครอบครัวคุณ .....บาท/เดือน (โดยประมาณ)

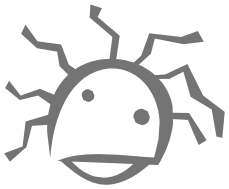
❒ พอใช้เหลือเก็บ ❒ พอใช้ไม่เหลือเก็บ ❒ ไม่พอใช้แต่ไม่เป็นหนี้ ❒ ไม่พอใช้และมีหนี้

13. ในระยะเวลา 1 ปีที่ผ่านมา คุณได้รับการวินิจฉัยจากแพทย์/จิตแพทย์ว่าเจ็บป่วยด้วยโรคทางจิต

❍ ไม่ใช่ ❍ ใช่ (ระบุชื่อโรค .....)

14. ในระยะเวลา 1 ปีที่ผ่านมา ครอบครัวหรือญาติสายตรงของคุณได้รับการวินิจฉัยจากแพทย์/จิตแพทย์ว่าเจ็บป่วยด้วยโรคทางจิต (เช่น โรคจิตเภท โรคอารมณ์แปรปรวน และโรคซึมเศร้า)

❍ ไม่ใช่ ❍ ใช่

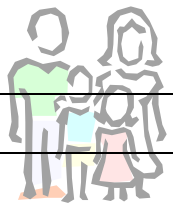


แบบสอบถามส่วนที่ 2
คำถามเกี่ยวกับเหตุการณ์ความเครียดในชีวิต

คำชี้แจง คำถามต่อไปนี้เป็นการสำรวจเกี่ยวกับเหตุการณ์ความเครียดที่เกิดขึ้นในชีวิตของคุณ ดังนั้นจึงไม่มีคำตอบที่ถูกหรือผิด กรุณาทำเครื่องหมาย☑ในช่องที่ตรงกับเหตุการณ์ที่เกิดขึ้นในชีวิตคุณ **ในช่วง 1 ปีที่ผ่านมา**

เหตุการณ์ในชีวิต(ในช่วง 1 ปีที่ผ่านมา)	*ใช่*	*ไม่ใช่*	*ไม่มีสามี/ภรรยา*
สุขภาพ 1. คุณเจ็บป่วยมากถึงกับต้องเข้ารับการรักษาในโรงพยาบาล			
2. คุณเจ็บป่วยไม่ถึงกับต้องเข้ารักษาในโรงพยาบาล แต่ต้องหยุดงานหรือหยุดทำกิจกรรมตามปกติ			
3. คุณดื่มเหล้า หรือสูบบุหรี่มากกว่าที่เคยดื่มหรือสูบ			
4. คุณมีการเปลี่ยนแปลงเกี่ยวกับแบบแผนการนอน (เช่น นอนไม่หลับ เข้านอนเร็วหรือนอนดึกกว่าปกติ)			
5. คุณมีการใช้กำลังแรงงานมากกว่าที่เคยทำ (เช่น ออกกำลังกายมากกว่าปกติ, ทำงานที่ออกแรงมากกว่าปกติ)			
6. คุณไม่มีกิจกรรมในการผ่อนคลายอารมณ์เลย (เช่น ชมภาพยนต์, ฟังเพลง)			
7. คุณเกี่ยวข้องกับผู้เป็นโรคติดต่อร้ายแรง (เช่น วัณโรค, โรคเอดส์)			
ครอบครัว 8. สามี/ภรรยาเสียชีวิต			
9. หย่า แยก			
10. สามี/ภรรยาเจ็บป่วยหนัก			
11. บุตรเสียชีวิต			
12. บุตรเจ็บป่วยหนัก			
13. คุณและสามี/ภรรยามีเรื่องบาดหมางกัน (เช่น สามี/ภรรยานอกใจ,			

สามี/ภรรยาชอบเที่ยว)			
14. คุณและสามี/ภรรยามีปัญหาเรื่องเพศสัมพันธ์			
15. บิดาหรือมารดาของคุณเจ็บป่วยหนัก			
16. บิดาหรือมารดาของคุณเสียชีวิต			
17. มีสมาชิกใหม่ในครอบครัว (เช่น มีบุตรคนใหม่ มีญาติมาอาศัยอยู่ด้วย)			
18. มีการโยกย้ายที่อยู่			
19. คุณและสามี/ภรรยาต้องจากกันนานๆ (6 เดือนขึ้นไป)			
เศรษฐกิจ 20. การใช้จ่ายเพื่อปัจจัย 4 (อาหาร เสื้อผ้า ยา และที่พัก) ในครอบครัวขัดสน ฝืดเคือง			
21. คุณหรือสามี/ภรรยามีหนี้สินล้นพ้นตัว			
22. คุณหรือครอบครัวต้องผ่อนส่งของที่มีราคาสูง (เช่น บ้าน ที่ดิน)			
เหตุการณ์ในชีวิต			
23. ครอบครัวของคุณถูกยึดหรือไล่ที่			
24. กิจการของคุณหรือครอบครัวขาดทุนหรือเลิกกิจการไป			
25. คุณต้องหาเลี้ยงครอบครัวแต่เพียงผู้เดียว			
การงาน 26. คุณเริ่มทำงานนอกบ้านเป็นครั้งแรก			
27. คุณถูกให้ออกจากงาน			
28. สามี/ภรรยาให้ออกจากงาน			
29. คุณตกงาน			
30. สามี/ภรรยาตกงาน			
31. คุณต้องรับผิดชอบการงานมากขึ้นจนไม่มีเวลาให้ครอบครัว			
32. คุณต้องทำงานที่ต้องเสี่ยงกับภาวะสุขภาพ			
33. คุณเปลี่ยนงานใหม่ซึ่งต้องมีการปรับตัว			
34. คุณทะเลาะกับนายจ้างหรือผู้บังคับบัญชา			
35. สามี/ภรรยาต้องรับผิดชอบการงานมากขึ้นจนไม่มีเวลาให้ครอบครัว			



สังคม 36.ครอบครัวของคุณประสบอุบัติภัยจนทรัพย์สินเสียหาย (เช่น ไฟไหม้บ้าน น้ำท่วมบ้าน)			
37. คุณต้องโทษ (สถานเบา โดยไม่ถูกคุมขัง หรือถูกขังไม่เกิน 3 เดือน)			
38. สามี/ภรรยาต้องโทษ (สถานเบา โดยไม่ถูกคุมขัง หรือถูกขังไม่เกิน 3 เดือน)			
39. คุณถูกทำร้ายร่างกายจนบาดเจ็บ			
40. สามี/ภรรยาถูกทำร้ายร่างกายจนบาดเจ็บ			
41. เพื่อนสนิทของคุณเสียชีวิต			
42. คุณหรือสามี/ภรรยาเสื่อมเสียชื่อเสียงเกียรติยศ (เช่น ก่อการทะเลาะวิวาท ถูกประจาน)			
43. สถานที่อยู่อาศัยของคุณหรือครอบครัวไม่มีความปลอดภัยในชีวิตหรือทรัพย์สิน (เช่น มีการลักขโมยบ่อยๆ มีเสียงดังรบกวน)			

แบบสอบถามส่วนที่ 3
คำถามเกี่ยวกับปัจจัยสิ่งแวดล้อมในการทำงานด้านจิตสังคม

3.1 คำถามเกี่ยวกับการทำงาน ตอนที่ 1 (ERIQ)

1. <u>คำแนะนำ</u> ข้อความต่อไปนี้เป็นข้อความเกี่ยวกับ<u>สถานการณ์การทำงานของคุณ**ในปัจจุบัน**</u> กรุณาตอบว่าคุณเห็นด้วยหรือไม่เห็นด้วยกับข้อความดังกล่าว <u>โดยทำเครื่องหมาย</u> ☑ <u>หน้าข้อความที่ตรงหรือใกล้เคียงกับความคิดเห็นของคุณมากที่สุด</u>เพียงคำตอบเดียว และกรุณาบอกระดับความรู้สึกของคุณที่มีต่อสถานการณ์นั้นๆ

(ขอขอบคุณสำหรับการตอบคำถาม)

เริ่มทำเวลา.....น.

1. ตลอดช่วงเวลาของการทำงาน ฉันรู้สึกกดดันเรื่องเวลาเนื่องจากปริมาณงานที่มีมาก/ลักษณะงานหนัก

- ❑ ไม่ใช่/ไม่เห็นด้วย
- ❑ ใช่/เห็นด้วย แต่ฉันไม่ได้รู้สึกทุกข์ใจ
- ❑ ใช่/เห็นด้วย และฉันรู้สึกทุกข์ใจบ้างเล็กน้อย
- ❑ ใช่/เห็นด้วย และฉันรู้สึกทุกข์ใจ
- ❑ ใช่/เห็นด้วย และฉันรู้สึกทุกข์ใจมาก

2. ฉันมีปัญหาเรื่องการถูกขัดจังหวะหรือถูกรบกวนในการทำงานบ่อยครั้ง

- ❑ ไม่ใช่/ไม่เห็นด้วย
- ❑ ใช่/เห็นด้วย แต่ฉันไม่ได้รู้สึกทุกข์ใจ
- ❑ ใช่/เห็นด้วย และฉันรู้สึกทุกข์ใจบ้างเล็กน้อย
- ❑ ใช่/เห็นด้วย และฉันรู้สึกทุกข์ใจ
- ❑ ใช่/เห็นด้วย และฉันรู้สึกทุกข์ใจมาก

3. ……..

- ❑ ……
- ❑ ……
- ❑ ……
- ❑ ……
- ❑ ……

4. ……

- ❑ ……..
- ❑ ……..
- ❑ ……..
- ❑ ……...
- ❑ ……

5. ……

6. ……

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17. จากการที่ฉันได้ใช้ความพยายามหรือทุ่มเทให้กับงาน รวมถึงความสำเร็จต่าง ๆ ในหน้าที่การงาน ฉันคิดว่าเงินเดือน/รายได้ของฉันจัดอยู่ในระดับที่เพียงพอ/เหมาะสมแล้ว

- ❑ ใช่/เห็นด้วย
- ❑ ไม่ใช่/ไม่เห็นด้วย แต่ฉันไม่ได้รู้สึกทุกข์ใจ
- ❑ ไม่ใช่/ไม่เห็นด้วย และฉันรู้สึกทุกข์ใจบ้างเล็กน้อย
- ❑ ไม่ใช่/ไม่เห็นด้วย และฉันรู้สึกทุกข์ใจ
- ❑ ไม่ใช่/ไม่เห็นด้วย และฉันรู้สึกทุกข์ใจมาก

2. <u>คำแนะนำ</u> ข้อความต่อไปนี้เป็นข้อความเกี่ยวกับ<u>สถานการณ์การทำงานของคุณ**ในปัจจุบัน**</u> กรุณาตอบว่าคุณเห็นด้วยหรือไม่เห็นด้วยกับข้อความดังกล่าว <u>โดยทำเครื่องหมาย</u> ☑ <u>ในช่องว่างที่ตรงหรือใกล้เคียงกับความคิดเห็นของคุณมากที่สุด</u>

ข้อความ	**ระดับของความคิดเห็น**			
	ไม่เห็นด้วยอย่างยิ่ง	**ไม่เห็นด้วย**	**เห็นด้วย**	**เห็นด้วยอย่างยิ่ง**
18. ฉันรู้สึกถูกกดดันได้ง่ายมากเมื่อมีเรื่องของเวลาเข้ามาเกี่ยวข้องในการทำงาน				
19. ……				

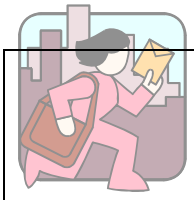
20. ……				
21. ……				
22. ……				
23. ถ้าวันนี้ฉันไม่สามารถทำงานที่ได้รับมอบหมายให้เสร็จตามเวลาที่กำหนด คืนนี้ฉันจะมีปัญหาในการนอนหลับ				

ทำเสร็จเวลา.....น.

3.2 คำถามเกี่ยวกับการทำงาน ตอนที่ 2 (JCQ)

<u>คำแนะนำ</u> ข้อความต่อไปนี้เป็นข้อความเกี่ยวกับ<u>สถานการณ์การทำงานของคุณ**ในปัจจุบัน**</u> กรุณาเลือกคำตอบและ<u>ทำเครื่องหมาย</u> ☑ <u>หน้าข้อความที่ใกล้เคียงกับความคิดเห็นของคุณมากที่สุด</u> เพียงคำตอบเดียว

เริ่มทำเวลา.....น.



ข้อความ	ระดับความคิดเห็น			
	ไม่เห็นด้วยอย่างยิ่ง	ไม่เห็นด้วย	เห็นด้วย	เห็นด้วยอย่างยิ่ง
1. งานของฉันต้องการความรวดเร็วมาก				
2. งานของฉันเป็นการทำงานที่หนักมาก				
3. ……				
4. ……				
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29. ในช่วง 5 ปีนี้ ความรู้ความสามารถ/ความชำนาญของฉันยังคงมีคุณค่าต่อการทำงาน				

30. ในแผนกการทำงานหรือหน่วยงานของท่านมีบุคลากรทั้งหมดกี่คน

❒ 2-5 คน ❒ 6-10 คน ❒ 10-20 คน ❒ 20 คนหรือมากกว่า ❒ ฉันทำงานคนเดียว

31. …….

❒ …….. ❒ …….. ❒ …… ❒ ……

❒ ……..

32. …….

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52. คุณคิดว่าระดับความชำนาญที่จำเป็นในงานที่ทำต้องอยู่ในระดับใด (จากการได้รับการฝึกอบรมอย่างเป็นทางการ โดยไม่จำเป็นต้องเป็นระดับเดียวกับวุฒิการศึกษาของคุณ)

❒ ระดับประถมศึกษา ❒ ระดับมัธยมศึกษาตอนต้น

❒ ระดับมัธยมศึกษาตอนปลาย ❒ ระดับอนุปริญญา/วิทยาลัย

❒ ระดับปริญญาตรี ❒ ระดับปริญญาโทหรือสูงกว่า

❒ ใช้เฉพาะประสบการณ์และไม่จำเป็นต้องจบการศึกษาในระดับใดๆ

ทำเสร็จเวลา.....น.

3.3 คำถามเกี่ยวกับการทำงาน ตอนที่ 3 (ปัจจัยด้านองค์กร)

<u>คำแนะนำ</u> ข้อความต่อไปนี้เป็นข้อความเกี่ยวกับ<u>สถานการณ์การทำงานของท่าน**ในปัจจุบัน**</u> กรุณาเลือกคำตอบและ<u>ทำเครื่องหมาย</u>✓<u>ในช่องว่างที่ใกล้เคียงกับความคิดเห็นของท่านมากที่สุด</u> เพียงคำตอบเดียว

เริ่มทำเวลา.....น.

ข้อความ	น้อยมาก	น้อย	บางส่วน	ค่อนข้างมาก	มากที่สุด
1. บริษัทมีการแจ้งให้พนักงานทุกคนได้รับทราบถึงนโยบายด้านสุขภาพและความปลอดภัยในการทำงานอย่างชัดเจน					
2. พนักงานของบริษัทได้ปฏิบัติตามนโยบายของบริษัทด้านสุขภาพและความปลอดภัยในการทำงาน					
3. ……					
4. ……					
5. ……..					
.					
.					
.					
.					
.					
29. บริเวณการทำงานของฉันได้รับการดูแลความสะอาด (จากบริษัท) เพื่อให้เกิดความปลอดภัยและสะดวกต่อการปฏิบัติงานอยู่เสมอ					
30. บริเวณการทำงานของฉันได้รับการดูแล (จากบริษัท) ให้มีความเป็นระเบียบเรียบร้อยเพื่อให้เกิดความปลอดภัยและสะดวกต่อการปฏิบัติงานอยู่เสมอ					

ทำเสร็จเวลา.....น.

แบบสอบถามส่วนที่ 4
คำถามเกี่ยวกับภาวะสุขภาพทางด้านร่างกายและจิตใจ

4.1 แบบสอบถามอาการทั่วไปที่อาจเกิดขึ้นเนื่องจากความครียด

คำแนะนำ ข้อความต่อไปนี้เป็นอาการทางร่างกายและจิตใจที่อาจเกิดขึ้นเนื่องจากคุณมีความเครียด จากงานขอให้คุณระบุความถี่ของอาการดังกล่าวภายในช่วงเวลา **6 เดือนที่ผ่านมา**โดยทำเครื่องหมาย ✓ ลงในช่องว่าง

อาการแสดง	ทุกวัน/ เกือบทุกวัน	ทุกสัปดาห์	ทุกเดือน	แทบจะไม่เกิดขึ้น/ไม่เคยเกิดขึ้นเลย
1. เสียด จุก แน่นบริเวณท้องหรือลิ้นปี่				
2. ปวดท้อง				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.....				
11.				
12.				
☹13. ปวดเมื่อยหรือปวดตึงตามกล้ามเนื้อ				
☹14. ปวดหลัง (บริเวณหลังส่วนล่าง)				
☹15. ปวดเจ็บตามข้อกระดูก เช่น ไหล่, เข่า, คอ				

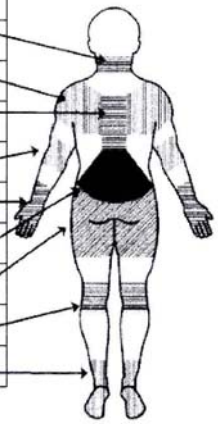
หมายเหตุ ☹ หากมีอาการในข้อ **13, 14 หรือ 15** กรุณาตอบแบบสอบถามหน้าถัดไปด้วย

แบบสอบถามความผิดปกติของระบบกระดูกและกล้ามเนื้อ
(Modified Nordic Musculoskeletal Questionnaire)

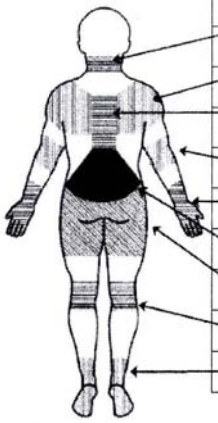
คำชี้แจง กรุณาทำเครื่องหมาย ✓ ลงในช่องว่าง ☐ ใช่ของบริเวณส่วนต่างๆของร่างกายที่คุณมีปัญหาความเจ็บปวดภายในช่วงระยะเวลา **6 เดือนที่ผ่านมา**

ซีกซ้ายของร่างกาย

6 เดือน	
☐ใช่	คอ
☐ใช่	ไหล่
☐ใช่	หลังส่วนบน
☐ใช่	ข้อศอก
☐ใช่	ข้อมือ
☐ใช่	หลังส่วนล่าง
☐ใช่	สะโพก/ต้นขา
☐ใช่	ข้อเข่า
☐ใช่	ข้อเท้า/เท้า



ซีกขวาของร่างกาย



	6 เดือน
คอ	☐ใช่
ไหล่	☐ใช่
หลังส่วนบน	☐ใช่
ข้อศอก	☐ใช่
ข้อมือ	☐ใช่
หลังส่วนล่าง	☐ใช่
สะโพก/ต้นขา	☐ใช่
ข้อเข่า	☐ใช่
ข้อเท้า/เท้า	☐ใช่

หากคุณมีอาการเจ็บปวดนอกจากบริเวณของร่างกายที่กำหนดให้ กรุณาระบุเพิ่มเติม

1. .....
2. .....
3. .....

4.2 แบบสอบถามภาวะความวิตกกังวลและภาวะซึมเศร้าฉบับภาษาไทย (Thai HADS)

<u>คำแนะนำ</u>

แบบสอบถามชุดนี้มีจุดมุ่งหมายที่จะช่วยให้ผู้ดูแลรักษาเข้าใจอารมณ์ความรู้สึกของคุณในขณะเจ็บป่วยได้ดีขึ้น กรุณาอ่านข้อความแต่ละข้อและ<u>ทำเครื่องหมาย</u> ✓ <u>ในช่องคำตอบที่ใกล้เคียงกับ ความรู้สึกของคุณในช่วง **1 สัปดาห์ที่ผ่านมา** มากที่สุด</u>

1. ฉันรู้สึกตึงเครียด
   ☐ เป็นส่วนใหญ่ ☐ บ่อยครั้ง ☐ เป็นบางครั้ง ☐ ไม่เป็นเลย
2. ฉันรู้สึกเพลิดเพลินใจกับสิ่งต่างๆ ที่ฉันเคยชอบได้
   ☐ เหมือนเดิม ☐ ไม่มากเท่าแต่ก่อน ☐ มีเพียงเล็กน้อย ☐ เกือบไม่มีเลย
3. ฉันมีความรู้สึกกลัว คล้ายกับว่ากำลังจะมีเรื่องไม่ดีเกิดขึ้น
   ☐ มี และค่อนข้างรุนแรงด้วย ☐ มี แต่ไม่มากนัก
   ☐ มีเพียงเล็กน้อยและไม่ทำให้กังวลใจ ☐ ไม่มีเลย

4. ฉันสามารถหัวเราะและมีอารมณ์ขันในเรื่องต่างๆได้
   ☐ เหมือนเดิม ☐ ไม่มากนัก ☐ มีน้อย ☐ ไม่มีเลย
5. ฉันมีความคิดวิตกกังวล
   ☐ เป็นส่วนใหญ่ ☐ บ่อยครั้ง ☐ เป็นบางครั้ง แต่ไม่บ่อย ☐ นานๆครั้ง
6. ฉันรู้สึกแจ่มใสเบิกบาน
   ☐ ไม่มีเลย ☐ ไม่บ่อยนัก ☐ เป็นบางครั้ง ☐ เป็นส่วนใหญ่
7. ฉันสามารถทำตัวตามสบาย และรู้สึกผ่อนคลาย
   ☐ ได้ดีมาก ☐ ได้โดยทั่วไป ☐ ไม่บ่อยนัก ☐ ไม่ได้เลย
8. ฉันรู้สึกว่าตัวเองคิดอะไร ทำอะไร เชื่องช้าลงกว่าเดิม
   ☐ เกือบตลอดเวลา ☐ บ่อยมาก ☐ เป็นบางครั้ง ☐ ไม่เป็นเลย
9. ฉันรู้สึกไม่สบายใจ จนทำให้ปั่นป่วนในท้อง
   ☐ ไม่เป็นเลย ☐ เป็นบางครั้ง ☐ ค่อนข้างบ่อย ☐ บ่อยมาก
10. ฉันปล่อยเนื้อปล่อยตัว ไม่สนใจดูแลตนเอง
    ☐ ใช่ ☐ ไม่ค่อยใส่ใจเท่าที่ควร ☐ ใส่ใจน้อยกว่าแต่ก่อน ☐ ยังใส่ใจตนเองเหมือนเดิม
11. ฉันรู้สึกกระสับกระส่าย เหมือนกับจะอยู่นิ่งๆ ไม่ได้
    ☐ เป็นมากทีเดียว ☐ ค่อนข้างมาก ☐ ไม่มากนัก ☐ ไม่เป็นเลย

12. ฉันมองสิ่งต่างๆในอนาคต ด้วยความเบิกบานใจ

☐ มากเท่าที่เคยเป็น ☐ ค่อนข้างน้อยกว่าที่เคยเป็น

☐ น้อยกว่าที่เคยเป็น ☐ เกือบจะไม่มีเลย

13. ฉันรู้สึกผวาหรือตกใจขึ้นมาอย่างกระทันหัน

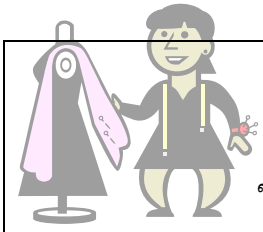
☐ บ่อยมาก ☐ ค่อนข้างบ่อย ☐ ไม่บ่อยนัก ☐ ไม่มีเลย

14. ฉันรู้สึกเพลิดเพลินไปกับการอ่านหนังสือ ฟังวิทยุ หรือดูโทรทัศน์ หรือกิจกรรมอื่นๆที่เคยเพลิดเพลินได้

☐ เป็นส่วนใหญ่ ☐ เป็นบางครั้ง ☐ ไม่บ่อยนัก ☐ น้อยมาก

แบบสอบถามส่วนที่ 5
คำถามเกี่ยวกับความพึงพอใจในการทำงาน

<u>คำแนะนำ</u> ข้อความต่อไปนี้เกี่ยวข้องกับความรู้สึกที่คุณมีต่อ<u>การทำงาน**ในปัจจุบัน**</u>
กรุณาทำเครื่องหมาย ✓ ลงในช่องว่างตามระดับความรู้สึกพึงพอใจ



ข้อความ	ระดับความพอใจ				
	ไม่พอใจมาก	ไม่พอใจ	เฉยๆ	พอใจ	พอใจมาก
1. ฉันพอใจที่ฉันยุ่งกับงานอยู่ตลอดเวลา					
2. ฉันพอใจที่มีโอกาสได้ทำงานคนเดียว					
3. ฉันพอใจที่มีโอกาสทำงานที่แตกต่างกันบ้างในบางช่วงเวลา					
4. ฉันพอใจที่มีโอกาสเป็นส่วนหนึ่งของสังคมในที่ทำงาน					
5. ฉันพอใจกับวิธีที่หัวหน้าปฏิบัติต่อลูกน้อง					
6. ฉันพอใจกับความสามารถในการตัดสินใจของหัวหน้า					

7. ฉันพอใจในความสามารถของตัวเองที่จะทำสิ่งต่าง ๆ ได้โดยไม่ขัดกับความรู้สึก					
8. ฉันพอใจกับงานที่มั่นคงของฉัน					
9. ฉันพอใจที่มีโอกาสทำสิ่งต่าง ๆ ให้ผู้อื่น					
10. ฉันพอใจที่มีโอกาสบอกผู้อื่นว่าควรทำอะไร					
11. ฉันพอใจที่มีโอกาสใช้ความสามารถในการทำงานบางอย่าง					
12. ฉันพอใจกับนโยบายของบริษัทที่จะนำไปสู่การปฏิบัติได้					
13. ฉันพอใจกับเงินค่าจ้างที่ได้รับและปริมาณงานที่ทำอยู่					
14. ฉันพอใจในโอกาสก้าวหน้าของงานที่ทำอยู่					
15. ฉันพอใจกับการมีอิสระในการตัดสินใจด้วยตัวเอง					
16. ฉันพอใจกับการได้มีโอกาสลองใช้วิธีการของฉันในการทำงาน					
17. ฉันพอใจกับเงื่อนไขการทำงาน					
18. ฉันพอใจที่ผู้ร่วมงานเข้ากันได้					
19. ฉันพอใจกับการชื่นชมหรือคำชมที่ได้รับเมื่อทำงานดี					
20. ฉันพอใจกับความรู้สึกว่าตนเองประสบความสำเร็จจากงาน					

#ขอขอบคุณอย่างยิ่งที่ท่านกรุณาตอบคำถาม#

BIOGRAPHY

NAME	Miss Aporntip Buapetch
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