Chapter 1

General introduction
Background and motives

Psychological and musculoskeletal health complaints are frequently reported in the general (working) population (e.g. Ihlebæk et al., 2002; Paoli and Merlié, 2001). In Europe, for instance, psychological health complaints (overall fatigue) and musculoskeletal health complaints (e.g. back complaints) are reported by 23-38 percent of the active workers (Paoli and Merlié, 2001). The prevalence of the above-described health complaints indicates that having these complaints is common and need not interfere with social functioning. However, when these complaints become more serious, coincide with illness, disease or are thought to be work-related, it may compel workers to report themselves absent from work. Tellnes and Bjerkedal (1989) showed that more than half of the sickness absence days in Norway is due to musculoskeletal health complaints. Nystuen et al. (2001) found that psychological health complaints accounted for one third of the sickness absence days in the same country. In the Netherlands, psychological and musculoskeletal health complaints account for the majority of sickness absence days also (Houtman, 1997; Houtman et al., 2002). Similar figures are observed in countries such as the United Kingdom (Stansfeld et al., 1995), Sweden (Hensing et al., 1997) and Japan (Muto et al., 1999). From a societal perspective, it is assumed that the transition from harmless health complaints to invalidating health conditions, manifested in sickness absence, is a continuous process influenced by several factors. One factor is the exposure to stressful working conditions (e.g. Karasek and Theorell, 1990; Siegrist, 1996; North et al., 1996; Kivimäki et al., 1997, 2001; Niedhammer et al., 1998; Marmot et al., 1999).

Epidemiological research shows that psychological and musculoskeletal health complaints are prevalent in the working population of truck drivers as well (e.g. Frymoyer et al., 1980; Van der Beek et al., 1993; Orris et al., 1997). For instance, Van der Beek and colleagues found that one out of every two Dutch truck drivers and one out of every four Dutch truck drivers suffered from regular pain or stiffness in the back and neck, respectively. Orris et al. (1997) demonstrated that, compared to the general US working population, American package truck drivers reported a significantly higher level of psychological health complaints (e.g. feelings of distress and anxiety). The high prevalence of the above-described health complaints among truck drivers is reflected in the sickness absence diagnoses of Dutch truck drivers visiting the occupational physician for a sickness absence consultation. These data, registered by the Central Bureau of Occupational Health Care in Road Transport (BGZ Wegvervoer) show that the physicians attributed 44 and 16 percent of the drivers’ absence incidences to musculoskeletal and psychological health complaints, respectively (Kloosterboer and Bosch, 1999). These registered data indicate that
musculoskeletal and psychological health complaints are the most important causes of sickness absence in the population of Dutch truck drivers.

Until now, occupational health research in truck drivers has focused primarily at the detrimental influence of physical working conditions such as (un)loading activities (Van der Beek et al., 1993), the exposure to vibration (Huishof and Veldhuijzen-Van Zanten, 1987; Palmer et al., 2000), and the exposure to draught and dust (Guillemin et al., 1992). Other factors that have received attention include the health influence of work-related lifestyle conditions such as smoking, eating habits, the lack of physical exercise, and the long and irregular working hours (Hedberg et al., 1993; Hedberg et al., 1998). The possible detrimental influence of stressful working conditions among truck drivers, on the other hand, has not received much attention in occupational health research. In this respect, research among professional drivers has been directed primarily at public bus drivers. Research, reviewed by Kompier and DiMartino (1995) and Evans (1994), has evidenced that stressful working conditions in these professional drivers may negatively affect their health. More recently, studies by Krause et al. (1998) and Rydstedt et al. (1998) affirmed that (changes in) the bus drivers' psychological job demands were predictive of the occurrence of back disorders, spillover of fatigue, and psychosomatic complaints.

Several changes over the last decades in the work (environment) of truck drivers suggest that stressful working conditions may lead to health problems in these professional drivers as well. One relevant change in this respect concerns the growing problem of road traffic congestion resulting in feelings of time pressure for two thirds of the international Dutch truck drivers (Kloosterboer and Bosch, 1999). Another relevant change concerns the entry of the 24 hours economy and the concurrent demand for just-in-time deliveries. Consignors (i.e. firms who use road transporters’ service for the supply and delivery) are posing a heightened demand on the competitive road transport industry for “just-in-time deliveries” or “on-demand transport”. These increased transportation demands seem to be more or less directly mirrored in increased psychological job demands for the truck drivers (Hamelin, 2001). A third change that should be considered relates to the entry of communication technology in the road transport industry. An increasing number of road transport companies are equipping their trucks with On Board Computer-systems (OBC-systems) to collect information about among others location via Global Positioning Systems (GPS), waiting times, and queues. De Croon et al. (submitted) showed that the application of On Board Computer Systems was associated with decreased job control for the Dutch truck drivers under study. According to De Croon et al. (submitted), truck drivers negatively perceive the application of OBC-systems in the truck as an employer’s
means to monitor continuously their work performance. The changing nature of work, presumably resulting in an increased exposure to stressful working conditions in truck drivers, forms the primary motive of the present thesis on stressful working conditions, sickness absence and turnover in truck drivers.

Conceptual model
Several occupational stress and health models are available that can help to design a study on stressful working conditions, sickness absence and turnover in an occupation such as truck driving (see for an overview Cooper, 1998). The concepts of psychological job demands and job control of Karasek’s Job Demand-Control model (Karasek, 1979) and the concept of need for recovery after work of the effort-recovery model (Meijman et al., 1990;1992; Sluiter et al., 1999a;2001) constituted the basic conceptual model for this research (see Figure 1). Underneath, the concepts within this theoretical frame are described consecutively.

Stressful working conditions: job demands and job control
The Job Demand-Control Model (JD-C Model) (Karasek, 1979) is a situation-centered model according to which the primary sources of stressful work lie within two basic characteristics of the job itself: (1) psychological job demands and (2) decision latitude. According to Karasek and Theorell (1990), work load, measured at a general level with subjective items such as 'work hard' and 'excessive work', is the central component of the psychological job demands dimension. Decision latitude (job control) consists of two sub concepts: decision authority and skill discretion. Decision authority is defined as the social authority over making decisions (Karasek and Theorell, 1990). Skill discretion refers to the breadth of skills available on the job. According to the JD-C Model, the most negative health effects of stressful working conditions will occur when the psychological job demands are high and job control is low. In 1990, Karasek and Theorell (Karasek and
Theorell, 1990) added a social support dimension to the JD-C Model. The extended Job demand-control-support Model (JD-CS Model) states that working situations which are characterized by high demands, low control and low social support have the most negative health effects.

The model of job demands and job control distinguishes itself from other occupational stress models by its popularity, its simplicity, and the extent to which it has received empirical support. In fact, reviews affirming that the model is predictive of health complaints or illness and disease indicate that the model is suitable for further investigation (e.g. Schnall et al., 1994; Kristensen, 1995; 1996; Van der Doef and Maes, 1998; 1999).

Despite the above assets of the JD-C Model, several limitations of the model (e.g. De Jonge and Kompier, 1997; Jones et al., 1998) should be taken into account before applying the model to truck drivers. In particular, the JD-C Model's description of stressful working conditions is rather global. The model generalizes across occupations, assuming that individuals will experience the same stressful working conditions and will display the same reactions to stressful working conditions in different work environments. However, it appears that, depending on the occupation under consideration, different stressful working conditions are more or less strongly related to health complaints (Narayanan et al., 1999; Sparks and Cooper, 1999). Alongside, workers in different occupations may react in dissimilar ways to stressful working conditions (Narayanan et al., 1999).

Short-term reaction to stressful working conditions: Need for recovery after work
Several "exposure time models" are available that can be used to examine the temporal relation between stressful working conditions on the one hand and sickness absence and employee turnover on the other hand (e.g. Frese and Zapf, 1988). In the present study, the effort-recovery Model of Meijman et al. (1990;1992) and Sluiter et al. (1999a;2001) is used as the theoretical background to examine how stressful working conditions affect sickness absence and turnover in truck drivers in the course of time. According to this model, the experienced need for recovery after work is a core intervening variable in the relation between stressful working conditions on the one hand and work-related illness/diseases and coinciding sickness absence on the other hand. Specifically, these researchers hypothesize that those workers who, due to stressful work, recover insufficiently after work (expressed as high needs for recovery) have to exert additional efforts to cope adequately with the demands of the job the next working day. Because of these additional efforts, the workers will experience more need for recovery after that
working day. When stressful working conditions are chronic, and opportunities to recuperate are insufficient, this process may start a vicious circle in which high needs for recovery after work require more efforts during the next working day, which, in turn, results in higher needs for recovery after that working day. The consequence of this vicious circle is cumulated fatigue, which may result in illness or disease in the longer term. In this study it is assumed that this health deterioration will be manifested in sickness absence and/or employee turnover in the long run.

The concept of need for recovery after work as a short-term work stress reaction is assumed to play a role with respect to the explanation of work-stress related illness/disease and coinciding sickness absence in truck drivers in particular. Research (Milosevic, 1997) has evidenced that recovery after work in truck drivers is often insufficient. Moreover, psycho-physiological research has provided evidence that insufficient recovery after work in this occupation is positively related to psychosomatic health complaints (Kuiper et al., 1997).

Long-term reaction to stressful working conditions: sickness absence and employee turnover

Sickness absence
Sickness absence for more than 14 working days is chosen as a long-term outcome of stressful working conditions in this thesis. This choice is made because research (e.g. Kristensen, 1991; Marmot et al., 1995; Kivimäki et al., 1997,2001; Burdorf et al. 1998; Smulders and Nijhuis, 1999, Sandanger et al. 2000; Bourbannais and Mondor, 2001, Erikson et al., 2001) showed that sickness absence of a prolonged duration is the outcome of psychological and musculoskeletal illness and disease to a large degree. Furthermore, sickness absence is important as a measure of the use of health services and as a cause of lost productivity (e.g. Marmot et al., 1995; Schaufeli and Kompier, 2001). In the Netherlands, for instance, in 1998, sickness absence represented 5.6 percent of the total working time (Schaufeli and Kompier, 2001). In Belgium, the total percentage of working days lost in 1995 because of sickness absence was estimated to be 7 percent. Similar figures are found in other western countries as was presented in an overview by Whitaker (2001).

Employee turnover
To make inferences about the causality of the relationship between the exposure to stressful working conditions and long-term sickness absence, prospective cohort research
is invaluable. A common methodological difficulty in this type of research, however, is attrition of workers who retire or change jobs during the follow-up period. Consequently, questions may arise about the power of the chosen study design, and the generalizability of the results. Moreover, in general, workers who quit their job may manifest an adaptive behavioral "withdrawal" reaction to cope with the accumulated work stress reactions of a chronic stressful job (e.g. Griffeth et al., 2000). This health behavior of workers may attenuate prospective relationships between stressful working conditions and the occurrence of long-term reactions such as prolonged sickness absence. For this reason, employee turnover is chosen as the second outcome of stressful working conditions in this thesis.

The primary questions of this thesis

1. To what extent are stressful working conditions in truck drivers predictive of sickness absence and turnover?

2. Does need for recovery after work play an intervening role in the presumed relationship between stressful working conditions on the one hand and sickness absence and turnover in truck drivers on the other hand?

It is expected that stressful working conditions in terms of high job demands and low job control are predictive of future long-term sickness absence and turnover in truck drivers. With respect to the second question, it is hypothesized that need for recovery after work mediates the prospective relationship between stressful working conditions on the one hand and long term sickness absence and employee turnover on the other hand.

The secondary aims of this thesis

For answering the two questions of this thesis, a subordinate aim of this research is to construct and validate an occupation-specific model of job demands and job control, which is useful in describing the stressful working conditions of truck drivers. As noted previously, workers in different occupations often do not experience the same stressful working conditions. Accordingly, it is hypothesized that the inclusion in the JD-C Model of (potentially stressful) job demands, which are specific for truck driving, improves the predictive power of this model with respect to health complaints in truck drivers.
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Another subordinate aim of this study is to develop and validate a short and user-friendly occupation-specific questionnaire to measure work stress reactions in truck drivers. As noted previously, workers in different occupations may perceive and react to stressful working conditions in different manners. Accordingly, it is expected that a questionnaire that is tailor-made for the occupation of truck driving will show (1) high internal consistency and satisfactory test-retest reliability and (2) will show favorable construct validity and criterion validity.

Outline of this thesis

Chapter 2 describes the results of a cross-sectional questionnaire study examining the association between stressful working conditions, in terms of the original Job Demand-Control Model, and psychosomatic health complaints in truck drivers. In Chapter 3, the predictive validity of the Job Demand-Control Model, now specified for the occupation of truck driving, is examined using fatigue and job dissatisfaction as health and well-being outcomes. Chapter 4 addresses the longitudinal relationship between occupation-specific stressful working conditions, need for recovery after work and sickness absence in truck drivers. Chapter 5 presents the results of a longitudinal study in which the relationship between occupation-specific stressful working conditions, need for recovery after work and turnover in truck drivers is examined. In Chapter 6 and Chapter 7, the results of two cross-sectional questionnaire studies (Chapter 6) and one prospective cohort study (Chapter 7) are described. These studies were conducted to develop and validate a short and user-friendly occupation-specific questionnaire measuring reactions to stressful working conditions (i.e. psychological job strain) in truck drivers. Finally, Chapter 8 presents the general discussion. In this chapter, the theoretical and practical implications of the research findings as well as the methodological considerations regarding the studies in this thesis are addressed.